

An aerial photograph of a tropical coastline. The sky is a clear, vibrant blue. The ocean transitions from a deep blue at the horizon to a bright turquoise near the shore. Gentle waves with white foam wash onto a wide, light-colored sandy beach. A few small figures of people are visible on the beach and in the shallow water.

THE GULF OF MEXICO

WHAT DO WE KNOW ABOUT IT?

THE AMAZING GULF OF MEXICO

1. 600,000 square miles in size.
2. Largest Gulf in the World
3. Tenth Largest Body of Water on the Planet.
4. It borders 5 US states, Cuba and parts of Mexico.
5. It formed about 300m years ago.
6. Sharks love it – there are 49 different species in its waters.
7. It has incredibly slow-growing old black coral reefs, up to 2,000 years old.
8. It is home to the “hot tub of despair”, an underwater brine pool so salty that most things can’t survive in it. It’s 4 times as salty as nearby seawater.
9. The Gulf is home to more than 750 known shipwrecks that date back to the 16th century.
10. Some areas are super deep, up to 14,383 ft (5,200 ft is the average).
11. It is a rich reservoir of natural gas and oil. 54% of all US oil comes from the Gulf, and 47% of natural gas.
12. There are about 27,000 oil and gas wells that have been drilled and abandoned here.



WHAT ARE SOME OF THE PROBLEMS ITS FACING?

CANCER ALLEY



85-mile corridor of the Mississippi River between Baton Rouge and New Orleans.

Home to more than 150 industrial plants and oil refineries.

Surrounded by some of the highest poverty levels and ill health in the US.

Small towns clustered around petrochemical processing facilities that dot the region are mostly populated by African Americans.

EPICENTER OF ENVIRONMENTAL RACISM

Throughout the US, minorities (African Americans, Indigenous people, immigrant) are more likely to live near industrial plants and are exposed to toxic pollutants at a rate much higher than whites.



An 85-mile stretch known as Cancer Alley is home to more than 150 plants and refineries.

CANCER ALLEY

Beyond cancer alley, the Gulf states that share the shoreline (Texas, Louisiana, Mississippi, Alabama, and Florida) continuously release tremendous amounts of toxicity in the form of air and water pollution.

Much more is washed into the gulf by storm surges from the increasing number of hurricanes that are hitting the shores in recent years.

Butadiene
Acrylonitrile
Neoprene
Acrylonitrile Butadiene Styrene
Styrene Butadiene Rubber
Nitrile Rubber
Styrene Butadiene Latex
Polybutadiene

Propylene
Polypropylene Glycols
Butyl Alcohol
Nitrile Rubber
Adipic Acid
2-ethylhexanol
Butyl Acetate
Styrene Acrylonitrile
Propylene Oxide
Hexamethylene

Ethylene

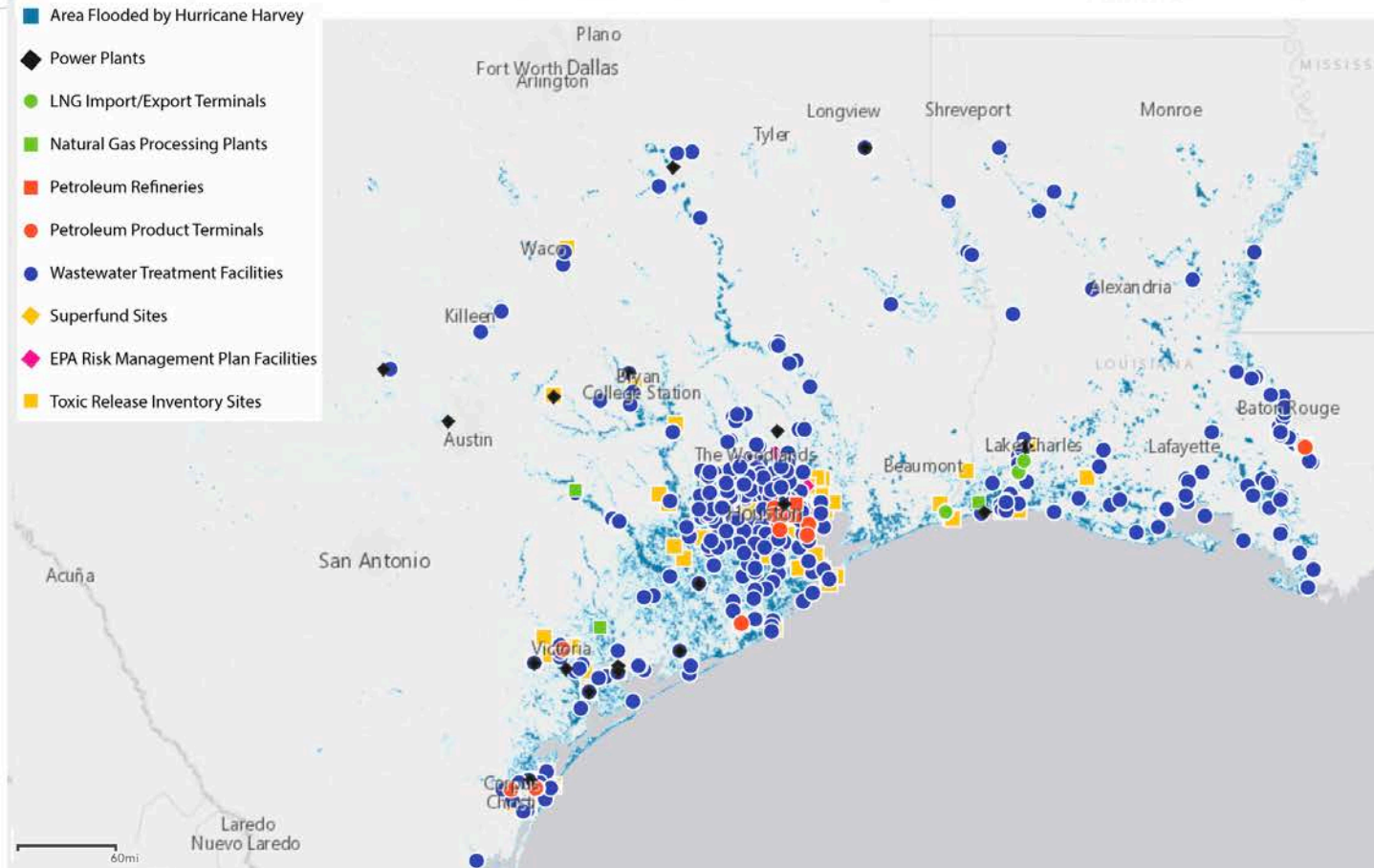
ENVIRONMENTAL STRESS
EXASPERATED BY
CLIMATE CHANGE

