An Ecosystem in Peril

DECADES OF DEGRADATION
A Long History of Environmental Decline

The BP Deepwater Horizon disaster, which occurred 50 miles off the coast of Louisiana and gushed oil from nearly a mile beneath the surface, is only the latest and most dramatic example of how human activities can profoundly affect a large marine ecosystem. As witnessed, such disasters jeopardize important ecological services, human uses, and economic activities. Even before the BP oil disaster, decades of environmental degradation had taken their toll on Gulf habitats and species. Unsustainable fishing practices, poorly planned coastal development, and pollution have all had detrimental impacts on the Gulf, not only affecting the environment but long-term economic prosperity as well.

The effects of years of environmental decline were already a major and largely overlooked problem for the nation when the BP oil disaster happened. By the time the subsea Macondo well was sealed five months later, an estimated 205 million gallons of oil had spewed into the Gulf’s waters, resulting in a spill nearly 20 times larger than the 1989 Exxon Valdez disaster in Alaska’s Prince William Sound.

The BP oil disaster gives renewed urgency to the need for Gulf restoration that delivers a healthy environment for the benefit of our economy and communities.

The dockside value of seafood products from commercial fishing supported more than 213,000 jobs in the Gulf in 2008.
Long-standing Problems in the Gulf

Even before the BP disaster, decades of environmental degradation had taken their toll on Gulf marine habitats and species. Loss of wetlands, erosion of barrier islands, hypoxia (“dead zone”), overfishing, degradation of essential fish habitats, and climate change are but a few examples of stressors that continue to damage the Gulf ecosystem. The Gulf is currently home to a number of endangered and threatened species including five species of sea turtles. Also, eighty percent of the nation’s wetlands loss each year is along the Gulf Coast. These stressors continue to degrade both marine and coastal habitats, destructively impacting the economy and communities in the region.

Overfishing and Invasive Species

Too many fish have historically been taken out of the Gulf, making them unable to sustain their populations. There is also the problem of unsustainable fishing practices that damage habitat or inadvertently capture and injure marine life.

Native Gulf animals and plants are often outcompeted by invasive animals and plants from other regions who lack natural controls such as their natural predators, diseases, and competitors.

Dead Zone

One of the most recognized consequences of pollution in the Gulf is the hypoxic zone, otherwise known as “the dead zone.” This is an area where oxygen levels are depleted due to nutrient pollution from upstream agriculture, resulting in the inability to support marine life. The Gulf collects freshwater runoff from more than 60 percent of the nation and includes outlets from 33 major river systems and 207 estuaries. The hypoxic zone in the Gulf covers an average area that is comparable to the size of the state of Connecticut.
Louisiana’s Wetlands Are Disappearing

More than half of the U.S. wetlands in the lower 48 states are found in the Gulf—40 percent in Louisiana alone. In recent decades these areas have faced an onslaught of stressors. Civil engineering projects (that sever flows of nourishing freshwater and sediment), oil and gas activities, encroaching development, hurricanes, and sea-level rise have slowly degraded the coastline and stunted the marshes’ ability to recover from negative events.

Coastal Louisiana has lost an average of 34 square miles of land each year for the past 50 years. This area is approximately the size of the state of Delaware.

Causes of Wetland Loss

Conversion to Other Uses
At one time in our history wetlands were seen as undesirable areas, and countless acres were drained and filled with sediments to make them suitable for other uses. These include conversion of wetlands to landscapes that support urban development and agriculture. While these losses have slowed due to legal protections for wetlands, conversion represents a major past source of wetlands loss.

Navigation and Flood Control Structures
Extensive navigation and flood control systems have been constructed along the Gulf coast. While man-made levees control flooding and maintain navigation channels, they also prevent wetlands from receiving the regular nourishment of water, sediments and nutrients needed for survival. In addition, canals for navigation and mineral extraction worsen erosion and draw saltwater into freshwater habitats, killing the plants that hold soil in place.

Hurricanes
Due to past degradation many wetland areas are not resilient enough to overcome damage from severe storms, where the pounding action of waves and wind can wash away soil and vegetation. Marsh balls—huge chunks of uprooted marshland—are a familiar site along the coast after a hurricane. Sometimes, the marsh balls can take root again and begin to grow. But, where salt water has covered the land and does not recede, the marsh dies and becomes open water.

Sea-Level Rise
Science has shown that natural cycles have caused sea level to change gradually throughout history. But, in recent history, the pace of sea-level rise has hastened. The polar ice caps are melting faster than they have in the past, likely due to climate change. Some estimates are that by 2040, the water along Louisiana’s coast will be 30 inches deeper than it is today resulting in the conversion of wetlands to open water.
Cautionary Tales from Past Ocean Oil Disasters

The BP oil disaster was a multidimensional event affecting interconnected habitats from the surface to the sea floor. While the impacts of the disaster are not yet fully known, it is likely that they will be felt across the entire Gulf ecosystem.

