OCEAN

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Outer Cape Environmental Awareness Newsletter

This 22nd Issue of OCEAN introduces some unpleasant news about transdermal chemicals in our environment and the consequences of changing weather. OCEAN is the educational publication of Safe Harbor, written and distributed for educational use. Thank you for sharing it where it may be useful. A special thanks to Whitney Johnson, of London, England, for her creative talent and generous efforts in the formatting and production of OCEAN 22.

~ Gordon Peabody, Editor

SERIES OF INTENSE STORMS SLAM CAPE COD

The winter of 2013 has kept on giving, right up to press time for OCEAN 22. This winter's unwelcome convergence of the sub tropical and sub arctic jet stream brought together minus 70 °F Greenland temps, with 90 °F air from the Gulf of Mexico. An unending series of these more intense storms were incorrectly referred to as "nor'easters". These were mini-Mega storms, boasting diameters of a thousand miles and barometric pressures competing with hurricanes. Because of the longer duration of these week after week, mini-Mega storms, coastal communities crumbled around the edges.

"Chronicle" TV program visits dune restoration at Ballston. Photo by Lara Henry.

The deeper causes of these storms will be discussed in OCEAN 23. As a footnote, these systems crossed the Atlantic and created havoc in the UK. (See "Extremes in Severe Weather Persist in UK" this issue).

Ocean storms send flood waters a mile inland.

Coastal dunes are a natural, protective landform that can significantly reduce storm damage. Safe Harbor Environmental has spent the past few years developing a coastal dune restoration system powered by storm winds. Called Biomimicry, Safe Harbor's strategy utilizes inexpensive cedar shims set into the sand, mimicking native beach vegetation by collecting and stabilizing wind blown sand. Safe Harbor's Biomimicry restoration of a Cape Cod Barrier dune system was featured on Boston CH 5 TV program "Chronicle."

SERIES OF INTENSE STORMS SLAM CAPE COD *Continued*

Simple ideas can be difficult to understand.
Photo by Nadia Bricault.

To see our segment on Chronicle: http://youtu.be/WhIeGvG8caw

Biomimicry restored this previously eroded dune with 24 verticle feet of new sand. Photo by Gordon Peabody

For more information on Biomimicry:
http://safeharborenv.com/services/biomimicry-creating-land-from-air/
http://safeharborenv.com/wp-content/uploads/2012/12/BIOMIMICRY-VIDEO.mp4

OCEAN 2013 ACHIEVEMENT AWARDS

OCEAN has selected recipients for this year's Environmental Achievement Awards. These recipients represent their colleagues and the many individuals among us who lead by example.

OCEAN Environmental Initiative Award

Newburyport MA Conservation Agent Julia Godtfredsen, with concerned property owner, and Safe Harbor Director Gordon Peabody.
Photo by Nadia Bricault.

City of Newburyport, MA Conservation Agent **Julia Godtfredsen**. Julia's coastal community of Newburyport has been featured, along with nearby towns, as an epicenter for devastating coastal erosion. Though City Mayor Donna Holaday thought they "had already seen every possible solution," Julia took initiative, on behalf of her community, to investigate one more, unusual coastal restoration system, powered by storm winds. Newburyport began using Biomimicry a week later.

OCEAN Environmental Education Award

Thank you to **Robert Sachs** and **Caroline Taggart** for their generous contribution to Safe Harbor's Environmental Education Program.

OCEAN Biomass Recycling Initiative Award

Thank you to Cape residents **Frank Wennick**, and **John Oslund** for specifying that firewood removed from their property be distributed within their community.

OCEAN Student Achievement Award

Milo Cress is a young student from North Truro, MA (and recently of Vermont) who launched a campaign ("I Go Strawless") earlier this year to encourage individuals and businesses to reduce the large numbers of plastic, one-time use drinking straws they use. He quotes a statistic that says 500 million straws a day (or about one-and-a-half straws a day per person) are used in the US and he's asking restaurants to take a no-straws pledge (except when customers request a straw for their drinks). He's suggesting regular

Student launches "I Go Strawless" campaign.

OCEAN 2013 ACHIEVEMENT AWARDS *Cont.*

straw users buy re-useable straws (steel, glass, bamboo), or biodegradable paper straws. Links to find re-useable straws appear below. Milo says he's not anti-plastic straw, just the automatic distribution of straws when they may not be needed.