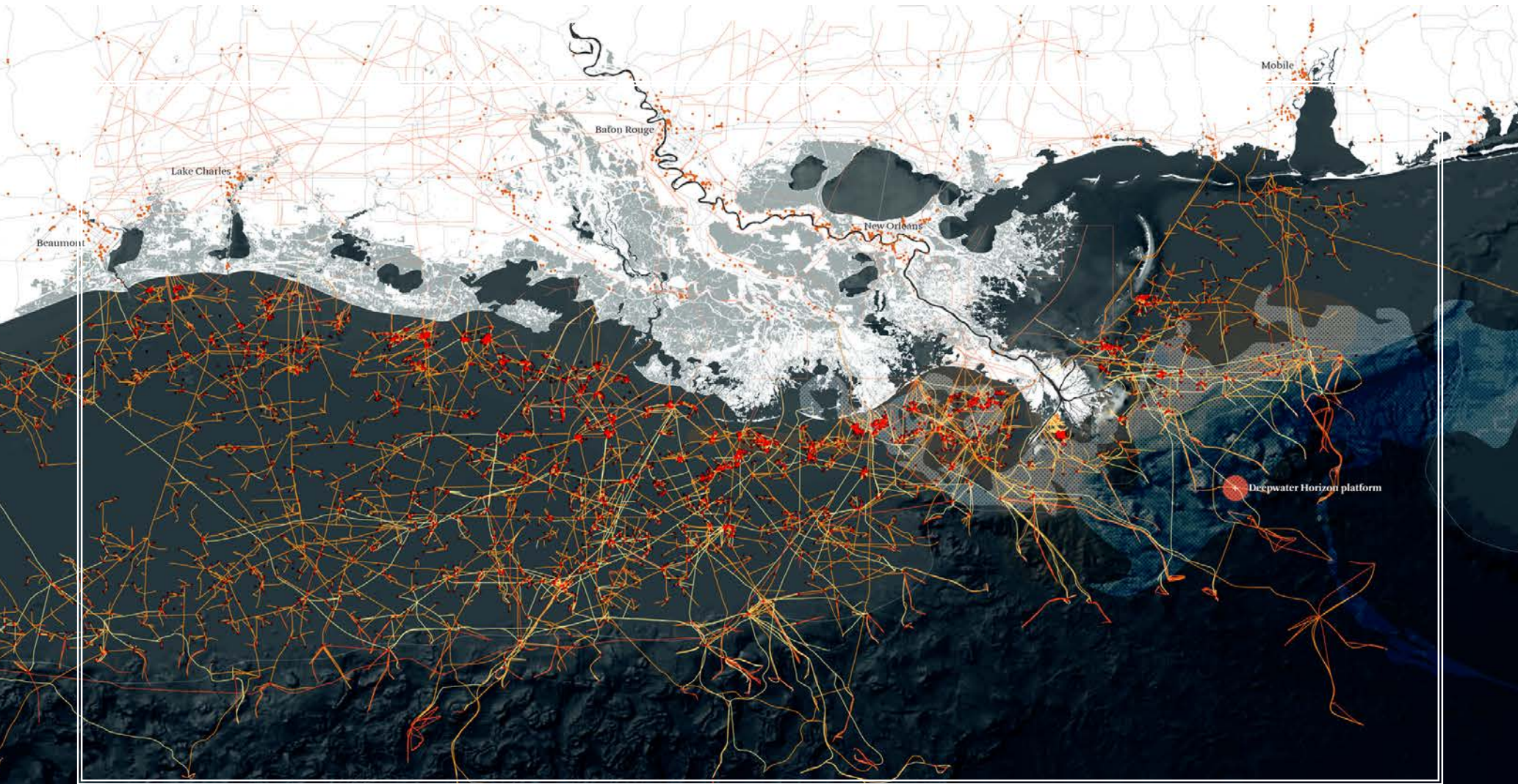
2017

Hurricane Harvey's Impact on Energy and Industrial Facilities

Hurricane Harvey brought devastating flooding to Texas and Louisiana. Using The Dartmouth Flood Observatory's satellite data on flood extent and publicly available data sources, the Union of Concerned Scientists has identified **over 650 energy and industrial facilities**--such as wastewater treatment plants, petroleum refineries, and Superfund sites--that were potentially exposed to Harvey's floodwaters, shown here in blue.

Energy and Industrial Facilities Exposed to Hurricane Harvey's Floodwaters





The 2010 Deepwater Horizon oil spill was the largest marine oil spill in history.
It was caused by an explosion on BP's Deepwater Horizon oil rig—located in the Gulf of Mexico about 40 miles off the coast of Louisiana.

Failing florida's fisheries and fishing industries

How the fishing capital of the world became a pollution capital



The BP oil spill cost the Gulf of Mexico's commercial fishing industry up to \$1.6 billion and up to 9,315 jobs in the first eight months following the spill.

SOURCE: Bureau of Ocean Energy Management (2016)



ENVIRONMENTAL COSTS OF THE BP OIL SPILL

Oil removed by state:

- Louisiana - 9,810,133 pounds.
- Alabama - 941,427 pounds.
- Mississippi - 112,449 pounds.
- Florida - 73,341 pounds.

In Louisiana, even after the cleanup, oily residue remained embedded into hundreds of miles of marshlands, killing vegetation and causing erosion.

In 2011, half of the area's bottlenose dolphins were affected by lung disease as a result of "toxic exposure to oil." (NOAA)

Almost 20% were so ill they weren't expected to live.

Between May 2010 and November 2012, more than 1,700 sea turtles were found stranded in distress (compared to 240 normally found each year).

In addition, 930 dolphins and whales were discovered stranded between 2010-2013. Only 20 a year are usually found in Louisiana.

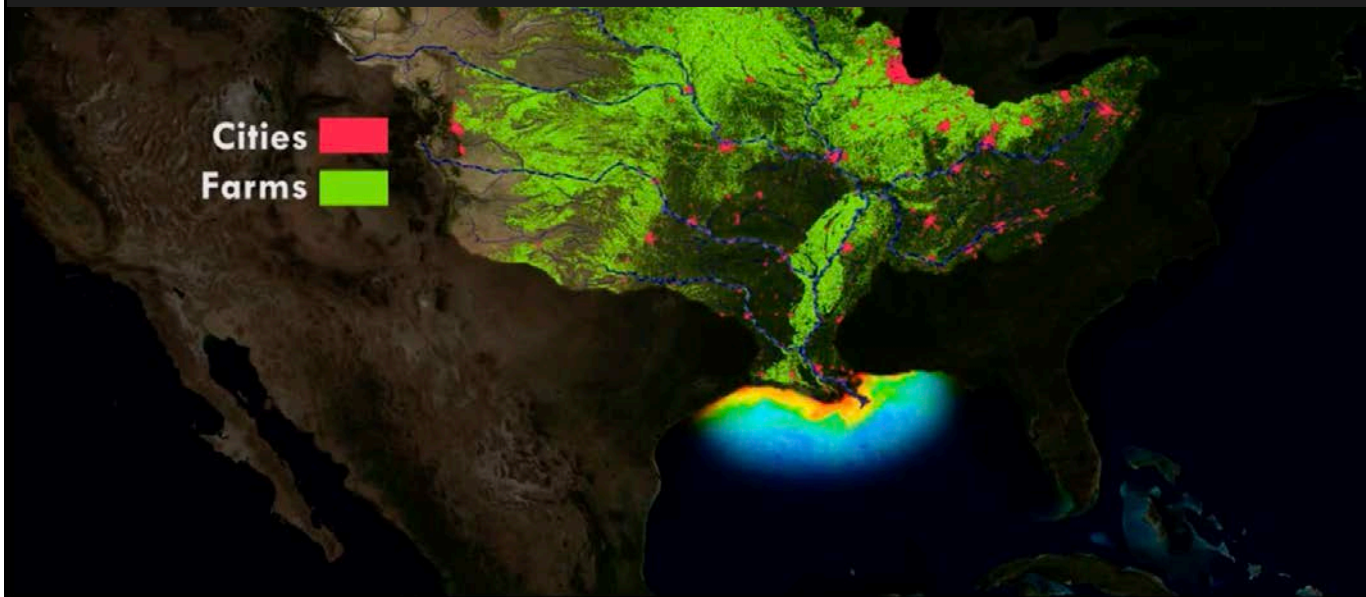
To replace lost foraging habitat for ducks and other migratory birds, 79,000 acres of harvested and idle rice fields have been intentionally flooded.

THE GREAT MISSISSIPPI RIVER

How much of US waters flow into the Gulf from the Mississippi?



About 12 million people live in urban areas that border the Mississippi, and these areas constantly discharge treated sewage into rivers.



However, the majority of the land in the Mississippi's watershed is farm land. Each spring as farmers fertilize their lands preparing for crop season, rain washes fertilizer off the land and into streams and rivers.

