

“ON EFFORT”

Newsletter

FALL 2019

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The Dolphin Project is an all-volunteer, non-profit research, conservation and education organization, founded in 1989, dedicated to the protection of wild estuarine Bottlenose dolphins and our shared environment. Tax ID# 58-1914176

FROM THE HELM...

Greetings Crew!

I'm comprising this newsletter while listening to Hurricane Dorian forecasts. While I feel concern for our Florida neighbors, I've got fingers crossed it doesn't come here. I can't drive yet due to 3 surgeries this year, so evacuation will be a challenge. Time will tell.

I apologize for not getting a newsletter out sooner but so far I haven't been in charge of my schedule. I've been filing away newsy articles and am now able to share them with you.

We've been busy with Education Outreach, Surveys and 30th Anniversary events. Mark your calendars for the 30th Celebration on October 26th at Fish Tales on the Ogeechee River. Details on Page 18. If you have a business (or know someone who does) and would like to sponsor this event or donate to the silent auction, let us know. We could use gifts cards and art work for the auction. A Sponsorship page (p.19) and TDP info page (p.20) are included in the newsletter. I've also included some 'Hurricane Humor' for all you coastal folks as you batten down your hatches. Y'all Stay Safe.

Peach

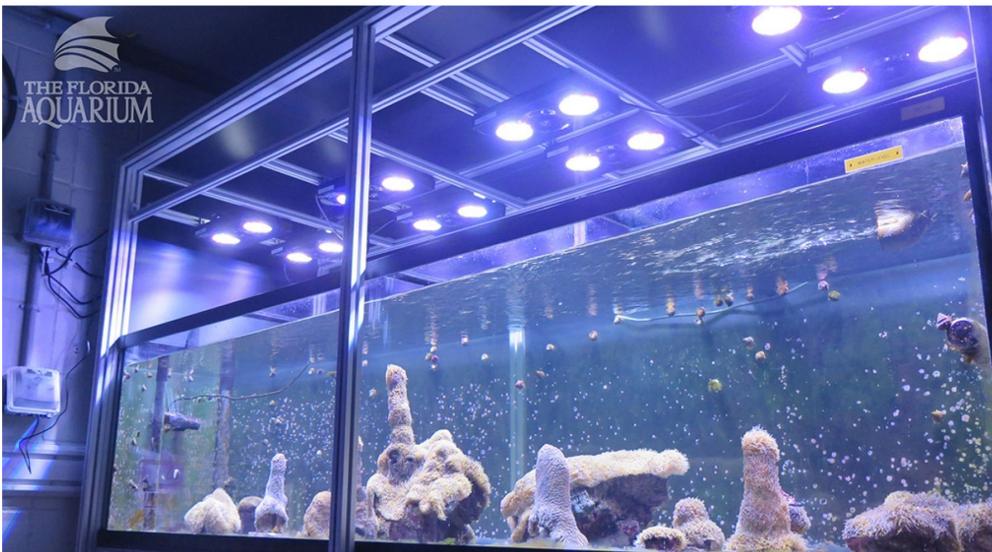
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CORAL REEFS

Vital to the health of the oceans and the species that are supported by them, researchers have created Atlantic coral in a lab setting for the first time, a feat they've dubbed a "scientific breakthrough."

The Florida Aquarium in Tampa said researchers were able to reproduce coral in a lab environment two days in a row, which could potentially alleviate concerns that the corals in the Florida Reef Tract may go extinct. "When history is made, there is hope, and today's scientific breakthrough by The Florida Aquarium's team of coral experts gives us real hope that we can save the Florida Reef Tract from extinction," said Roger Germann, The Florida Aquarium President and CEO, in a statement. Germann continued: "And, while many coral experts didn't believe it could be done, we took that challenge to heart and dedicated our resources and expertise to achieve this monumental outcome. We remain fiercely committed to saving North America's only barrier reef and will now work even harder to protect and restore our Blue Planet."



Befittingly known as Project Coral, the endeavor started in 2014 when scientists began to focus on pillar coral, which has been ravaged over the years by stony coral tissue loss disease. This type of coral, which "often resembles fingers or a cluster of cigars," according to the National Oceanic and Atmospheric Administration, is considered nearly extinct. It is also listed on the Endangered Species Act. Senior Coral Scientist Keri O'Neil said the accomplishment bodes well for the future of the species. "The massive and fully synchronized spawning at The Florida Aquarium's Center for Conservation, which occurred exactly at the predicted wild spawning time, indicated perfect aquatic conditions for pillar corals in our Project Coral system," said O'Neil in the statement. "When you have great husbandry, great water quality, and all of the right environmental cues, this is what you can do, you can change the game for coral restoration."

The researchers said the work done in the lab is just the first step, described as a "head start," to help juvenile corals survive long enough to eventually put them in the oceans and repopulate coral reefs along the Florida Reef Tract. "We couldn't have done this important work without our amazing partners," Germann said in the statement. The partners included NOAA, Horniman Museum and Gardens, Florida Fish and Wildlife Conservation Commission and others. "Working together," Germann said, "the future of the Florida Reef Tract just got a lot brighter."

Coral Reefs occupy less than 1% of the ocean floor yet they provide home for at least 25% of all the marine species and are a key resource for the survival of an estimated 1/2 billion people.

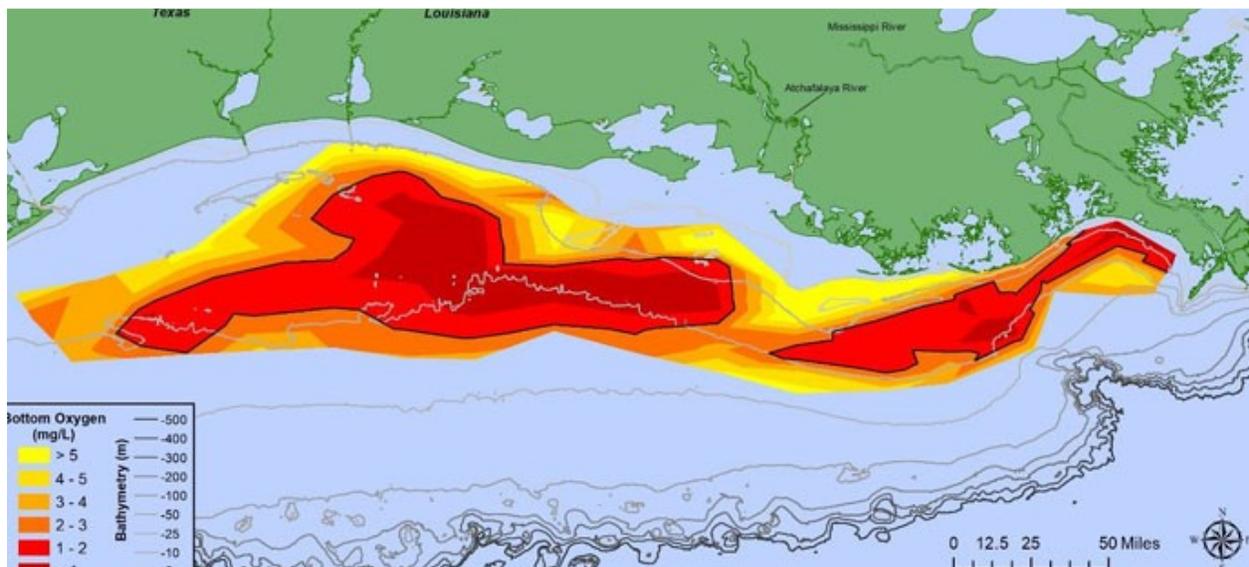
Remember if your home is hit by a dolphin, DO NOT GO OUT TO SEE IF THE DOLPHIN IS OK. That's how the hurricane tricks you into coming outside.