For more information or to buy glass straws:

http://glassdharma.com/ (and lots of large retailers, like Target)

http://www.capecodonline.com/apps/pbcs.dll/article?AID=/20111103/NEWS/111030330

OCEAN Environmental Educator Award

Robert Burns, Environmental Studies teacher at Monomoy Regional High School, offers his students real time, "boots on the ground" opportunities outside the classroom. His students have worked with Safe Harbor as volunteers, on numerous coastal restoration projects.

Link to recent article: http://www.capecodonline.com/apps/pbcs.dll/gallery?Site=CC&Date=20130213&Category=MEDIA01&ArtNo=213009996&Ref=PH&SectionCat=SPECIAL48&Presentation=desktop#img-2.

OCEAN Environmental Achievement Award

Scott Landry, Director of Whale Disentanglement Program, Provincetown Center for Coastal Studies. Though Scott will be first to acknowledge that he works with a team and is uncomfortable taking credit for his work, this award recognizes: his leadership in teaching fellow professionals; his commitment to educating the public; and (by the way) risking his life to free tangled 50 ton whales. For more information or to support PCCS visit http://www.coastalstudies.org/what-we-do/whale-rescue/introduction.htm

PCCS Team approaches entangled whale.

OCEAN Thanks to **Russ Cohen**, of the MA Division of Ecological Restoration, for his consistent support in sharing relevant topics with us.

USE CAUTION WITH TRANS DERMAL HAND SANITIZERS

By OCEAN Researcher Lauren Bamford (3/9/2013), with contribution by OCEAN Assistant Editor Nadia Bricault

Recent studies have caused the FDA to think twice about the pervasive use of a common household bactericide, triclosan (Triclosan, 2012). Triclosan, which inhibits bacterial growth by specifically inhibiting an enzyme required for bacterial lipid biosynthesis (Levy, 1999), can be found in a wide variety of products from children's toys to toothpastes, [handsanitizers], and cosmetics (Triclosan, 2012). Although triclosan is effective in Colgate Total toothpaste in preventing gingivitis (Triclosan, 2012), recent findings suggest that the chemical may be more harmful than beneficial. A study published in 2000 found that triclosan easily enters the bloodstream through dermal absorption (Howes et al, 2000). Another study conducted in Sweden found the chemical in three out of five human breast milk samples as well as in fish exposed to wastewater (Adolfsson-Erici, 2002). Most recently, a team of researchers from the University of California, Davis has found that triclosan impairs the functioning of striated muscle cells in humans and whole muscles in mice and minnows (Cherednichenko, 2012). The chemical appears to function by impairment of the calcium dynamics required for communication between two proteins required for muscle contraction (Stromberg, 2012). In light of these and other findings indicating potential negative health impacts, the FDA is "reviewing all of the available evidence on this ingredient's safety in consumer products" (Triclosan, 2012).

The full report is posted on our website: http://safeharborenv.com/environmental-initiatives/triclosan-transdermal-chemicals-in-your-body/

Read More at:

http://www.fda.gov/forconsumers/consumerupdates/ucm205999.htm

http://blogs.smithsonianmag.com/science/2012/08/triclosan-a-chemical-used-in-antibacterial-soaps-is-found-to-impair-muscle-function/

http://health.howstuffworks.com/wellness/preventive-care/triclosan-free-hand-sanitizer.htm

LIFESTRAW

Thanks to OCEAN Researcher Lauren Bamford (3/26/2013)

An estimated 884 million people in the world do not have access to the most basic necessities; the majority of these people come from the poverty stricken developing parts of the world and need an efficient and affordable way to obtain clean drinking water (The Lifestraw® Concept 2013). The Lifestraw® is a new and recently awarded invention that may provide an efficient and affordable solution. According to the manufacturer, Vestergaard Frandsen, this innovative and compact tool filters out waterborne bacteria and protozoan parasites as well as microscopic particles, leading to easy access to safe drinking water in virtually any location (Lifestraw 2013). The device works using three different compartments: a plastic mesh screen which filters out larger particles, an ion exchange system which releases the disinfectant iodine, and a system which uses silver as a second disinfectant (Walters 2008). While providing safe drinking water to nearly 4.5 million people in the Western Province of Kenya through distribution of the device, the company has also reduced carbon emissions in these communities by 1.4 million tons in only six months simply because residents no longer needed to burn wood to boil contaminated water (How Carbon 2013). Through Vestergaard Frandsen's "Carbon for Water" campaign, the company hopes to use the carbon credits received to reinvest and distribute even more Lifestraws® to impoverished communities, providing even more people with clean drinking water while also reducing carbon emissions by over 2 million tons a year (How Carbon 2013).

Innovative water filter system.