ALL THIS CONTRIBUTES TO POLLUTION THAT CAUSE DEAD ZONES IN THE GULF.

WHAT IS A DEAD ZONE?

A DEAD OR HYPOXIC ZONE OCCURS AT THE BOTTOM OF A BODY OF WATER WHEN THERE'S NOT ENOUGH OXYGEN TO SUPPORT MARINE LIFE.

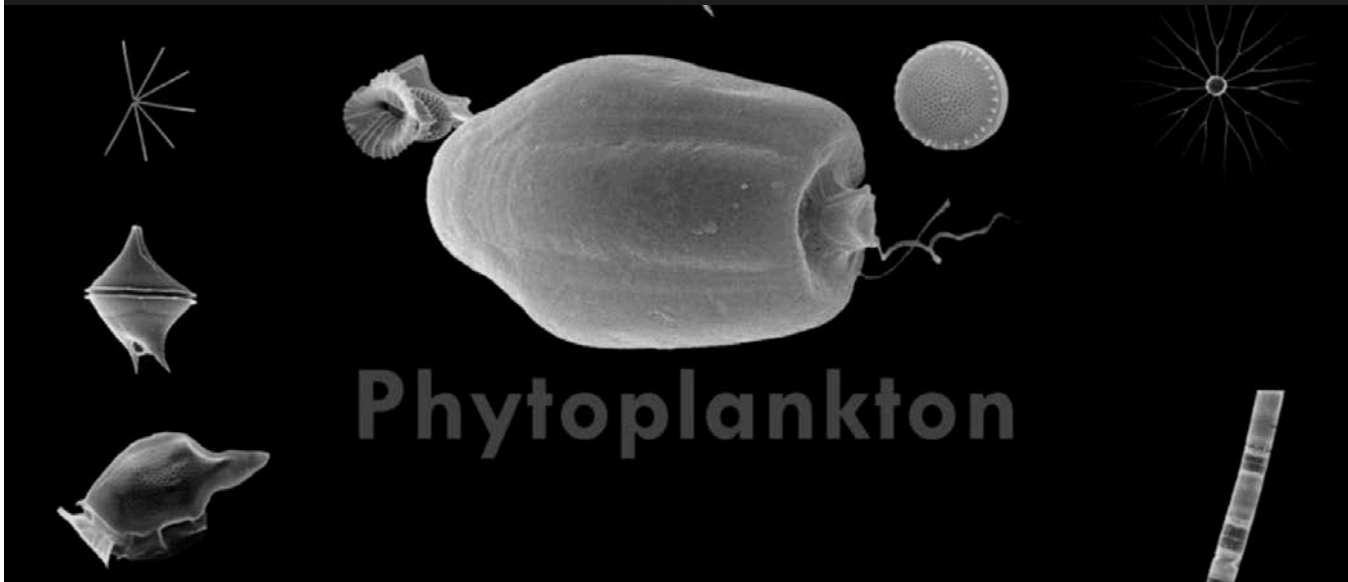
THE SECOND LARGEST DEAD ZONE IN THE WORLD IS IN THE GULF OF MEXICO, WHERE IT OCCURS EVERY SUMMER.

THE RECORD (2017) WAS ALMOST 9,000 SQUARE MILES - THE SIZE OF SWITZERLAND.

THE 2019 DEAD ZONE WAS ALMOST 7,000 SQUARE MILES (THE 2ND LARGEST ON RECORD).

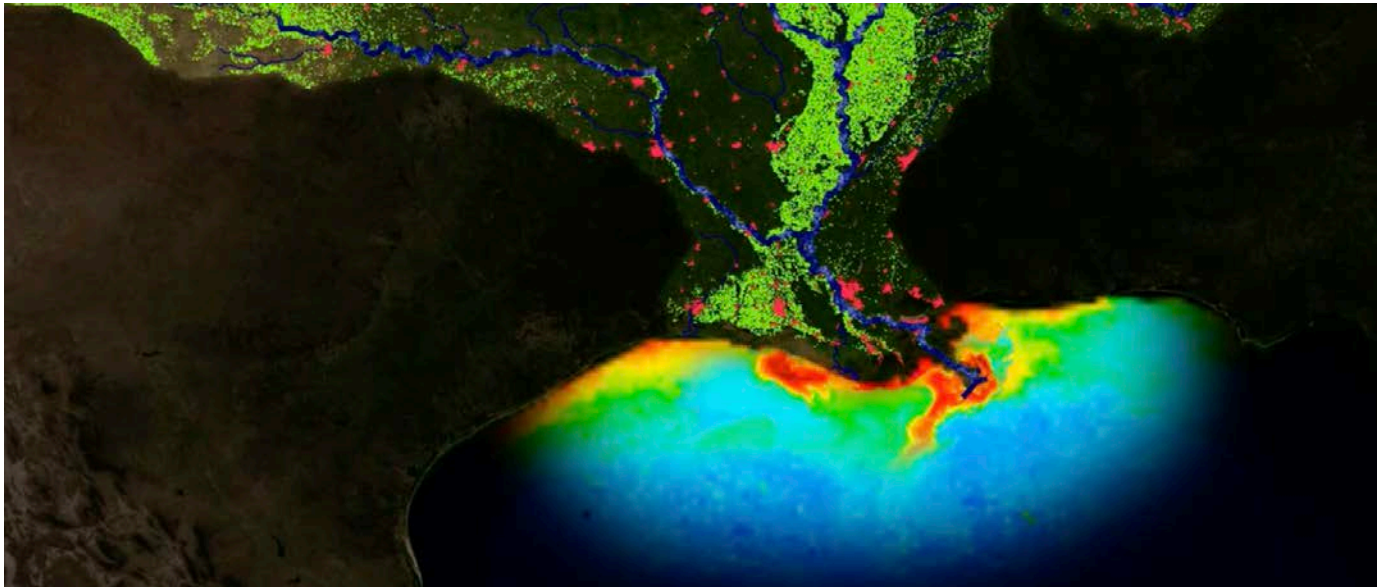
The Arabian Sea is the largest and thickest dead zone in the world

Did you know that half of the oxygen that we breathe comes from tiny organisms that live in the ocean? These microscopic marine organisms, called phytoplankton, produce oxygen just like land plants.



Phytoplankton

But phytoplankton are not plants, they are Protists, single celled organisms. They are so small that thousands of them can fit in a single drop of water.

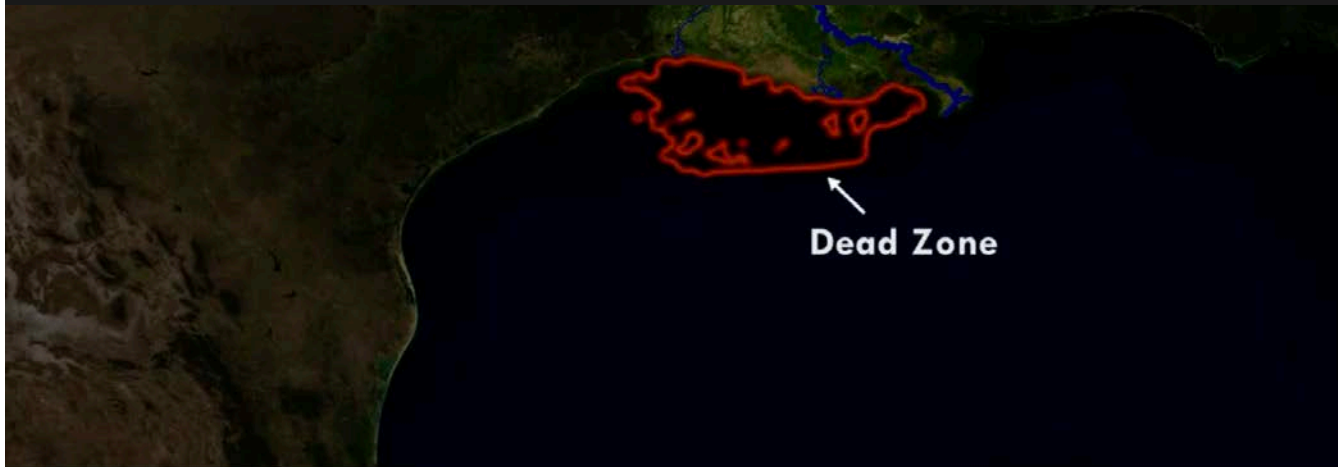


All of the urban and farm discharge includes nutrients such as nitrogen and phosphorus that are very important for the growth of phytoplankton.