Waiting for a hurricane is like being stalked by a turtle.

GULF of MEXICO DEAD ZONE

A dead zone of oxygen-depleted waters forms every summer in the Gulf of Mexico in response to nutrient runoff from the Mississippi River watershed. Scientists have been tracking the summer dead zone for 33 years now, and they have found that this year's area of low oxygen waters extends for 6,952 square miles (18,006 square km). It is the 8th largest dead zone ever recorded. Nutrient-rich runoff containing nitrogen and phosphorus from agricultural lands and sewage causes the summer dead zone in the Gulf of Mexico. These nutrients, in combination with sunlight and warm waters in the Gulf, trigger algal blooms. Then, as the algae die off and are decomposed by bacteria, oxygen in the bottom waters drops to levels that can be deadly for many marine organisms.

Scientists took measurements of the extent of this year's dead zone from onboard the R/V *Pelican* over July 23–29, 2019. The area of the dead zone was estimated at 6,952 square miles (18,006 square km). This is the eighth largest dead zone recorded in the 33 year historical record of such events. The dead zone was actually smaller in size than that predicted back in spring based on the amount of rainfall and runoff generated this year. Scientists suspect that Hurricane Barry, which made landfall along the Louisiana coast on July 13 as a Category 1 storm, stirred up the waters and disrupted the growth of the dead zone. The dead zone is expected to continue its rapid growth if future conditions remain calm. The dead zone will eventually dissipate in the autumn as water temperatures cool and oxygen-rich waters become well mixed. Marine ecologist Nancy Rabalais of Louisiana State University led the sampling effort. She commented on the survey results in a statement: "Past research indicates that hypoxia can take a week to reform in the summer after major wind events such as the recent passage of Hurricane Barry. We didn't know what we would find when we went out to map the zone. We found that, despite the storm, the zone reformed and was in the process of rapidly expanding."



The dead zone in the Gulf of Mexico has harmful effects on marine life and fisheries, and so scientists have set a target to have the dead zone grow to no larger than 1,900 square miles (4921 square km) on average (with data collected over a five year period) by 2035. To achieve such a remedial goal, further reductions in nutrient runoff from farms and urban areas will be necessary. The annual summer sampling in the Gulf of Mexico is a joint endeavor of Louisiana State University and LUMCON (Louisiana Universities Marine Consortium), and the scientists receive funding support from NOAA (National Oceanic and Atmospheric Administration) for their work.

Bottom line: A large dead zone formed in the Gulf of Mexico during the summer of 2019. The size of the dead zone was smaller than expected because of Hurricane Barry, but it was estimated to be the 8th largest on record. Large dead zones in the Gulf of Mexico are harmful to marine life, and further reductions in nutrient runoff are needed to reduce the size of the summer dead zone that forms every year.

By Deanna Conners, an Environmental Scientist who holds a Ph.D. in Toxicology and an M.S. in Environmental Studies.

DEFICIENCIES IN OFFSHORE DRILLING

A new report shows that thousands of oil spills are still happening and that workers in the oil and gas industry are still dying on the job. The report comes from Oceana, a nonpartisan nonprofit dedicated to protecting and restoring the oceans, has sued the federal government to stop seismic airgun blasting in the Atlantic Ocean. The blasting is the first step needed to allow offshore drilling, when seismic airguns are used to find oil and gas deep under the ocean. Every state along the Atlantic coast has opposed the blasting, worried that spills could hurt tourism and local fisheries. Some scientists say the testing could also hurt marine life, including the highly endangered North Atlantic right whale.

The group tied its report, released Thursday, to the ninth anniversary of the BP Deepwater Horizon oil spill to show what has been happening since the government promised to hold the industry accountable to higher safety standards. Using public records and interviews with people in the field, Oceana found that although there hasn't been another big blowout like the Deepwater accident, oil spills continue, and so do fatalities, though they're not often front-page news.

There were at least 6,500 oil spills in US waters between 2007 and 2017, according to the report, which said that's probably an undercount. Despite a decrease in fatality rates overall as an industry, according to the US Centers for Disease Control and Prevention, the fatality rate of oil and gas industry workers, onshore and off-, was an average of seven times higher than that of other US workers in general between 2003 and 2013. At the time of the Deepwater disaster, the US oil and gas industry had reported one of the highest fatality rates as compared to other oil-producing countries. "Almost 10 years after the BP Deepwater oil spill, offshore drilling is just as dirty and dangerous, despite pledges otherwise," said Diane Hoskins, Oceana's campaign director. "There is still this unacceptable risk of devastating oil spills, and yet there is this call from the Trump administration to expand drilling to new areas and a call to abandon or weaken safety regulations. We should not be expanding drilling."



The United States is already the world's largest exporter of refined petroleum products, but the Trump administration has pushed for more. In April, Trump signed executive orders, which he called "Unleashing American Energy," that make it easier for companies to build gas and oil pipeline projects and make it harder for states to stop them. He's revoked an order that banned oil and gas drilling in the Arctic, as well as the Atlantic, although that's tied up in the courts. A judge also ruled against the administration's approval of natural gas drilling plans on public lands in Colorado.

As part of its call for action, Oceana wants the US government to increase inspections. As of 2018, the Bureau of Safety and Environmental Enforcement employs about 120 inspectors to conduct more than 20,000 inspections, the report found. Fines are based on spill amounts that are generally estimated by the company and are often under-reported, studies have found. Civil penalties for violating offshore operating requirements are capped at \$44,675 per day per violation. "That's a rounding error when you know that operating costs can be about \$1 million per day," Hoskins said. "Fines need to be higher."

The report also calls on the government to reduce its reliance on research and standards written by the oil industry. There have been some improvements in industry-written research since the disaster, noted CJ Beegle-Krause, an expert on the oil industry who has worked for private industry, independent research organizations and in government research. She is not affiliated with the Oceana report. When it comes to transparency, for example, all industry projects require companies to publish details about their work in peer-reviewed scientific journals.

DEFICIENCIES IN OFFSHORE DRILLING continued

"The science is coming out and being reviewed, and that transparency has changed since the Deepwater Horizon," Beegle-Krause said. "Where my thinking comes from is that you need government, industry and academics working together from different viewpoints, to provide balance in terms of perspective. Each know quite a bit about oil and the environment, and working together, you get much better results."

Is the industry safer now than before the spill? "That is not an easy question to answer," Beegle-Krause said, but it's in the industry's best interest to keep people safe and avoid accidents. Hoskins is certain that more needs to be done to prevent spills and make the industry safer. "The facts are clear, and the anniversary is a painful reminder of what is at stake," she said. "We hope President Trump and the Department of Interior listen to this report."

DEEPWATER HORIZON OIL STILL AFFECTING WILDLIFE

It wasn't just the coastline and the ocean surface that was drenched in oil after the Deepwater Horizon spill of 2010. Life in the deep sea took a hit, too, and many species in the region are still drastically reduced in number. "The health of our overall oceans also requires a healthy deep sea, as the deep oceans serve vital roles in carbon cycling, marine food webs, and overall ocean function," says Craig McClain at the Louisiana Universities Marine Consortium. He and his colleagues used remotely operated underwater vehicles to survey the Gulf of Mexico around the site of the disaster. They did the survey in June of 2017 and compared their findings to surveys done in the two months directly following the oil spill.