Read more:

http://www.vestergaard-frandsen.com/carbon-for-water/how-it-works.html

JUST UNCOMFORTABLE INFORMATION

Thanks to OCEAN Researcher Eliza Ives

One of our most careful researchers helped us with this article but because it deals with such uncomfortable information, we have been sitting on it. We finally decided to post the complete article on our website and provide an abstract in OCEAN.

Phthalates, called "plasticizers," are a group of industrial chemicals used to make plastics like polyvinyl chloride (PVC) more flexible or resilient and also as solvents. Phthalates are nearly ubiquitous in modern society, found in, among other things, toys, food packaging, hoses, raincoats, shower curtains, vinyl flooring, wall coverings, lubricants, adhesives, detergents, nail polish, hair spray and shampoo.

Phthalates have been found to disrupt the endocrine system. Several phthalate compounds have caused reduced sperm counts, testicular atrophy and structural abnormalities in the reproductive systems of male test animals, and some studies also link phthalates to liver cancer, according to the U.S. Center for Disease Control's 2005 National Report on Human Exposure to Environmental Chemicals. Though the CDC contends the health hazards of phthalates to humans have not been definitively established, for some years, the U.S. Environmental Protection Agency has regulated phthalates as water and air pollutants.

In July 2008, as a result of pressure from EWG and other health groups, the U.S. Congress passed legislation banning six phthalates from children's toys and cosmetics.

Plastics are widely used in modern life. Bisphenol A (BPA, 2,2-bis(4-hydroxyphenyl)propane) is used in the production of polycarbonate plastic containers such as baby bottles and resins that line metal cans for food and beverages. BPA is also used as a plasticizer to soften and increase the flexibility in polyvinyl chloride (PVC) plastic products, printer ink and the "carbonless paper" used for receipts. BPA has another medical use in dental sealants and composites used for filling. The unbound monomeric BPA can leach out into the surrounding environment (Talsness et al., 2009). Phthalates are a group of similar phthalic acid esters (PAEs) used as plasticizers in PVC plastics. Since PAEs are not covalently bound to the plastic matrix, they can easily leach out of products into the external environment

JUST UNCOMFORTABLE INFORMATION *Continued*

([Heudorf et al., 2007], [Meeker et al., 2009] and [Silva et al., 2004]).

BPA was originally discovered as an artificial estrogen, and its estrogenic effect was used to enhance the rapid growth of cattle and poultry. BPA was also used for a few years as estrogen replacement for women. Since BPA can bind weakly to both estrogen receptors ESR1 and ESR2, it is likely to be an endocrine disruptor.

Our full report has been posted on our website:

http://safeharborenv.com/pthalates-basic-education-on-plastics-in-our-body/

Related online resources:

http://www.ewg.org/node/21290

http://safemama.com/2008/02/10/cheat-sheet-paraben-phthalate-free-baby-care/

INTRIGUING FOLLOW-UP ON POLARIZED LIGHT FROM OCEAN 21

Light reflecting from road surface mimics water.

Stone flies may lay eggs on pavement instead of water.

Our recent OCEAN 21 article described how polarized light has moved to the forefront of research in species orientation and disorientation. One more example is included here: a paved road surface creates a sheen, which insects interpret as water. Stone Flies in Great Britain have been laying eggs on highways instead of lakes.

LOST AND FOUND DEPARTMENT

OCEAN 21's article about a lost wedding ring being found on a garden carrot inspired us to share two unusual but possibly linkable items: Pigs and Crocodiles.

BEIJING (AP)—*16,000 dead pigs recovered in the last two weeks from rivers that supply water to Shanghai.* Authorities give daily updates assuring the public that tests show Shanghai's water is safe, but no official has given any full explanation about the massive dumping of pig carcasses. Hog farmers have told state media that the dumping of swine carcasses is rising because police have started cracking down on the illicit sale of pork products made from dead, diseased pigs.

ASSOCIATED PRESS—*15,000 Crocodiles Escape from South Africa Farm*. Around 15,000 crocodiles have absconded from a farm in South Africa due to heavy rain and flooding. The massive reptiles were let loose after an intense deluge risked bursting their enclosure in Pont Drift, Limpopo, near South Africa's border with Botswana. Faced with impending calamity, the property's owners were forced to open the gates to release the water—and the crocs along with it.

Although thousands have since been recaptured, at least half of the crocodiles remain at large, and the search zone is widening: one was later discovered on a school rugby hitch 75 miles away. Zane Langman, the son-in-law of the farm's owner, told South Africa's Beeld newspaper that floodwater from the nearby Limpopo River rose swiftly from waist-height at 1pm to head-height by nightfall.