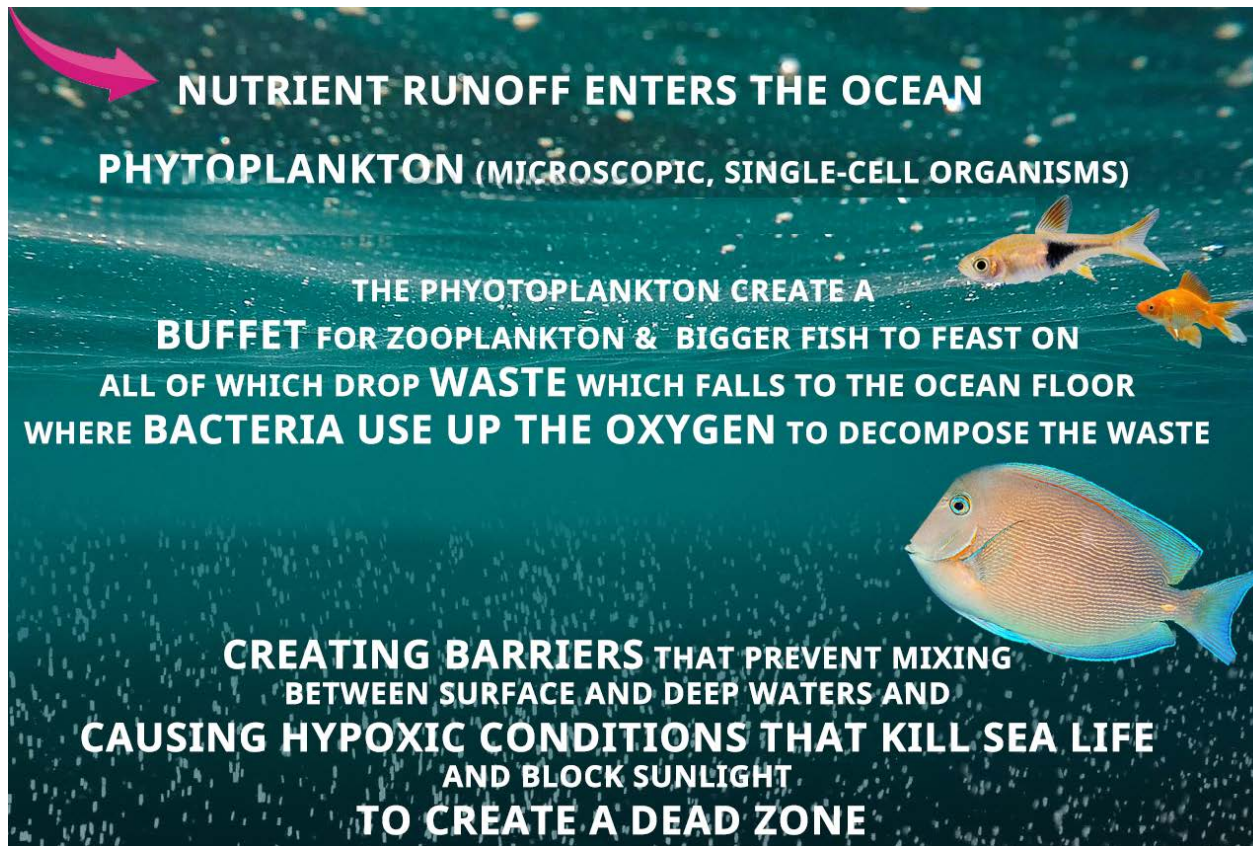
Incredibly, about 1.7 million tons of these nutrients are dumped into the Gulf of Mexico every year.

Once the Gulf of Mexico receives this huge influx of nutrients, massive phytoplankton blooms occur.

These blooms result in an area called the **Dead Zone** -- areas with such low oxygen concentration that few organisms can survive there.



But if phytoplankton blooms produce oxygen, then why does a Dead Zone occur?



NUTRIENT RUNOFF ENTERS THE OCEAN

PHYTOPLANKTON (MICROSCOPIC, SINGLE-CELL ORGANISMS)

**THE PHYTOPLANKTON CREATE A
BUFFET FOR ZOOPLANKTON & BIGGER FISH TO FEAST ON
ALL OF WHICH DROP WASTE WHICH FALLS TO THE OCEAN FLOOR
WHERE BACTERIA USE UP THE OXYGEN TO DECOMPOSE THE WASTE**

**CREATING BARRIERS THAT PREVENT MIXING
BETWEEN SURFACE AND DEEP WATERS AND
CAUSING HYPOXIC CONDITIONS THAT KILL SEA LIFE
AND BLOCK SUNLIGHT
TO CREATE A DEAD ZONE**

Every summer the dead zone at the mouth of the Mississippi River suffocates any surviving sea life that live on the ocean floor.

There are many other smaller dead zones that periodically appear and shift around the rim of the Gulf, chasing away the sea life that can escape into the deeper waters offshore.

RED TIDE

In Florida, a **red tide** is a phenomenon caused by microscopic algae called *Karenia brevis* that in high concentrations can cause harmful algal blooms (HABs).

The algae contain a **toxin that affects the nervous system (neurotoxin)**, which is released when the algae break open (either by crashing waves or when ingested by an animal).

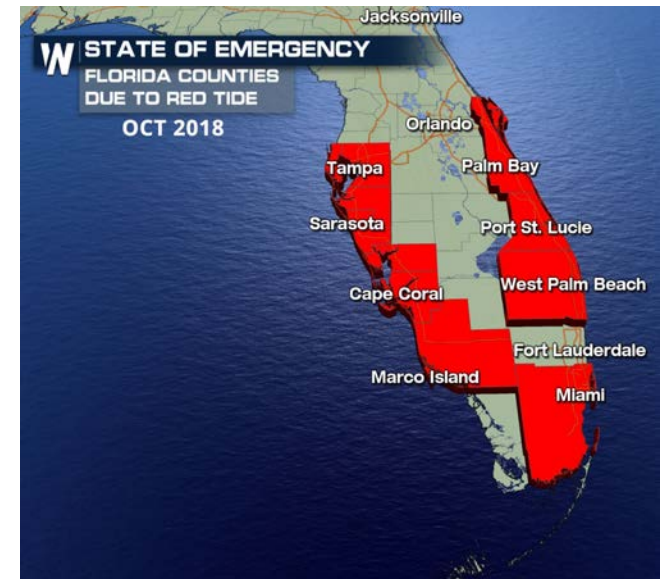
These potent neurotoxins can **be transferred through the air, or the food web where they can kill** zooplankton, shellfish, fish, birds, marine and land mammals, and humans, that feed either directly or indirectly on them.

Karenia brevis algae occurs naturally in the Gulf, usually 10-40 miles offshore, at safe levels of less than 1,000 cells per liter of water.

In **coastal waters, the algae meet nutrient-rich run-off** (residential, industrial and agricultural) – the ‘fuel’ that allows it to grow and reproduce to harmful levels, making the **water deadly**.

If it is **breathed in**, it causes respiratory tract irritation and is particularly dangerous to those with medical conditions such as asthma or lung disease.