While the number of animals has increased, the diversity was lower. McClain says he and his team noticed an absence of sea cucumbers, fly-trap anemones, Venus flower basket sponges, and giant isopods – crustaceans that look like large woodlice. There has also been a change in which animals inhabit the area. The communities seen in 2010 and 2017 were less than 20 per cent similar in composition.

Surprisingly, they found an abundance of arthropods, including the red shrimp *Nematocarcinus*, a white caridean *Glyphocrangon* shrimp, and the Atlantic deep sea red crab. McClain says they may be attracted to the site because the hydrocarbons that break down in the wake of an oil spill can mimic the chemicals in sex hormones that they use to find mates. "This seems to be common in some other oil spills. A historic oil spill in Buzzards Bay in New England attracted the American Lobster in droves," he says. "We believe the hydrocarbons are serving as an attractant and creating a La Brea Tarpit scenario, where healthy individuals are attracted but are trapped, and may eventually die, at the site." They may die there because the chemical signals may also deter other animals they prey on from entering the area. The sampling McClain and his team did were at deeper sites than the Deepwater Horizon well, but he says that at these depths in the Gulf of Mexico, we wouldn't expect to see much difference in diversity. "We are confident that the differences of the Deepwater Horizon site specifically reflect environmental damage related to the oil spill," he says.

Journal reference: *Royal Society Open Science*, DOI: 10.1098/rsos.191164

Read more: <https://www.newscientist.com/article/2214384-marine-life-is-still-struggling-after-the-deepwater-horizon-oil-spill/#ixzz5y36KuUmL>

IMPORTANT WEATHER UPDATE: As hurricane Dorian descends on Florida, Federal disaster officials have warned that electric and internet outages could force people to interact with each other for the first time in years. Residents are bracing themselves for the horror of awkward silence and unwanted eye contact. FEMA has advised: Be prepared. Write down possible topics to write about in advance. Sports, weather. Remember a conversation is basically a series of Facebook or twitter updates strung together. STAY SAFE.

DON'T BLAST. DON'T DRILL

April 25, 2019

Mary Landers, Savannah Now

The Trump administration is suspending plans to expand offshore drilling, including plans to drill off Georgia, after a recent court ruling blocked drilling in the Arctic and Atlantic, Interior Secretary David Bernhardt told the Wall Street Journal. Bernhardt said the agency would delay indefinitely its five-year plan for oil and gas drilling on the Outer Continental Shelf as the case goes through the appeals process. "By the time the court rules, that may be discombobulating to our plan," Bernhardt told the Wall Street Journal in a report published Thursday. The plans had been expected to be released in the near future. President Donald Trump had revoked an Obama administration ban on oil and gas drilling in the Arctic and Atlantic, but a federal judge in Alaska ruled in late March that the president could not reverse the ban.

Southeastern environmental groups were cautiously optimistic about the announcement. "I certainly hope that 'indefinitely delayed' is Washington-speak for 'never,'" said Southern Environmental Law Center Senior Attorney Sierra Weaver. "Whatever the reason for this delay, more than 230 communities have spoken out against seismic testing and offshore drilling in the Atlantic, and those hundreds of thousands of coastal residents and businesses welcome any development that makes risking their coast less likely."

Among those communities are Tybee, Savannah, Thunderbolt, Richmond Hill and Pooler, whose councils have passed resolutions opposing offshore drilling and/or seismic testing used for oil exploration. The Georgia House of Representatives also passed a resolution earlier this year opposing offshore drilling and emphasizing its concern about possible negative effects of drilling on coastal fisheries and tourism.

Paulita Bennett-Martin, Savannah-based campaign manager for Oceana, was encouraged by the announcement. "It suggests that the movement to stop the expansion of offshore drilling is working," she said. "Many coastal leaders, local organizations, and businesses have worked hard to have their voices heard. And now, we must remain diligent and motivated in the movement to protect our oceans and coast."

Supporters of offshore energy were also focused on reaching a final decision, though National Ocean Industries Association President Randall Luthi urged the Interior Department to move forward. "The Secretary's statement certainly raises one eyebrow, but a further review of the Five Year Program under development due to a recent lower court decision regarding Alaska offshore access was not unexpected," he said. "While there is no firm guess on what 'indefinitely' means, it clearly indicates we won't see a draft plan tomorrow, nor did we expect to. However, Interior should still evaluate the option of moving ahead with a proposed plan, with the caveat that the areas that are affected by the previous withdrawal could be excluded from an eventual sale. A hard stop negates months of environmental and economic analysis that could be used to move the plan forward. Again, this is not a final plan, it is a proposed plan."

A reporter is interviewing a Florida victim of a Hurricane. In the background, a scene of complete devastation; the roof is gone, half of the walls are down, personal possessions scattered around. The person looks shell-shocked, with an unfocused gaze. The hair is wild, clothes disheveled, dirt smudges on the face and arms.

"So what are you going to do now?" asks the reporter. "Are you going to rebuild?"

"No," replies the victim. "I'm gonna move to Georgia."

"Georgia? Why Georgia?"

"That's where the rest of my stuff is."

PLASTICS DON'T MIX WITH THE OCEAN

April 1, 2019

Sardinia, Italy

CNN Wire

The carcass of a pregnant sperm whale that washed up in Sardinia, Italy, last week had 22 kilograms (49 pounds) of plastic in its stomach, and was carrying a dead fetus, the country's environment minister and a marine life non-profit organization said. Luca Bittau, president of the SeaMe group, told CNN the beached mammal's remains contained "garbage bags ... fishing nets, lines, tubes, the bag of a washing machine liquid still identifiable, with brand and barcode ... and other objects no longer identifiable." "She was pregnant and had almost certainly aborted before (she) beached," he said. "The fetus was in an advanced state of composition." The dead animal, which was eight meters (26 feet) long, washed up on a beach in the Sardinian tourist hotspot of Porto Cervo. Bittau said the cause of death would be known after histological and toxicological examinations carried out by veterinarians in Padua, northern Italy.

Sergio Costa, Italy's environment minister, said in a Facebook post: "Are there still people who say these are not important problems? For me they are, and they are priorities." "We've used the 'comfort' of disposable objects in a lighthearted way in the past years and now we are paying the consequences. Indeed the animals, above all, are the ones paying them," he continued. Costa also referred to the recent approval by the European Parliament of a law banning a wide-range of single-use plastic items, such as straws, cotton buds and cutlery, by 2021. "Italy will be one of the first countries to implement it," he promised. "The war on disposable plastic has begun. And we won't stop here."

Last month, a young whale was found dead in the Philippines with 40 kilograms (88 pounds) of plastic bags in its stomach. A few years ago, a Minke whale washed up dead on the Georgia coast with 144 plastic bags in its stomach.