The impacts of past oil spills in the marine environment may lend insights into the potential effects from the BP oil disaster.

Past Oil Disasters and Their Effects

Ixtoc-I Oil Spill
In 1979, the exploratory oil well Ixtoc-I suffered a blowout in the southern Gulf of Mexico, resulting in 100 million gallons of oil pouring into the ocean. Zooplankton and phytoplankton, two of the fundamental building blocks of the food web, decreased significantly for three years following that disaster. Unfortunately, the lack of long term studies on the impacts of the Ixtoc-I spill hamper our ability to better forecast the impacts of the BP disaster. The remaining lesson is that a long-term research and monitoring program needs to be established moving forward.

Exxon Valdez Oil Spill
There are many physical and biological differences between the Gulf of Mexico and the northern Gulf of Alaska (including Prince William Sound), and there are great differences between the characteristics of the BP oil disaster in 2010 and the Exxon Valdez oil spill in 1989. The Exxon Valdez oil spill was the best studied spill event in the history of the U.S., if not in the world. Although there was immediate and dramatic harm, the full story of impact and recovery from the Exxon Valdez played out over two decades and in some ways is not yet complete.

Salmon Population Threatened
A decade after the 1989 Exxon Valdez oil spill, scientists demonstrated that exposure of salmon eggs to very low concentrations of weathered oil could still reduce survival of salmon at sea.

Pacific Herring Population Depleted
Oil from the Exxon Valdez spill contributed to a historic crash in the Pacific herring population in Prince William Sound. This critical part of the regional food web has yet to recover some two decades later.

How the Oil Spill Impacts Marine Life

The BP oil disaster occurred at the worst possible time for many fisheries. For shrimpers, it happened during the most economically important season of the year. The oil spread near some of the nation’s most productive oyster grounds and crab fishing areas. For many key fish species, the event occurred during spawning season. Fish eggs and larvae floating in offshore waters of the northern Gulf were especially susceptible to the toxic oil and the dispersants used to break up the oil.

Almost 15 percent of total seafood catches in the United States come from the Gulf of Mexico, and commercial fishermen earned $629 million in total landings revenue in 2009.
Commitment to Long-term Monitoring and Restoration

It is essential that a comprehensive, science-based restoration effort be established—not only to restore the harm from the BP oil disaster, but also to reverse the decades of environmental degradation preceding it. Information gained from long-term monitoring and research will be necessary to detect and understand lingering harm. This knowledge will be critical in responding to new threats, supporting decisions to restore the Gulf, and maintaining sustainable uses of the ecosystem.

Close monitoring of “indicator” species threatened by the spill and past degradation can reveal the health of the Gulf. Here are a few of these important species that should be carefully monitored to take the pulse of the Gulf.

Blue Crab
*Callinectes sapidus*

Blue crab populations have been harmed by too many crabbers and too many crab pots in the water, in addition to environmental stressors. Some stressors include habitat loss such as erosion, which damages coastal marshes that serve as blue crab nursery grounds, and agricultural runoff, which creates low-oxygen dead zones in deeper waters where adults live and spawn. Shortly after the BP disaster occurred, oil was found on crab larvae entering Gulf estuaries, placing further environmental stress on the Gulf blue crab population.

*Kemp's Ridley Sea Turtle
*Lepidochelys kempii*

The oil disaster worsened this sea turtle’s already precarious position. During the BP spill, oil often accumulated in mats of sargassum where young Kemp’s ridleys tend to rest and eat. Adult turtles turned up dead on beaches. Persistent oil in the turtles’ environment could accumulate in tissues and cause chronic or fatal disease. It could also lead to reproductive failure.

These endangered turtles can be helped by protecting their nesting beaches, improving the quality and management of marine waters and coastal wetlands that support their food supply, and by ensuring that fishing methods are compatible with their recovery.

Bluefin Tuna
*Thunnus thynnus*

Western Atlantic bluefin tuna, a severely overfished species that migrates long distances to spawn exclusively in the northern Gulf, was at peak spawning in May, precisely when oil was reported. Due to intense fishing pressures, Atlantic bluefin tuna populations have plummeted by as much as 82 percent over the past 40 years, making them particularly susceptible to oil impacts. Many fish born in 2010 were almost certain to have encountered oil at some point in their life. Because they mature slowly, it may be a decade or more before the impacts on the population are fully known.

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“Steps must be taken to curb the impacts of multiple stressors on Gulf ecosystems in order to reduce the negative consequences for the marine and terrestrial environment, national commerce, maritime industry, energy security, fisheries, and the rich cultural legacy of the Gulf Coast.”

—America’s Gulf Coast: A Long-Term Recovery Plan After the Deepwater Horizon Oil Spill by Secretary of the Navy Ray Mabus