Large die-offs of algae result in a decaying process that depletes the surrounding water of oxygen – thereby creating a **dead zone**.



Red tides and blue-green algae blooms are similar, but different.

Red tides mainly occur in saltwater bodies and estuaries.



Blue-green algae (cyanobacteria) mainly occur in freshwater bodies.



ECONOMIC IMPACTS

RED TIDES

SWFlorida's lingering red tide caused fish kills, economic impacts and environmental damage.

Economic impacts effect four main sectors:

recreation and tourism;

commercial fisheries;

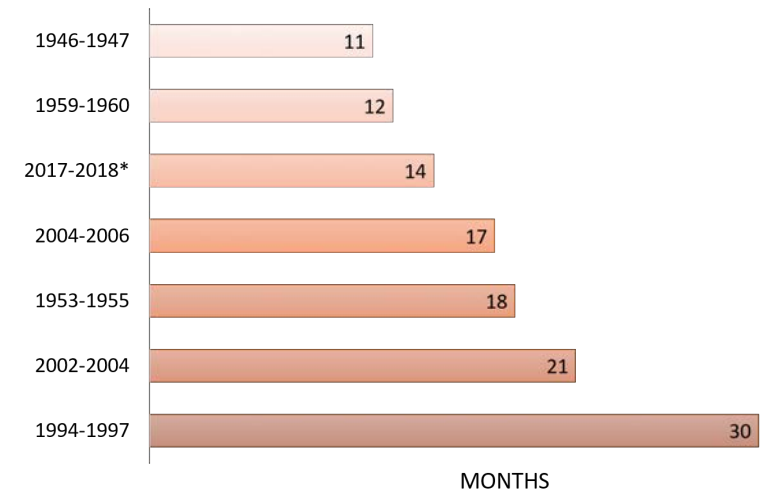
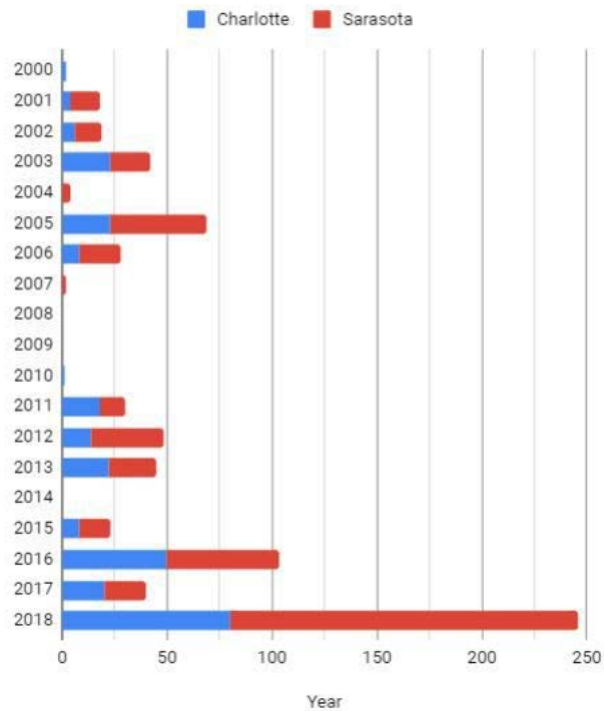
public health;

monitoring and management costs; and

potentially a decline in residential home value (not examined)

Fish Kills Caused by Red Tide

Source: FWC Fish Kill Database



BLOOM DURATION

SOURCE: Sea Grant

ECONOMIC IMPACTS

- Red tides are estimated to cause more than \$20 million in tourism-related losses in Florida each year.
- The 2015-16 red tide event resulted in a sales loss of \$1.33 million to the hard clam aquaculture industry.
- Health costs attributed to medical expenses and lost workdays associated with Harmful Algae Blooms cost the US \$22 million dollars annually.
- According to the Florida Department of Health, treatment costs for respiratory illness in Sarasota County during the 2015-16 red tide event might have reached as high as \$4 million dollars.
- Cleanup costs for affected areas reach into the millions of dollars.
- Red Tide also negatively impacts locally caught seafood and its consumption.



[FOR MORE ON FLORIDA'S RED TIDE: www.flseagrant.org/news/2018/12/understanding-floridas-red-tide](http://www.flseagrant.org/news/2018/12/understanding-floridas-red-tide)



A CYCLE OF BUSINESS-AS-USUAL

- The U.S. Environmental Protection Agency (EPA) has not used its authority under the Clean Water Act to solve the problem of agricultural runoff, despite acknowledging for more than two decades that nutrients are a problem and that we need to develop numeric regulations to control the amount of nitrates and phosphates entering water systems.
- Instead, it leaves it up to the states to implement narrative standards that describe the quality of water needed for a body of water to be used for a designated purpose, such as recreation.
- The states, for the most part, have failed to adequately enforce these standards.
- The law says that, when there is a problem [with implementation], the EPA needs to step in and do what needs to be done. However this has not been the case.
- The Natural Resources Defense Council (NRDC) has filed multiple petitions asking the EPA to step in, however the agency has denied the petitions, and the NRDC has responded by challenging this in lawsuits.
- The states and the EPA are under substantial pressure from corporate interests not to do anything about the problem, even though the law requires that they do.
- Adding to the problem, the Trump Administration has suspended The Waters of the United States rule, also known as WOTUS, which clarifies which wetlands and small waterways are protected under the Clean Water Act of 1972.
- **The biggest hurdle to improving water quality in the region is jump-starting government systems into positive environmental action.**



In short, there are no limits on agricultural use of fertilizers

Reducing chronic nitrogen and phosphorous pollution could cost the US up to \$1.4 billion annually, depending on the methods used and where they were implemented.

BUT IF WE LOOK AT ALL THE OTHER COSTS ASSOCIATED WITH THE CONSEQUENCES, IS IT THAT MUCH TO INVEST IN?

Catherine Kling (2010), Professor in Iowa State University's Department of Economics.



SEA GRASS & MANGROVES

Many thousands of square miles of seagrass beds and mangrove swamps have succumbed to pollution sources associated with urban growth, agricultural runoff, and industrial development.

The exact size of the loss is indeterminable, because no one knows how much existed to begin with.

SALT MARSHES

Salt marshes are **coastal wetlands rich in marine life**. Sometimes called tidal marshes because they occur in the zone between low and high tides. Salt marsh systems are dynamic and constantly changing. Their plants thrive along low-energy (sheltered) coastlines and in areas called estuaries, where freshwater from the land mixes with sea water.

The plants that grow in salt marshes are composed of a variety of rushes, sedges and grasses that create a landscape of various shades of gray, brown and green.

Value

Salt marshes provide nursery areas for fishes, shellfish and crustaceans. These plants have extensive root systems that enable them to withstand brief storm surges, buffering the impact on upland areas. Salt marshes also act as filters. Tidal creeks meander through the marshes transporting valuable nutrients as well as pollutants from upland development. Salt marshes can **absorb, or trap, some of these pollutants**, reducing the pollutant load entering estuaries. Salt marshes also **prevent sediments from washing offshore**, often creating more land on which salt marshes can grow.

Salt Marsh Losses in Florida

Despite their value, salt marshes have been **drained or filled with silt, sand or refuse** to an elevation at which they can no longer survive. It is estimated that in Florida at least 60,000 acres, or 8 percent, of estuarine habitat has been lost to permitted dredge and fill activities (channel deepening, maintenance dredging, shell dredging, and dredging for land fill construction).

For example, ship channel dredging and port construction in Tampa Bay have brought great economic benefits (by becoming one of the largest ports in the nation).

The cost has been the loss of more than 40% of its original mangrove and salt marsh acreage.



CORAL REEFS

Coral reefs are like bustling underwater cities that lie beneath tropical, sunlit waves. Thousands of colorful creatures dash and dart about them, as loud and as fast-paced as the citizens of any human city.