By Lucia Binding

Sky News

Plastic advertising balloons that blow away to sea are killing seabirds, seals and other wildlife, campaigners have warned. Despite being sold as "biodegradable", the freebies handed out at local fetes and by big restaurant brands are often blown away miles to the coast. "Dolphins, whales, turtles, seabirds and other animals have been killed by balloons," a Marine Conservation Society spokesman told Sky News. "Animals swallow the balloons which can block their gut, causing them to starve. "They can also become entangled in the balloon's string. Turtles feed on jellyfish and can mistake balloons for their prey, making them particularly at risk." Claire Wallerstein. A dead seal with a balloon and ribbon hanging from its mouth was recently found on a Cornish beach by wildlife campaigner Claire Wallerstein. She also found a gannet that died after becoming tangled in ribbon tied to a balloon near Felixstowe in Suffolk, England Ms Wallerstein told Sky News: "While usually marketed as '100% biodegradable latex', all the evidence shows that balloons do not break down at all, or at least not for months or years, in the cold, oxygen-poor conditions of the sea. "I have a 'biodegradable' balloon that's been in an open jar of seawater in my garden for the past three years and it's shown no sign of breaking down whatsoever. "

CLIMATE CHANGE? YES, HERE WE GO AGAIN!

Published January 23, 2017

National Geographic

252 million years ago was the day the Earth almost died. It was an extinction event of truly epic proportions, one that dwarfed even the catastrophic bolide impact that wiped out the non-avian dinosaurs. **Also known as the Great Dying, the Permian-Triassic mass extinction saw the disappearance of 96% of all marine species and 70% of terrestrial vertebrates.** Occurring over a geologically short timespan of only 300,000 years, it was an event that only the hardiest of life forms could keep up with, and it took millions of years for Earth's biodiversity to recover. The prime suspect is extreme volcanism leading to global warming and plummeting oxygen levels.

The Permian period⁽¹⁾, which ended in the largest mass extinction the Earth has ever known, began about 299 million years ago. The emerging supercontinent of Pangaea presented severe extremes of climate and environment due to its vast size. The south was cold and arid, with much of the region frozen under ice caps. Northern areas suffered increasingly from intense heat and great seasonal fluctuations between wet and dry conditions.

The climate in the Permian was quite varied. At the start of the Permian, the Earth was still in an ice age. Glaciers receded around the mid-Permian period as the climate gradually warmed, drying the continent's interiors. Beginning under the grip of an ice age and ending in quite the opposite manner, the Permian saw climate change on an unprecedented scale. Sea levels were some 200 feet (60 m) higher than today, plummeting towards the end of the period to some 66 feet (20 m) below the current level, the lowest levels during the Phanerozoic Aeon (our current aeon). This trend, among other factors, saw the Permian climate change dramatically, warming towards the middle of the period. The palaeoclimate continued to dry during the Permian, particularly in the continental interior, but temperatures alternated between extremes of hot and cold.

Sea levels in the Permian remained generally low, and near-shore environments were reduced as almost all major landmasses collected into a single continent—Pangaea. This could have in part caused the widespread extinctions of marine species at the end of the period by severely reducing shallow coastal areas preferred by many marine organisms. As the climate dried and sea levels dropped, coniferous forests closer to the coast gave way to a sun-bleached desert that dominated the interior of Pangaea. Starved of water, this hostile, scorched-earth landscape was perhaps the biggest desert the world has ever known. Towards the very end of the period, temperature fluctuations had reached a new extreme. Nights were bitterly cold, while days were blasted by the intense heat of the sun, rather like modern deserts yet far more intense. It was around then that hardy animals, such as mammal-like reptiles evolved to adapt to the extreme conditions.



It's safe to say that the Permian climate went completely haywire, particularly toward the end of the period. Alternating between hot and humid and cool and dry, it was a time of extreme change that led to two major extinction events. The first occurred in the Middle Permian, when rampant volcanic activity led to a major greenhouse crisis. However, nature continued to evolve rapidly throughout, with more successful and adaptable animals quickly replacing those that could not keep up. In particular, the first major extinction event of the period saw the rise of many reptilian dynasties, some of which persist to this day.

Various theories seek to explain this mass extinction. Some scientists think a series of volcanic eruptions pumped so much debris into the atmosphere that the sun was blocked out, causing a significant drop in temperature and preventing plant

CLIMATE CHANGE? YES....

photosynthesis, which in turn caused food chains to collapse. There is evidence that magma poured onto the earth surface, for thousands of years, contributing to the environmental stress that led to mass extinction. The reduced coastal habitat and highly increased aridity probably also contributed. Based on the amount of lava estimated to have been produced during this period, the worst-case scenario is the release of enough carbon dioxide from the eruptions to raise world temperatures five degrees Celsius.

Another hypothesis involves ocean venting of hydrogen sulfide gas. Portions of the deep ocean will periodically lose all of its dissolved oxygen allowing bacteria that live without oxygen to flourish and produce hydrogen sulfide gas. If enough hydrogen sulfide accumulates in an anoxic zone, the gas can rise into the atmosphere. Oxidizing gases in the atmosphere would destroy the toxic gas, but the hydrogen sulfide would soon consume all of the atmospheric gas available. Hydrogen sulfide levels might have increased dramatically over a few hundred years. Models of such an event indicate that the gas would destroy ozone in the upper atmosphere allowing ultraviolet radiation to kill off species that had survived the toxic gas. Other scientists point to global climate change, citing evidence for a period of sudden warming and cooling. These rapid extremes of conditions may have meant species were unable to adjust. Other theories include a catastrophic release of methane gas stored under the seabed, triggered by earthquakes or global warming, or a massive asteroid impact. Perhaps a combination of factors was to blame. But whatever the cause, new animals and plants would evolve to fill the void. Not least among them: the dinosaurs.

The end of the Permian heralded the end of the Palaeozoic Era, which had lasted for 289 million years. However, as after every major extinction event, the Earth proved her resilience once again, laying the foundations for the arrival of the dinosaurs in the Late Triassic.

¹⁾ *Permian Period, in geologic time, the last period of the Paleozoic Era⁽²⁾. The Permian Period began 298.9 million years ago and ended 252.2 million years ago, extending from the close of the Carboniferous Period⁽³⁾ to the outset of the Triassic Period⁽⁴⁾.*

²⁾ *Paleozoic Era meaning "ancient life" is the earliest of three geologic eras of the Phanerozoic Eon, spanning from roughly 542 to 251 million years ago*

³⁾ *Carboniferous: relating to or denoting the fifth period of the Paleozoic era, between the Devonian and Permian periods.*

⁴⁾ *Triassic: pertaining to a period of the Mesozoic Era, occurring from 230 to 190 million years ago and characterized by the advent of dinosaurs and coniferous forests.*

RECENT CLIMATE CHANGE...

Ok, so if you can't relate to the earth, with one giant continent, over 250 million years ago with a sea rise 200 feet higher than what we now have, here's more recent news...

By Christopher Carbone

Fox News

A group of scientists studying evidence preserved in cave formations have found that global sea levels were 52 feet higher 3 million years ago than they are today. Their findings, based on an analysis of deposits from Arta Cave on the island of Mallorca, depict a time when earth was 2 to 3 degrees Celsius warmer than in the pre-industrial era, and have implications from the study of current-day sea-level rise. Sea level rises as a result of melting ice sheets, but scientists have long worked to answer how fast and how much it could rise during a warming period.

"Constraining models for sea-level rise due to increased warming activity critically depends on actual measurements of past sea level," said senior research scientist Victor Polyak. "This study provides very robust measurements of sea-level heights during the Pliocene era." The project zeroed in on cave deposits that form in coastal caves at the "interface" between brackish water and cave air when the ancient spaces were flooded by rising seas.