OCEAN NEWS

This issue of OCEAN 22 introduces Nadia Bricault as our Assistant Editor.

UNUSUAL FISHERY, UNUSUAL PROBLEMS

By OCEAN Researcher Brigid McKenna

A deckload of Maine shrimp.
Photo by NPR.org/Gulf of Maine Research Institute.

"Where have all the shrimp gone?" One of New England's most historically prolific fisheries is now in jeopardy with an uncertain future. The winter shrimp industry, which has been predominately utilized by Maine fisherman for over half a century, may be facing a new threat that could potentially cease its existence as we know it. The 2013 season has been lining up to be one of the least productive in its history, and if it gives insight to the oncoming years, then its outlook is bleak.

Despite cautionary measures put into place to preserve this shrimp stock, there has been a steady decline of shrimp caught in recent years.

The life cycle and seasonal transitions of the Gulf of Maine northern shrimp (Pandalus borealis) have been cited as to how the fishery is managed. Mature shrimp live offshore where they mate late summer to early fall. Mature females carry the embryos until they travel inshore to release the larvae. These spawning females are the main target of the fisheries because of location, quality and sustainability.

Through much research effort it has been determined that this annual migration inshore is temperature dependent, meaning that changing oceanic temperatures may have a significant impact on these crustaceans. These northern shrimp have adapted to local temperatures and, accordingly, mating occurs to coincide with phytoplankton blooms. Could there be links to naturally occurring North Atlantic Oscillation or Arctic Oscillation links? No matter what, a likely certainty if this "trend" continues is that the Gulf of Maine northern shrimp stock will not be the only shrimp fisheries negatively affected down the road and we must be prepared for what the future may hold if this is the case.

The full report, with more analysis, is an informative read on our website: http://safeharborenv.com/environmental-initiatives/new-england-shrimp-fishery-mystery/.

More on Shrimp:

http://www.fishwatch.gov/seafood_profiles/species/shrimp/species_pages/white_shrimp.htm.

PROTECT TREES WITH YOUR EYES

Emerald Ash Borer Beetles

By Nadia Bricault, OCEAN Assistant Editor, (4/11/2013)

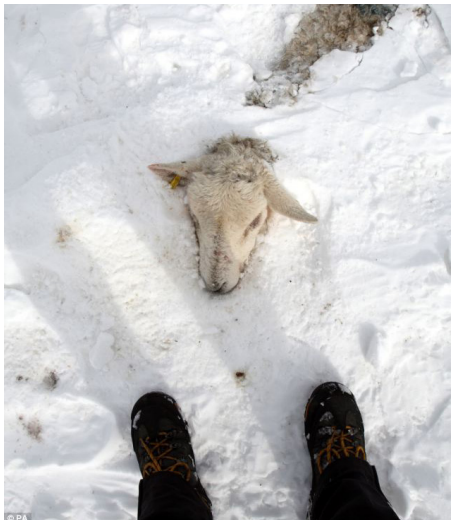
New England may be facing the loss of every Ash tree.

The Emerald Ash Borer, EAB, is an invasive non-native beetle, killing our ash trees. Originating from areas in Eastern Russia, Northern China, Japan, and Korea, the EAB burrows in the bark of the ash tree, leaving hundreds of larva to eat their way out. According to the USDA, EAB's initial introduction into the United States occurred in the 1990's by shipments of wood packing material from Asia [USDA, 2013]. However, EAB were not detected until 2002 in Canton, Michigan and by then an estimated 50–100 million ash trees had been killed. Since then 14 states have been affected and an estimated 7.5 billion ash trees, or *fraxinus genus*, are estimated to be killed. The life cycle of EAB is about 1–2 years and the adult beetle is dark metallic green in color, ½-inch long and ⅛-inch wide [Emerald, 2013]. According to Emeraldashborer.info, "EAB is now considered the most destructive forest pest ever seen in North America. The scope of this problem will reach the billions of dollars nationwide if not dealt with. State and federal agencies have made this problem a priority. Homeowners can also help by carefully monitoring their ash trees for signs and symptoms of EAB throughout the year."

Read more: http://stopthebeetle.info/what-is-eab/; and http://www.emeraldashborer.info/faq.cfm#sthash.2W9iZ6RU.dpbs

EXTREMES IN SEVERE WEATHER PERSIST IN UK

By OCEAN Researcher Lauren Bamford (3/16/2013)



The impossible rescue of sheep from 12 foot snow drifts.
Photo by Dailymail.co.uk (March 6, 2013).