Built up in tissue-thin layers over millennia, corals are the high-rise apartment buildings of the city.

Their calcium skeletons represent generations of tiny invertebrate animals.

Jacketing them is a living layer of colorful coral polyps (soft-bodied organisms related to sea anemones and jellyfish). At their base is a hard, protective limestone skeleton, which forms the structure of coral reefs.

Reefs begin when a polyp attaches itself to a rock on the sea floor, then divides, or buds, into thousands of clones.

Their complex structures offer **shelter**. And for more than a hundred species of fish, and dozens of species of invertebrates, those coral skyscrapers are **lunch**.

Warming oceans stress corals. This causes them to bleach, which means they turn white and become vulnerable.

A **prolonged spike in temperatures** of just one to two degrees Celsius (1.8 to 3.6 degrees Fahrenheit) may be enough to **kill corals**.

Greenhouse gas emissions acidify the water. That can dissolve the corals' mountain of calcium skeletons.

Chemicals, too, can stress or kill corals or their larvae. Some of these chemicals wash off the land. Others, such as **sunscreens**, wash off of people.

Today, **about 60 percent of the world's reefs are at risk of disappearing.**

Threats to reefs have dramatically escalated in the last few decades. **Florida's barrier reef appears not only to be dying, but vanishing altogether**, perhaps dissolving as a result of acidification.



EVERGLADES

Everglades National Park encompasses 1.5 million acres of subtropical wilderness in South Florida.

It is home to one of the largest wetlands in the world.

Nine distinct habitats have been identified in the park, but it is best known for its mangroves (the largest contiguous stand of protected mangroves in the western hemisphere).

It also includes sawgrass prairies (dense stands of tall grass), and freshwater sloughs (backwater to a larger body of water such as a river or bay) that draws water from Lake Okeechobee southward.

The Everglades teems with plant and animal species not found anywhere else in the world.

It provides important habitat for numerous species like the manatee, the Florida panther, and in the winter months, more than 360 species of birdlife.

The Everglades receives an average of 60 inches of rain a year. To put that in perspective, Seattle, Washington, receives a little more than half of that annual amount.

The frequent thunderstorms during the summer rainy season ensure a seasonal supply of freshwater to the Everglades.

Invasive species, like the Burmese Python, are threatening the Everglades ecosystem.

Poor water management, landgrabs, and political interests that protect industry (most notoriously 'big sugar') and support legislation that paves the way for private interests to use taxpayer resources to develop the Everglades also threaten it.



Long Pine Key Lake in the Everglades. Photo by Glenn Nagel

AGRICULTURE/URBANISM

Beyond the **pollutants discharged from point source pollution** such as Florida's Lake Okeechobee, which has been degraded by **agricultural and urban runoff** for years,

a wide variety of non-point source pollutants, including **runoff from millions of tons of lawn fertilizer** that satisfy Florida residents' obsession with manicured **lawns and golf courses**,

and all the **oil, gas, chemicals and heavy metals** that result from every square inch of urbanization, wash, leach and **drain into waterways** that lead to the Gulf.

Nutrient pollution, one of the biggest problems for water quality in the Gulf, is as difficult to trace as it is to catch running water in your hands.

Our ill-informed habits (such as cultivating lawns and building golf courses) not only contributes to red tide and algae blooms,

but perpetuates continuing rapid species decline and natural habitat loss.

Habitat diversity has been largely replaced with biologically poorer and more homogenous human-dominated landscapes.



The numerous freighters, tankers and **cruise ships** chug in and out of south Florida's bustling ports each year also bring health risks, emitting more air (diesel) pollution than the emissions of **300m cars**. (NOAA)

Sewerage is also a problem. The EPA estimated that a single 3,000-person cruise ship can pump as much as **74,000 gallons of sewage into the ocean in a single day**, spewing out a **toxic cocktail of nutrients, metals, solids, endocrine disrupters and pathogens**.

<https://www.epa.gov/vessels-marinas-and-ports/vessel-sewage-discharges>



How do we begin addressing such complex problems?

ENACTING SUITES OF INTERRELATED TACTICS, STRATEGIES, MECHANISMS & ACTIONS

- PUBLIC PROTEST & ADVOCACY
- PERMITTING/POLICY REFORM
- AGRIBUSINESS (COMMERCIAL & RESIDENTIAL)
- WISE WATER MANAGEMENT POLICY
- BIOREMEDIATION OF MARINE SHORELINES
- RESTORING ECOSYSTEMS AS INTERCONNECTED LIVING ENTITIES
- EXTERNAL ACCOUNTING FOR INDUSTRY & INDUSTRIAL DISCHARGE
- ENVIRONMENTAL EDUCATION & RESEARCH
- ADDRESSING ENVIRONMENTAL RACISM

WHAT ARE SOME OF THE POSITIVE THINGS HAPPENING LOCALLY AND REGIONALLY?

BOTH REFORMISM/SOCIOECOLOGICAL SOLUTIONS



LOCAL-SCALE ACTIONS



In Cancer Alley, the “Petrochemical Corridor,” an **increasing number of facilities are slated to be built** in primarily African-American communities concentrated in **St. James Parish**, midway along this corridor.

Plants still in the permitting process include the infamous Chinese-owned Wanhua chemical plant, the Taiwanese-owned Formosa plastic manufacturing plant, and Texas-based Syngas methanol facility.

All have received a green light on the local level, but the plants still need permits from Louisiana’s Dept. of Environmental Quality (DEQ).

The **Coalition Against Death Alley (CADA)**, a group of Louisiana-based residents and members of various local and state organizations, is calling for a stop to the construction of new petrochemical plants and the passing of stricter regulations on existing industry in the area.

CADA members, which include the groups **RISE St. James, Justice and Beyond, the Louisiana Bucket Brigade, 350 New Orleans, and the Concerned Citizens of St. John**, are expressing their opposition at parish council meetings and other state regulatory hearings.

While CADA members have yet to leverage local representatives to reject any of the proposed petrochemical plants, their **efforts have slowed the permitting process** by presenting information that led to the tabling of certain decisions. Some of the proposed **permits end up with added stipulations**.



ORDINANCES RESTRICTING FERTILIZER USE

The Conservancy of Southwest Florida has worked with several communities to **educate SW Floridians about fertilizer usage**.

They **work with government to enact legislation that restricts fertilizer usage**.

Nearly **90 local governments** around the state have **adopted strong fertilizer ordinances**, including most SWFL counties from Marco Island to Punta Gorda (however, the City of Naples and Collier County have either weakened or never adopted strict ordinances regarding fertilizer application).

Some of the major components of a strong ordinance include:

- Calendar-based rainy season ban — no fertilizer between June 01 through September 30
- Application Rate — no more than 4 lbs. of nitrogen per 1000 sq ft. in any year
- Fertilizer Nitrogen Content — no less than 50% slow release nitrogen
- Fertilizer Phosphorous Content — 0–2% per guaranteed analysis
- “Fertilizer Free” Buffer Zones — no fertilizer within 10 feet of a water body

Fort Myers Beach is poised to become the first in Southwest Florida to **ban chemical (glyphosate)** found in Roundup weed killer

Sanibel island offers guided native vegetation and landscaping information and encourages to use organic fertilizers.

CORAL REEF RESTORATION

There is no single answer. What works on one reef may not save another.



In Florida, researchers are restoring reefs with tiny coral fragments.