"We can use knowledge gained from past warm periods to tune ice sheet models that are then used to predict future ice sheet response to current global warming", explained Professor Bogdan Onac with the USF Department of Geosciences. The researchers were particularly interested in the mid-Piacenzian Warm Period which was 3 million years ago. "The interval also marks the last time the earth's atmosphere CO₂ [Carbon dioxide levels] was as high as it is today, providing important clues about what the future holds in the face of current anthropogenic warming," Onac said.

DEFICIENCIES IN OFFSHORE DRILLING continued

"The science is coming out and being reviewed, and that transparency has changed since the Deepwater Horizon," Beegle-Krause said. "Where my thinking comes from is that you need government, industry and academics working together from different viewpoints, to provide balance in terms of perspective. Each know quite a bit about oil and the environment, and working together, you get much better results."

Is the industry safer now than before the spill? "That is not an easy question to answer," Beegle-Krause said, but it's in the industry's best interest to keep people safe and avoid accidents. Hoskins is certain that more needs to be done to prevent spills and make the industry safer. "The facts are clear, and the anniversary is a painful reminder of what is at stake," she said. "We hope President Trump and the Department of Interior listen to this report."

BOTTLENOSE DOLPHINS DYING in GULF of MEXICO

June 14, 2019

CBS/AP

Bottlenose dolphins are stranding themselves at an unusually high rate in the northern Gulf of Mexico, including Louisiana, Mississippi, Alabama and the Florida panhandle. Authorities say more than 260 dolphins have stranded along the U.S.

Gulf Coast since Feb. 1, triple the usual number. Scientists from the National Oceanic and Atmospheric Administration (NOAA) say 98% of those dolphins died, and they've classified the strandings as "unusual mortality events."



Unusual mortality events (UME) are defined as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response. Scientists say it's too early to know the cause, but they're investigating whether lingering effects from the 2010 Deepwater Horizon Disaster and salinity changes from high rivers and a Louisiana spillway opening contributed.

NOAA says on its website that a number of the dolphins stranded from Louisiana to the Florida Panhandle had sores consistent with freshwater exposure, but those are common in the spring. A Mississippi scientist says the spillway opening is at least partly to blame for 126 dolphin deaths across Mississippi's coastline. Moby Solangi calls it worse than the BP disaster. He says 91 dead dolphins were found in Mississippi during all of 2010.

Top Ten Reasons Hurricane Season is Like Christmas

10. Decorating the house (boarding up windows)
9. Dragging out boxes that haven't been used since last season (camping gear, flashlights)
8. Last minute shopping in crowded stores
7. Regular TV shows pre-empted for "specials"
6. Family coming to stay with you
5. Family and friends from out-of-state calling
4. Buying food you don't normally buy... and in large quantities
3. Days off from work
2. Candles

And the number one reason Hurricane Season is like Christmas...

1. At some point you know you're going to have a tree in your house!

HUMANS ‘LOVING DOLPHINS TOO MUCH’

New Zealand bans swimming with bottlenose dolphins after numbers plunge

Conservation research shows humans are ‘loving the dolphins too much’ in Bay of Islands region. The New Zealand government has banned tourists from swimming with bottlenose dolphins in an attempt to save the struggling species. According to the department of conservation [DoC] research has shown that humans were “loving the dolphins too much” and human interaction was “having a significant impact on the population’s resting and feeding behavior”.

The ban on swimming with bottlenose dolphins applies to tour operators in the North Island’s Bay of Islands region, which is popular with tourists for its warm climate and golden beaches. Other dolphin tours that interact with different species of dolphin in other parts of the country are still permitted. Tourists can still swim with common or dusky dolphins in tours operated in the South Island.

Bottlenose dolphins prefer to swim in coastal regions, making them vulnerable to human activity, and their numbers in the Bay of Islands have declined by 66% since 1990, according to DoC.

A core group of only 19 bottlenose dolphins visit the region regularly now, and the latest reports show a 75% mortality rate among their calves – the highest seen both in New Zealand, internationally and in captivity. Alongside banning tourist swims with bottlenose dolphins, DoC have stipulated that tour operators may interact with the dolphins only for periods of 20 minutes (reduced from 30 minutes) at a time, and all tour operators will be restricted to visiting either morning or afternoon, in order to provide a block of time where the dolphins are left alone.



The possibility of creating a marine mammal sanctuary in the Bay of Islands is also being investigated by DoC, research partners and local Māori tribes.

Tour operators in the Bay of Plenty have raised concerns about the impact the new ban will have on tourism numbers, and said less tour operators on the water will mean fewer eyes watching out for how private boats interact with the vulnerable population.

Listening to meteorologists predict what’s gonna happen with hurricanes 5 days out is like looking up your symptoms on WebMD. “Could be nothing’ - might could kill ya”

What did the hurricane say to Florida? I’ve got my eye on you.

WHALES IN THE DESERT

There is an ancient Egyptian desert, once a vast ocean, that guards the secret of one of the most remarkable transformations in the evolution of life on planet Earth. There's a Valley of Whales in the Middle of Egypt's Desert and its Millions of Years old. The site is called Wadi El Hitan, dubbed the Valley of Whales, located around 160 kilometers from the famous pyramids at Giza. Egypt is known as the land of Pyramids, Pharaohs, and golden sands. Countless treasures have been excavated from beneath Egypt's sands, revealing a treasure trove of a time long gone. Archeologists have discovered pyramids, temples, entire cities and treasures whose value is incalculable. But there's more to Egypt than the Sphinx, the Pharaohs, and its incredible pyramids, and there is more to this wonderful land than the Valley of Kings. Some 160 kilometers southwest of the Pyramids at the Giza plateau is a treasure trove of history. There aren't any pyramids, temples or mummies buried there, but it is nonetheless a site of great importance. In fact, Wadi El Hitan was designated a UNESCO World Heritage Site in 2005. The reason? hundreds of fossils of some of the earliest forms of whales, the archaeoceti (a now extinct sub-order of whales) lie buried beneath the desert sand.



The story of Wadi Al Hitan is worthy of the most impressive tales. Some 40 million years ago (give or take a few), massive beasts swam in the vast prehistoric Tethys ocean. It was home to numerous beasts which have long since been forgotten. One of these massive creatures, over 50 feet long had massive jaws and jagged teeth. It looked unlike anything living inside Earth's oceans today. The creatures eventually died sinking to the prehistoric ocean seafloor.

Tens of thousands of years went by, and a fine protective mantle of sediment but eventually build up over the bones of the beasts. The prehistoric sea receded, and the former seabed transformed into a vast desert as powerful winds armed with fine grains of sand began covering the surface little by little, eventually preserving the whales which would remain hidden for time to come. Eventually, it became another one of the many secrets hidden beneath the golden sands of Egypt.

Time passed by, and the planet geology and geography warped. The planet's crust smashed India into Asia, giving birth to the breathtaking Himalayas. Mankind came into existence, and Africa saw the very first humans stand straight, evolve, and eventually build a civilization that would forever become imprinted in history. The mighty Kings of Egypt build incredible mastabas, which evolved into massive pyramids. Egypt flourished and fell, and the land of Pharaohs was no more.

WHALES IN THE DESERT continued...

The Valley of the Whales, as the site is dubbed, is the most important sites in the world to demonstrate the above-mentioned evolutionary process. The way of life of these mammals is accurately portrayed during their evolution. The number, concentration, and quality of fossils are unique to Wadi El Hitan which is a time capsule providing evidence of millions of years of coastal marine life and evolution.