Editor's note: Because of the unique location of the UK, between significant ocean currents and atmospheric winds, we pay very close attention to possible climate change patterns occurring there.

In 2012, the UK saw extremes from both sides of the spectrum: drought and flooding. Many of the main rivers were observed to be at their highest during times of flooding and at their lowest during times of drought in a span of only four months (Harrabin 2013). This meant that many farmers and businesses found themselves prohibited from taking water from the rivers and then soon after found their fields and buildings flooded with excess water (Harrabin 2013). In total, about 8,000 homes were flooded during the year's unprecedented weather fluctuations (Harrabin 2013). British farmers, business-owners, and homeowners deal with drier droughts and wetter flooding periods, while also also dealing with changes in the timing of these phenomena. In recent years, the flooding period, which usually occurs in the winter, has been occurring more often in the summer, further disrupting people's lives (Harrabin 2012). Reports from the Met Office and the Center for Environmental Health (CEH) say that climate change is not to blame (Harrabin 2012). Instead, they say it may be caused by a more negative phase of the North Atlantic Oscillation (NAO) leading to flooding in the summer instead of winter (Harrabin 2012). It should be noted that the NAO itself may be under the influence of man-made climate change. Scientists report that although climate change does not control which phase the NAO index is in, it does seem to be increasing its variability, causing more negative and more positive phases and in turn, more severe droughts and storms ("Swings" 2009).

Reference: http://www.bbc.co.uk/news/uk-wales-21940646

Read More: http://www.bbc.co.uk/news/science-environment-21651067

http://www.bbc.co.uk/news/science-environment-19995084

http://www.sciencedaily.com/releases/2009/01/090113101200.htm

TIME-LAPSE FROM THE INTERNATIONAL SPACE STATION—ALONE AT NIGHT

Reposting this incredible video that appeared in our last issue. Earth at night as seen from the International Space Station. (Thank you Edward Johnson.)

http://www.youtube.com/watch?v=FG0fTKAqZ5g

CORRECTION: "THANK YOU TO SUSY KIST"

An article on Ocean Renewable Power Company's tidal energy technology in OCEAN 21 requires an important correction. When the original article on tide and wave energy was edited for length, the tide energy segment was edited out but the tide energy image remained. This was not intended to illustrate a story on a wave energy device. The two forms of ocean energy—wave and tidal—are distinctly different. While wave energy devices capture the energy of waves on the ocean surface, tidal energy devices, such as ORPC's, are completely submersed and capture the energy in tidal currents.

DROUGHT FORCES NEIGHBOR STATES TO COURT

Thanks to OCEAN Researcher Kristyna Smith (2/18/2013)

In Texas, low tide has lasted for a year.

In New Mexico, years of drought have left Elephant Butte Reservoir levels dangerously low, and the mountains in northern New Mexico and southern Colorado are seeing lower-than-normal snowpack. Flow in the Rio Grande near Santa Fe this spring is projected to be just 47 percent of the 1981–2010 average (Haederle, *Los Angeles Times*, 2013). The waters of the Rio Grande are being disputed by two neighboring states, Texas and New Mexico. In January 2013 Texas asked the Supreme Court to hear its complaint that New Mexico has been diverting water it is obligated to send downstream under the 75-year-old Rio Grande Compact.

The Rio Grande Compact is a system of dams and canals that impounds water at reservoirs in New Mexico and delivers it to farmers in southern New Mexico and West Texas. The compact established a formula for allocating the river's water to various users (Haederle, *Los Angeles Times*, 2013).

According to Pat Gordon, Texas' representative on the Rio Grande Compact Commission, New Mexico is allowing its residents to sink wells under the reservoirs, which cause water to flow from the river into the adjoining underground aquifer. This reduces the amount of water available for the irrigation network.

Charles DuMars, a prominent water law specialist says that while the wells may be depleting the river's flow, the compact only requires that New Mexico deliver a set amount of water into the reservoirs. While the Supreme Court may dictate how and to whom water is delivered, it has no control over the amount of rainfall these states see.

http://articles.latimes.com/2013/jan/25/nation/la-na-texas-water-20130126

http://newswatch.nationalgeographic.com/2013/01/18/drought-fuels-water-war-between-texas-and-new-mexico/

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Our next issue explores the unique ability of water to transport to our faucets chemicals from septic systems, drains and yards. Our researchers have also explored links between some unusual, large scale shifts in atmospheric systems and how the consequences have played out for us.