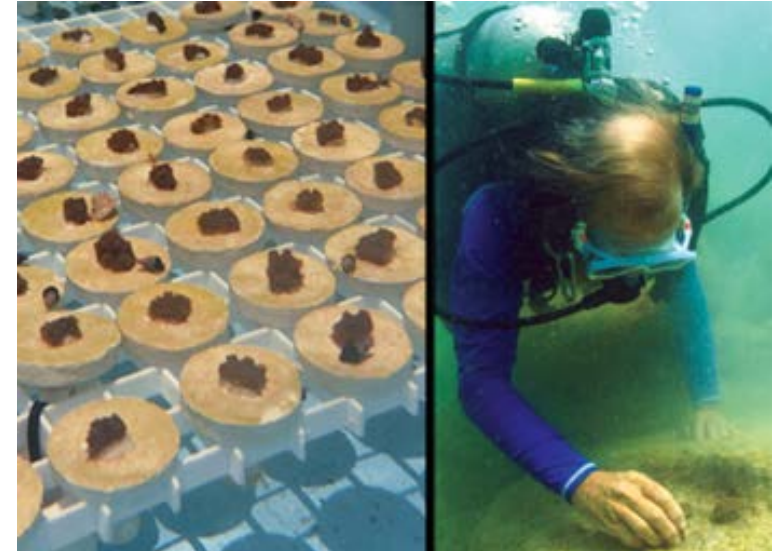


In Hawaii, the hardest, more stress-tolerant corals are bred in labs.



Efforts in the Philippines are showing promise in restoring flood damaged reefs with tiny coral larvae.

- Reef restoration research project by biologists Chris Page / David Vaughan at Mote Marine Laboratory, Florida.
- The research team is **cultivating 17 species of coral for microfragmentation**.
- Coral “microfragments” **repair themselves remarkably fast: 25 to 40 times faster** than corals naturally grow.
- Genetically identical microfragments — clones — are spread over the surface of dead coral skeletons in the Florida Keys.
- As **they fuse together, they create a fast growing “skin” over an otherwise dead reef**. The hope is that thousands of pieces could potentially carpet a small reef in just a few years.
- The corals grow in large troughs on land, with seawater running through them. A half dozen or so of the corals are slow-growing species that create the structure of the reef. Some can mound into boulders the size of a truck.
- As the ocean warms and bleaching and disease becomes more common, **genetic diversity** is important for resilience, so the researchers are raising 20 to 30 genetic variants of each coral species and are also collecting eggs and sperm from wild colonies.
- The first 200 microfragments were introduced into the ocean five years ago at two sites off Big Pine Key, Fla. The colonies are now around eight times larger than they were at planting. And they have begun to fuse into patches about the size of a 5-gallon bucket lid. Since then, the team have planted close to 10,000 microfragments in the wild.
- **Fragmentation and microfragmentation are both time and labor-intensive. That makes them very expensive.**



Coral microfragments grow on round pucks (left) on Florida's Summerland Key (2016). These microfragments are later planted to restore reef-building corals. This is what reef scientist Dave Vaughan (right) does in the waters off the southern tip of Key West.
C. Page; Conor Goulding/Mote Marine Laboratory

SEA GRASS BED RESTORATION



The Department of Environmental Protection (DEP) seagrass restoration program consists of three components: salvage, laboratory tissue culture and aquaculture.

The seagrass salvage program recovers seagrasses which would otherwise be lost as a result of marine construction (i.e., docks, piers) and transplants the grass to areas of similar habitat where beds are in need of restoration.

In 2004, 50 square meters (50 m²) of lab-cultured widgeon grass was installed to aid in the establishment of the seagrass beds in the Pensicola region.

The widgeon grass now measures over 10,000 square meters (10,000 m²).

CHARLOTTE HARBOR NATIONAL ESTUARY PROGRAM

What We Do and How We Do It:
Protecting Southwest Florida's water and estuarine resources



Power of Partnerships



Pulling together diverse stakeholders is the most powerful and effective to protect our waters. The CHNEP creates a safe environment for dialogue and reaching consensus-based decisions based on sound science. Speaking with a unified voice and set of priorities means more influence and resources for all.

Empowering Citizens



Whether is it providing vital information to policymakers, environmental education to children, or presentations to community groups, CHNEP is in our community working every day to empower citizens to protect water and estuarine resources - the basis of Southwest Florida's quality of life and economy.

Research and Restoration



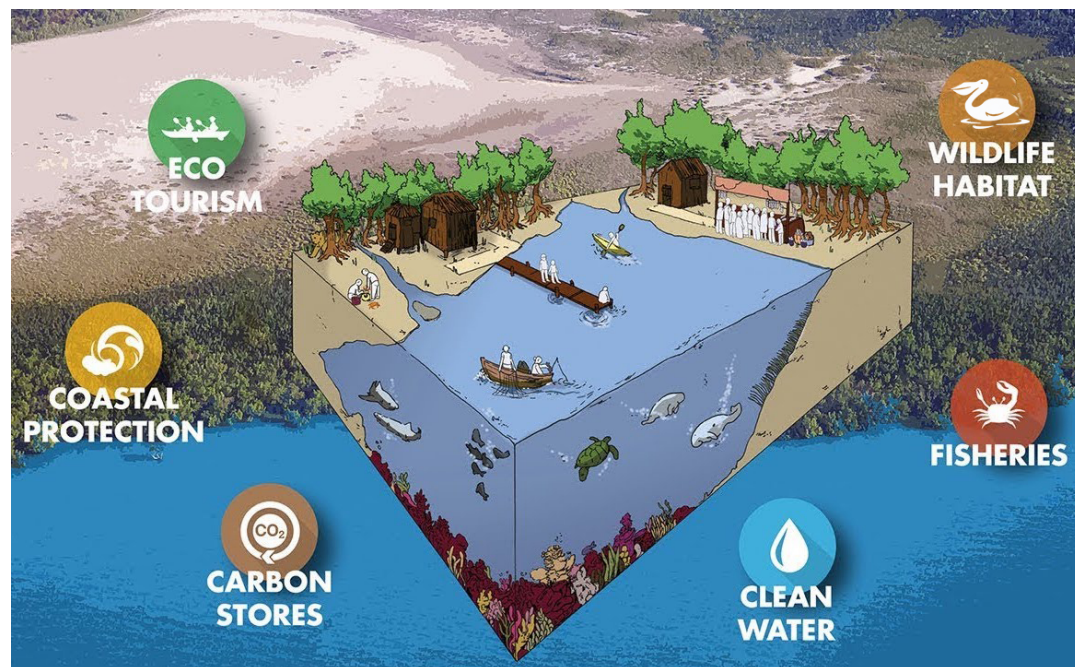
Our small but mighty team directly undertakes scientific research and restoration to improve water quality, replant seagrasses and create more oysters in our waters. We also provide critical support to our research and restoration partners with field support, financial assistance, grant writing and administration, data analysis, etc.

Mangrove forests protect uplands from storm winds, waves and flooding and provide an important habitat for a range of sea and bird life.

Mangroves can help prevent erosion by stabilizing shorelines with their specialized root systems. Mangroves also filter water and maintain water quality and clarity.

A wide mangrove fringe can considerably reduce wave and flood damage to landward areas by enabling overflowing water to be absorbed into the expanse of forest.

MANGROVE RESTORATION



This mangrove restoration is within Rookery Bay National Estuarine Research Reserve, on Marco Island

Mangrove Losses In Florida

Florida's estimated remaining 469,000 acres of mangrove forests contribute to the overall health of Florida's southern coastal zone. This ecosystem traps and cycles various organic materials, chemical elements and important nutrients. It is true that mangroves can be naturally damaged and destroyed, but there is no doubt that human impact has been most severe.



FGCU's Vester Marine Field facility and the Everglades Research institute are important base of operations for research of Southwest Florida's coastal wetland and watershed habitats.





SUB-NATIONAL/REGIONAL-SCALE INITIATIVES



When the Mississippi River Collaborative was [founded](#) in 2005, [nitrogen and phosphorus pollution](#) entering the Mississippi River was already a top priority. Drinking water in many areas was in jeopardy. Beaches were being closed. Fish kills were occurring. The Gulf of Mexico Dead Zone was growing at an alarming rate, depriving aquatic life of oxygen and threatening entire ecosystems.