Then, more than one hundred years ago, massive fossils of long-gone beasts were revealed by the Egyptian wind, which delicately preserved and revealed the fossils since time immemorial. The site is so important that scientists argue the site reveals evidence for the history of one of the greatest mysteries in the evolution of whales: the appearance of the species as an ocean-going mammal from a previous life as a land-based animal. Today, the site is a desert covered with geological features that make it even more unique. But in the distant past, Wadi El Hitan was a massive ocean where whales swam, hunted and reproduced. These remains show these animals losing their hind limbs, hydrodynamic bodies (like those of modern whales) while presenting primitive aspects of bone structure. Other fossil materials found at the site allow reconstructing the environment and the ecological conditions of the time. The site portrays the form and way of life during the transition from land animals to ocean-going mammals.

Although the fossils discovered at the site may not be the oldest, their great density in the area and the quality of their preservation is to the degree that even some stomach contents have remained intact. Thanks to the discovery of fossils of other early animals like sharks, crocodiles, sawfish, turtles, and rays, scientists have been able to accurately reconstruct the environmental and ecological conditions of the site. The site and the first fossil skeletons of whales were discovered at the Valley of Whales in 1903. But for more than 80 years, the site was forgotten, mostly due to the difficulty of accessing the site.

However, in the late 1980s, as all-wheel-drive-vehicles become widely available, people started visiting and documenting the site. Eventually, the *Valley of Whales* would attract the interest of not only scholars but fossil collectors and even tourists. People would go there and collect fossils without properly documenting or conserving the fossils. This led to the disappearance of a number of fossils from the site, prompting warnings for the site to be adequately conserved. One of the

most important discoveries at the site was also the largest fossil discovered there, with 21 meters in length. The fossil showed clear traces of five-fingered flippers on its forelimbs, and an unexpected existence of hind legs, feet, and toes, features that were precisely unknown in an archaeoceti.

The site exceeds the values of different similar sites in terms of the number, concentration, as well as the quality of its fossils, and their accessibility, found in an attractive and protected landscape. The site includes an impressive assemblage of fossilized skeletons of Archaeoceti (primitive whales documenting cetacean transition to marine life), sirenians. It also includes well-preserved fossils of reptiles, as well as shark teeth that date back to around 40 million years ago. Scientists have identified the fossils of crocodiles, sea turtles as well as the fossilized remains of sea snakes at the site. A number of species of bony fish, sharks and rays are represented at the site, but the largest number of fossils are isolated small teeth, which are often inconspicuous. There are also larger fish fossils including the rostra and pegs of sawfish. In fact, the site features a sawfish rostrum of 1.8 meters long.

WHALES IN THE DESERT continued...

Wadi El Hitan is also home to a wide variety of fossilized shells as well as disc-shaped nummulite fossils. According to scientists, the strata in Wadi Al Hitan belongs to Middle Eocene and it includes a vast mass of vertebrate fossil within 200 km² of the desert. While researchers here have identified a vast number of whale fossils, they have also cataloged and reported the fossils of sea cows, among over one hundred different fossils. Scientists were able to reconstruct their origin and conclude their form was serpentine and the animals were carnivorous.

The site has been found to feature typical streamlined body form modern whales, but also shows us clear evidence of some of the primitive aspects of skull and tooth structure. In other words, the valley of Whales in Egypt is a unique site not only because of its diverse fossil library but because of the examples of fossils and their respective age. The site has managed to remain well-protected because not many people access it. In fact, it is believed that between **1500** and **2000** tourists venture out and visit the site which is accessible through unpaved and unmarked desert roads.

The tourists that do decide and come to the site are mostly foreigners who then camp in the valley. Wadi El Hitan lies within the Wadi El Rayan Protected area, but nevertheless, part of the site has been turned into a tourist venue, and there are walkways placed in between the main fossils. Small shelters were also built at the site. In addition to its vast collection of fossilized remains, Wadi El Hitan is home to more than 15 different species of desert places as well as 15 different types of mammals including the red fox and the Egyptian mongoose. The site is mostly frequented by the Gennec Foxes who tend to visit the campsite at night in search for food.



DOLPHIN MOM ADOPTS WHALE CALF—A FIRST!

July 30, 2019

NATIONAL GEOGRAPHIC

Bottlenose dolphins are doting mothers, nursing, protecting, and playing with their youngsters for up to six years. Now, new research has revealed the first known case of a wild bottlenose mom adopting a calf of another species. In 2014, researchers spotted a bottlenose mother caring for an unusual-looking male calf, along with what was presumed to be her biological calf, in coastal waters off French Polynesia. While bottlenose dolphins have slender beaks, the mysterious one-month-old's beak was short and blunt. Eventually, the scientists identified the orphan as a melon-headed whale—an entirely different species and genus of dolphin. “We were really excited to be able to witness such a rare phenomenon,” says study lead author Pamela Carzon, scientific leader of the Groupe d’Étude des Mammifères Marins (GEMM) de Polynésie, based in Tiputa, French Polynesia. Adoption is uncommon among wild mammals, with most occurring between related members of the same species. The only other scientifically documented case involving an adopted orphan of a different species and genus was in 2006, when University of São Paulo

Primatologist Patrícia Izar observed a group of capuchins caring for a baby marmoset. “At the time, we were really, really astonished,” she says. Scientists are intrigued by adoption in the animal world because it was once considered a uniquely human

DOLPHIN MOM ADOPTS WHALE CALF—A FIRST!

behavior, adds Izar, who was not involved in the study. Carzon and her team filmed and photographed the dual-species dolphin family from land, boat, and underwater as part of a long-term study of this community of around 30 bottlenose dolphins that began in 2009.



Adoption is uncommon among wild mammals, with most occurring between related members of the same species.

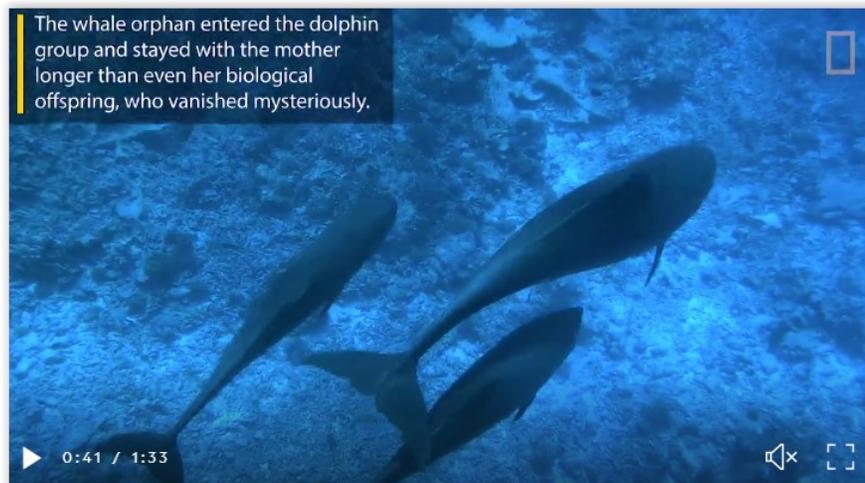
Although the mother already had a baby, once the lone melon-headed calf entered the picture, he rarely left his new mom's side. The trio were frequently seen swimming together—an unusual sight, as dolphin mothers normally care for a single infant at a time. It wasn't always familial bliss—the melon-headed calf would repeatedly shove his adoptive "sister" out from her place under their mother's abdomen. The ever-persistent orphan was not only intent on integrating himself into the family unit; he also figured out how to fit into the broader group of dolphins. "The melon-headed whale was behaving

exactly the same way as bottlenose dolphins," says Carzon, who reported the observations in June in the journal *Ethology*. For instance, he regularly socialized with other youngsters and would even join in on their favorite pastime of surfing and leaping into the waves.

Female bottlenose dolphins have been known to "steal" babies of other species for brief periods during conflicts, but the adoptee's enthusiasm and the mom's dedication show this was no kidnapping. In this case, the mother made an enormous time commitment to the orphan—the two were spotted together for nearly three years, disappearing around April 2018, the time he would have weaned. Their union continued long after her biological calf vanished for unknown reasons at one-and-a-half years old. The bottlenose female was also seen nursing her adoptive calf on two occasions, which suggests she was highly invested, says Kirsty MacLeod, a behavioral ecologist at Lund University in Sweden, who was not involved in the study. "In mammals, synthesizing milk is very costly—it's a very precious resource."

But a big question remains: Why would a bottlenose dolphin bother to invest in an infant to which she has no genetic ties? One possibility is that the recent birth of her calf triggered her maternal instincts. "Most likely, it was just a perfect moment for this calf to come along, when [the mother] was at a very receptive period to forming those bonds with her own offspring," says MacLeod, "and it led to this slightly wacky situation." Personality could have been another driving factor, as this particular dolphin was already well known for her tolerance of scuba divers in the area. Her easygoing attitude may be what kept her from displaying typical bottlenose aggression toward non-offspring.

Then there was the melon-headed whale orphan himself. The researchers believe his determination to join the bottlenose family—and act like them—played a key role in the successful adoption. "It shows that young dolphins have striking behavioral flexibility," says Carzon



The whale orphan entered the dolphin group and stayed with the mother longer than even her biological offspring, who vanished mysteriously.

MOSQUITO FORCEFIELD!

August 27, 2019

Andrew Liszinski

Saying goodbye to the warm summer months is a little easier when it also means the war against mosquito bites is coming to an end. They're not just an itchy annoyance, however, mosquitoes can spread dangerous diseases and viruses, but researchers at Brown University might have come up with the perfect mosquito forcefield: garments lined with graphene.

If you've been avoiding any and all science news for the past decade and are unfamiliar with graphene, it's a seemingly miraculous material made from a single layer of carbon atoms arranged in a two-dimensional hexagonal lattice. It's lightweight but 100 times stronger than steel, and has been used in everything from wearable blood sugar monitoring patches, bike tires with adaptable grip, and even mind-melting optical illusions.

But in a paper published yesterday in the *Proceedings of the National Academy of Sciences of the United States of America*, researchers at Brown University in Providence, Rhode Island, detail how the graphene oxide-lined fabrics they had been developing to serve as a barrier against toxic chemicals also protected wearers from mosquito attacks in two different ways

For starters, it was found that mosquitoes couldn't generate enough force for their proboscis—which is the appendage

they use to puncture the skin and withdraw blood—to actually penetrate the thin layer of graphene oxide. It acts as a sort of impenetrable force field to their attacks, but it actually works in both directions. Mosquitoes are able to pick up on chemical signals coming off your skin, alerting them to a nearby meal. But when test subjects wore a thin layer of cheesecloth protected with the extra layer of graphene oxide, not only did mosquitoes not bite, they didn't even land on the patches of exposed skin. So in theory, not only would you not have to worry about bites, while wearing a graphene oxide suit you wouldn't even have to worry about mosquitoes annoyingly buzzing past your head.

You would, however, have to worry about rain. The graphene oxide material used in this study was an effective mosquito deterrent only when it was perfectly dry. When it got wet, its force field properties were all but diminished. To get around this, the researchers found that another form of graphene oxide with a reduced oxygen content was effective against mosquitoes when wet or dry, but changing the ingredients also meant the material was no longer breathable.

In other words, you'd be safe against mosquitoes, but you'd

also feel like you were wearing a sauna. While this is big news for those who want to avoid pesky but innocuous mosquitos, it's much bigger news from a global health perspective. The World Health Organization estimates that "millions of deaths every year" are caused by mosquitos spreading a variety of diseases to humans.

The next step for the research team is to find a way to stabilize the regular graphene oxide protective layer so that it's resilient against all conditions—wet or dry—while actually being comfortable to wear. If they can pull that off, they just might have created the holy grail of camping wear.



Hurricane tip: Before it starts, write down all the things you love about your spouse and children. It will be really hard to remember after 72 hours without power.

WHALES BEACH on ST. SIMONS ISLAND

July 17, 2019

Fiza Pirani, Atlanta Journal Constitution

First responders and volunteers flocked to the shore when at least 20 pilot whales beached themselves on St. Simons Island's East Beach Tuesday evening, according to the Georgia Department of Natural Resources. Glynn County EMA and Homeland Security officials reported all whales were back in the ocean as of 7:40 p.m. Tuesday. A Facebook Live video of the mass stranding made the rounds online. Glynn County officials took to Facebook to thank all who stepped up to help the pilot whales, which can weigh up to 800 to 1,000 pounds, make their way back to sea.

According to the Wildlife Resources Division from the Georgia Department of Natural Resources, while some animals were successfully pushed back out, two pilot whales died and were taken in for a necropsy. "The remaining whales were last seen swimming in the sound, and it is hoped they will continue to keep moving out to sea," officials said. It's unclear what exactly led to the mass stranding, but DNR experts wrote on Facebook that "among cetaceans, pilot whales are the most common species known to strand in mass numbers." Last year, more than 50 beached pilot whales died on the shore of New Zealand's Chatham Island. It was the fifth stranding in the country in less than a week.

"The reason whales and dolphins strand is not fully understood," Phys.org reported after the increased beaching. "But theories include sickness, navigational error, geographical features, the presence of predators, and extreme weather." Marine mammal scientist Karen Stockin told Phys.org she suspects the unusual changes in whale behavior were driven by "warmer sea surface temperatures" that affect where the prey is moving. "The reality is I've no doubt it's been further exacerbated by the potential global warming effect," she said.

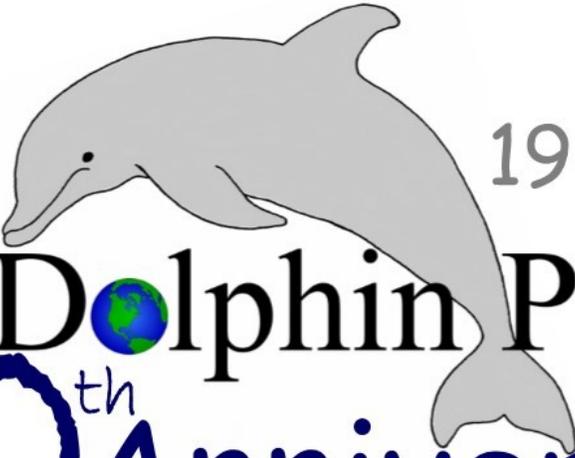
UPDATE: A group of pilot whales involved in strandings Tuesday that left three of them dead along St. Simons Island was seen offshore Wednesday. While further strandings are possible, Georgia Department of Natural Resources biologists hope the threat to this pod of pilot whales has passed. Brunswick boat pilots spotted the whales on Wednesday morning. As of that afternoon, the pod had moved even farther off-shore. DNR is continuing to monitor beaches and the public is encouraged to report marine mammal strandings to 877-WHALE-HELP (877-942-5343). Among cetaceans – the order of marine mammals including whales, dolphins and porpoises – pilot whales are the most common species known to strand in mass numbers.