Since its inception, the Mississippi River Collaborative has been doing everything it can to convince EPA that numeric standards for nitrogen, phosphorus, and algae pollution indicators must be established as a critical first step toward reducing nitrogen and phosphorus pollution in their lakes and rivers, and thus improving water quality for the entire Basin.

Flash forward a decade and the problem is as bad as it ever was. Not for a lack of available solutions to the problem, but because of EPA's unwillingness to act in a manner sufficient to protect water quality.

EPA LAWSUIT

What do you do when EPA does not adequately address a major environmental problem?

[2008 MRC Petition to US EPA](#)

[2012 MRC Lawsuit \(Gulf Restoration Network et al v. Jackson and EPA\)](#)

WHAT IS MRC DOING TO REDUCE POLLUTION FROM AGRICULTURE?

The MRC Agriculture Group closely monitors the causes and effects of nitrogen and phosphorus pollution in the waters of the Mississippi River basin as well as the programs designed by states and the federal government to combat the problem, and does the following:

- Advocates for strong and effective conservation compliance policies, stormwater management programs, and livestock operation regulations,
- Educates the public, media, and decision-makers about the need for cleaner water,
- Participates in the US Department of Agriculture's State Technical Committees, and
- Serves as experts representing environmental interests in multi-stakeholder policy processes.

POLICY RECOMMENDATIONS

"MRC Principles for State Agricultural Water Quality Certification Programs", MRC Agriculture Group, 2012

Background: In 2012, Minnesota announced its new Agricultural Water Quality Certification Program. The program seeks to accelerate the adoption of recommended management practices on Minnesota's agricultural lands. If farmers adopt practices that benefit water quality, they will be provided with regulatory certainty. While we support state efforts to increase agricultural conservation, we are concerned that this latest voluntary program will not succeed in achieving significant reductions in nutrient pollution. But knowing that other states will probably follow Minnesota's lead, members of the MRC Agriculture Group came up with these 11 principles for successful state agricultural certification programs.

"MRC Recommendations for Cropland in State Nutrient Reduction Strategies", MRC Agriculture Group, 2014 and

"MRC Recommendations for Livestock in State Nutrient Reduction Strategies", MRC Agriculture Group, 2014

Background: The EPA has asked states along the Mississippi River to develop Nutrient Reduction Strategies. These strategies should set goals for reducing nitrogen and phosphorus loading to surface waters and describe plans to achieve these goals. It is important that strategies contain new initiatives and funding streams, instead of just describing existing policies and programs. Members of the MRC Agriculture Group developed recommendations for how states can reduce nutrient pollution from cropland and livestock operations.

"Cultivating Clean Water: State-Based Regulation of Agricultural Runoff Pollution", Environmental Law & Policy Center, 2010

Background: Some US states have passed laws that address agricultural pollution. These laws and associated regulations and programs may serve as models for Mississippi River Basin states wanting to take action. This report summarizes state agricultural non-point source programs. The report also highlights five agricultural conservation practices that the MRC Agriculture Group considers important to implement at much larger scales. For each practice, there is discussion of what individual states are doing and what the MRC Agriculture Group considers necessary elements of an effective program.

THE SOLUTIONS

Ending farm runoff's exemption from the Clean Water Act would provide necessary legal leverage to tackle the agricultural pollution problem. Unfortunately, ending the decades-old exemption is unlikely to happen in the foreseeable future, if ever. Therefore, a more likely solution scenario is for states to act individually. The least desirable and effective path is the status quo, whereby farmers voluntarily choose to take actions that result in less polluted runoff from their farms.



There is no single silver bullet that will solve the agricultural pollution problem. However, there is a huge toolbox that individual farmers and states can access to come up with solutions. Tools that should be considered include the following.

State-Level Solutions:

- Develop and implement Nutrient Reduction Strategies designed to meet clean water goals for local rivers and lakes and reduce the size of the Dead Zone in the Gulf of Mexico.
- Adopt state laws that limit pollution in stormwater runoff from farm fields.
- Improve enforcement of state and federal CAFO regulations.
- Support expanding Conservation Compliance provisions of the federal Farm Bill to more farms and outcomes.
- Target the limited available public funding for conservation activities to priority watersheds in order to have the greatest impact.

Farm-Level Solutions:

- Base fertilizer application rates on soil tests.
- Minimize soil tillage.
- Use continuous living cover.
- Apply fertilizer when it is needed by a growing crop.
- Treat gully erosion.
- Do not apply chemical fertilizer or animal waste on snow, ice, or frozen ground.
- Restrict cattle access to waterways.

WETLANDS & COASTAL RESTORATION

An intergovernmental partnership known as the Comprehensive Everglades Restoration Program is working to restore the Greater Everglades ecosystem, critical to the area's freshwater supply, biodiversity and flood control.

However these measures are not enough and cause environmental justice issues of their own. WHY?



Visit the Florida DEP's website for a complete list of Office of Resilience and Coastal Protection's Managed Areas and Associated Management Plans.



Oyster Bay. Photo by James Pion

THEY RELY ON CIVIL
ENGINEERING
SOLUTIONS NOT
ECOLOGICAL
ENGINEERING
SOLUTIONS.

Ecosystem Restoration



Greater Everglades Ecosystem

The South Florida Water Management District works to protect and preserve four unique watersheds: the Kissimmee Basin, Lake Okeechobee and its watershed, the Everglades and our region's coastal systems. Each is a vital part of the South Florida ecosystem.

The **Kissimmee River**, with the Upper Chain of Lakes, forms the headwaters of the Everglades. The river once meandered for 103 miles from Lake Kissimmee to Lake Okeechobee, through a wide floodplain.



Lake Okeechobee is at the center of South Florida's regional water management system. The shallow but massive lake is 730 square miles, the second largest freshwater lake within the continental United States.

Everyone in south or central Florida benefits from a healthy **Everglades**. Restoration projects are underway to protect this national treasure. The South Florida Water Management District is working closely with federal, state and local partners to achieve restoration goals.

South Florida's **coastal systems** support spiny lobsters, shrimp, crabs, oysters, spotted sea trout and many other species of commercial and recreational interest. Coastal ecosystems need special protection because these areas are often impacted by population centers along Florida's coasts.

Restoration Improves Water Quality and Quantity

A comprehensive effort is underway to protect and restore these ecosystems. Planned and ongoing restoration projects are improving regional water quality, hydrology and ecology – all of which were fundamentally altered by public and private development projects begun more than a century ago.

bullsugar.org

Bullsugar.org is dedicated to ensuring a lasting legacy of clean water and healthy estuaries for future generations. In order to achieve this mission, we are focused on 3 issues:

- 1.) Buying land in the EAA to reconnect Lake Okeechobee and the Everglades. The River of Grass has been dammed and diverted to both coasts. Until the flow is restored southward, all three estuaries -- east, west and south -- will continue to suffer, impacting Florida's tourism & real estate economy.
- 2.) Stopping the political corruption and injustice caused by the US Sugar Program. Sugar subsidies are corporate welfare, and they have warped Florida's water management and government to the benefit primarily of 2 billionaire families, the Motts (US Sugar) and Fanjuls (Florida Crystals).
- 3.) Restoring sensible water quality rules to hold polluters accountable. Florida's economy, health and way of life depend on clean water and healthy estuaries. Our laws and politicians must reflect this importance of clean water to Floridians' health and prosperity.



WHAT ARE SOME OTHER PROBLEMS OR SOLUTIONS YOU SEE IN
THE GULF OF MEXICO / SW FLORIDA?

HAVE YOU CHECKED IN WITH YOUR INTENTION TODAY?