Learn more about the strandings on St. Simons: <http://bit.ly/2YgU9wE>

IMAGES: Pod of pilot whales seen offshore Georgia coast.

IMAGES: People assist beached pilot whales on St. Simons Island, Georgia





1989-2019

The Dolphin Project

30th Anniversary

Join our volunteers for a 'whale' of a time to
celebrate The Dolphin Project's 30th Anniversary
at Fish Tales Restaurant at Fort McAllister Marina on
the Ogeechee River
in Richmond Hill, Georgia on
Saturday, October 26th at 5:00pm

Featuring a low country boil feast*, music and silent auction.

\$40 advance / \$45 at the door

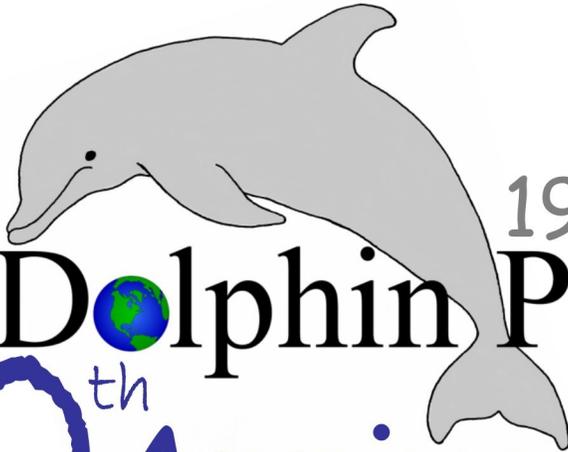


Send check to
The Dolphin Project-30,
155 Bent Tree Way, Richmond Hill GA 31324

*MENU: *low country boil, salad, chicken fingers, hush puppies, dessert and soft beverages. Cash Bar.*

For info
email: thedolphinproject@gmail.com

Interested in being a sponsor or donating to the silent auction, or know someone who might?
See our Sponsorship form on page 18 and TDP Info Sheet on page 19



1989-2019

The Dolphin Project

30th Anniversary

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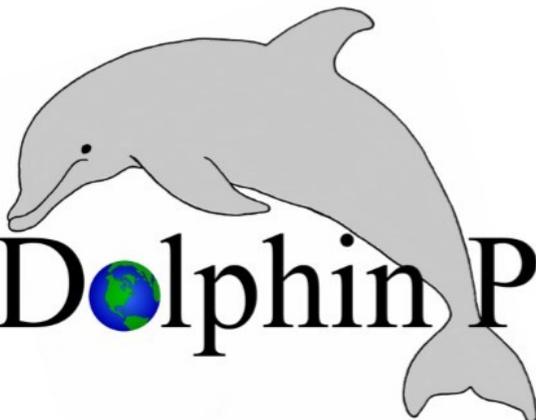
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The Dolphin Project

30 Years of Research 1989 – 2019

As an ALL-VOLUNTEER, science-based, non-profit research, conservation and educational organization, The Dolphin Project is unique. It is the only organization of its kind in the United States to be granted a government permit to conduct long-term, scientific studies of *Tursiops truncatus* – Atlantic Bottlenose Dolphin – in the Georgia and lower South Carolina coastal estuarine waters. Photo-identification surveys take place on inshore waters from January through November, from Hilton Head South Carolina to St. Mary's, Georgia. The Dolphin Project volunteers seek to contribute to the knowledge base of Bottlenose dolphins through the sharing of collected field data. Regular collaboration takes place both formally and informally with research scientists, universities, government agencies and other scientific organizations. All of the viable data and photos are uploaded into two databases at Duke University: MABDC (Mid Atlantic Bottlenose Dolphin Catalog) and OBIS SEAMAP (Ocean Biogeographic Informational System Spatial Ecological Analysis of Megavertebrate Populations). Scientists access these databases to conduct health and abundance studies of marine mammals. The Dolphin Project has co-authored and published a research paper with Savannah State University. No other organization has conducted on-site research on the wild Bottlenose dolphin on a consistent basis off the coasts of Georgia and lower South Carolina for the past thirty years.

In addition to research surveys, The Dolphin Project endeavors to promote a better understanding of marine mammals by expanding the public's knowledge and concern for our marine environment through its Education Outreach Program. Age appropriate presentations are offered to schools and organizations. Community festivals and special events are hosted by our volunteers. The Dolphin Project is the only group that offers recurrent education about the Bottlenose dolphin and coastal ecology. Education is the key to conserving our wildlife and natural resources.

*"In the end we will conserve only what we love. We love only what we understand.
We understand only what we are taught." B. Douim*

Today the work of The Dolphin Project volunteers is more critical than ever. With encroaching development, contagious diseases, sonar blasting and increasing human populations on the coast, the environment for the wild Bottlenose, as well as all marine life, is threatened. The Dolphin Project will remain vigilant in its protection of our coastal treasures. As the Dolphin Project celebrates its thirtieth year of research in 2019, it continues to expand its mission by word and deed through its dedicated volunteers providing research for the protection of wild Bottlenose dolphins and its Education Outreach Programs.

*"Never doubt that a small group of thoughtful, committed citizens can change the world;
indeed it is the only thing that ever has." Margaret Mead*

www.thedolphinproject.org

P.O. Box 60753, Savannah, Georgia 31420
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TDP VOLUNTEERS... THANK YOU!!!



Habersham H.S. sharing Goldfish crackers at TDP dolphin program

TDP Skipper Boyd Stanley with musician Don Dixon at performance of King Mackerel & the Blues are Running



TDP booth at Arts On the Coast 'Magnum Opis' art show >>>



Margaret Ann & Joni at TDP booth at Atlanta Science Festival >>>



St. Mary's crew: Skipper Carl Miller and TL Loree Scherck



Stanley Crew: Dodie, Boyd, Jennifer, Penny, Jerry



Ron Greco at Garrison School of the Arts

Dodie & Sandy at Georgia Southern/Armstrong with our new awesome Photo-ID banners



We should just name hurricanes after politicians. That way we wouldn't have to worry about them actually coming through with anything.

TDP VOLUNTEERS... THANK YOU!!!



Belinda at
Heard
Elementary

Workman Crew:
Sandy, Terry,
Tom, Bill



Tom, Sandy, Mary, Gary, Dodie & Tove at Savannah Bananas Fun Day



Susan, Mary Elize, Renee, Jennifer



Johnson Crew: John, Mary, Charlotte, Michele, Ed, Susan



<<< Jason Cave at Liberty County/GSU STEM Day

**You think black Friday shopping is bad?
You've clearly never been to a Florida WalMart before a hurricane**

2019 TDP CALENDAR

Sept 7	TRAINING
Sept 12	TDP Board meeting
Sept 14	SURVEY—sign up NOW!!!
Sept 25	Lyman Hall Elementary School STEM night, Hinesville
Oct 5	COASTFEST Brunswick ... Volunteers needed
Oct 18-20	Great Ogeechee Seafood Festival ... Volunteers needed!!!
Oct 19	Skidaway Institute of Oceanography Science Day ... Volunteers needed!!!
OCT 26	TDP 30th ANNIVERSARY at FISH TALES
Nov 16	SURVEY— sign up NOW!
Dec 7	Richmond Hill Christmas Parade ... Volunteers needed

TDP Sponsors THANK YOU!!!



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