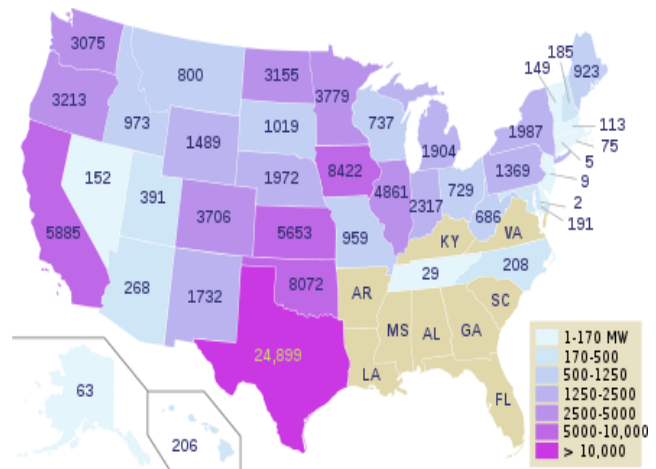
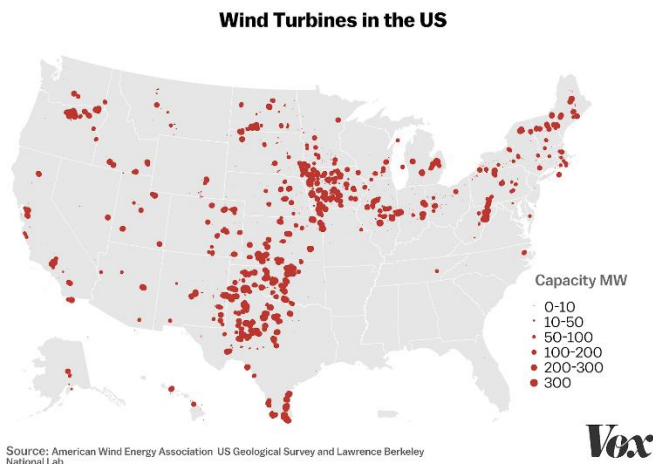


## Wind Power 1985-Present



As the US continues to diversify its production of electricity, wind turbines have become an increasingly normal sight. The US Department of Energy projects that the nation will achieve **404 gigawatts of wind energy capacity** across the country **by 2050**. The US currently has approximately **90 gigawatts** of capacity. Analysts expect **demand** to remain fairly consistent over that period, meaning that wind power will be able to generate up to a third of all electricity by 2050.

**Texas** alone, with **22.6 gigawatts** installed, would rank **sixth in the world** today in total wind capacity if it were its own country. This is a remarkable feat, based on Texas' long history of fossil fuel extraction, refining and utilization. In order for wind power to be beneficial, areas with high winds must be sought, often in the plains regions as well as in those with higher elevations or passes.

Wind power is not enjoying the same success in every part of the country, as can be seen in both maps above. Arguments against wind projects range from potentially unfair subsidies or special deals, the danger posed to migratory bird species, to the idea that the large turbines are a visible nuisance to communities nearby.



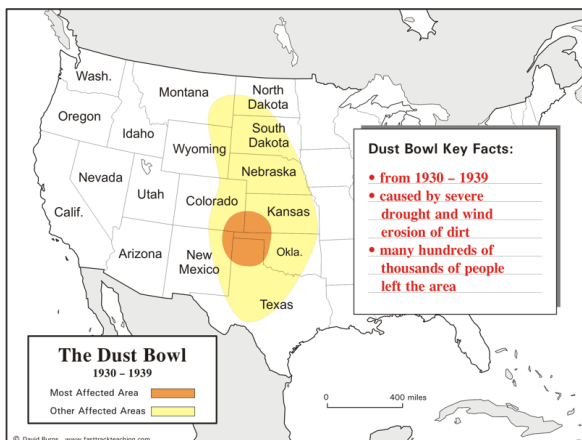
Credits:

<https://www.vox.com/energy-and-environment/2018/5/2/17290880/trump-wind-power-renewable-energy-maps>

## The Great American Dust Bowl 1930-1936

The American Dust Bowl refers to a period of time between 1930 and 1936 where the American Great Plains were over farmed and the top layer of soil was deprived of all nutrients. Since there were no more nutrients in the soil, plants and crops failed. When the wind would pick up, as it often did in the Great Plains, large dust storms were created. These storms would last for days at a time. The dust was so thick that at times the sun was covered and it would be dark and dusky, even in the middle of the day.

Since the majority of the people in the Great Plains relied on farming, many families lost everything since they could no longer farm or raise animals. Ghost towns replaced once busy towns and cities. The American economy was hit hard. Also, adding to the loss of agricultural production, was that the United States was amidst the worst economic depression of all times, gaining the name The Great Depression. Some Americans believed the Dust Bowl would never end, and for many it was too late. However, in the fall of 1939 the Great Plains saw a rainier than average wet season. This helped return a lot of nutrients to the Great Plains and slowly brought agriculture back. Since the Dust Bowl, Americans have used various systems, like crop rotations and improved irrigation, to ensure that the Great Plains would not be over farmed.

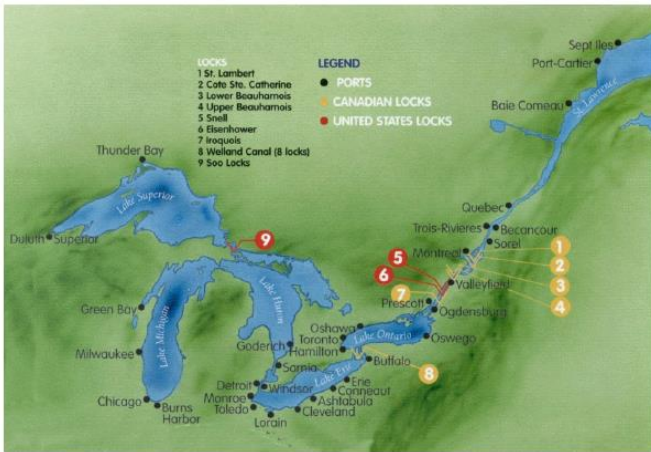


# St. Lawrence Seaway 1959-Present

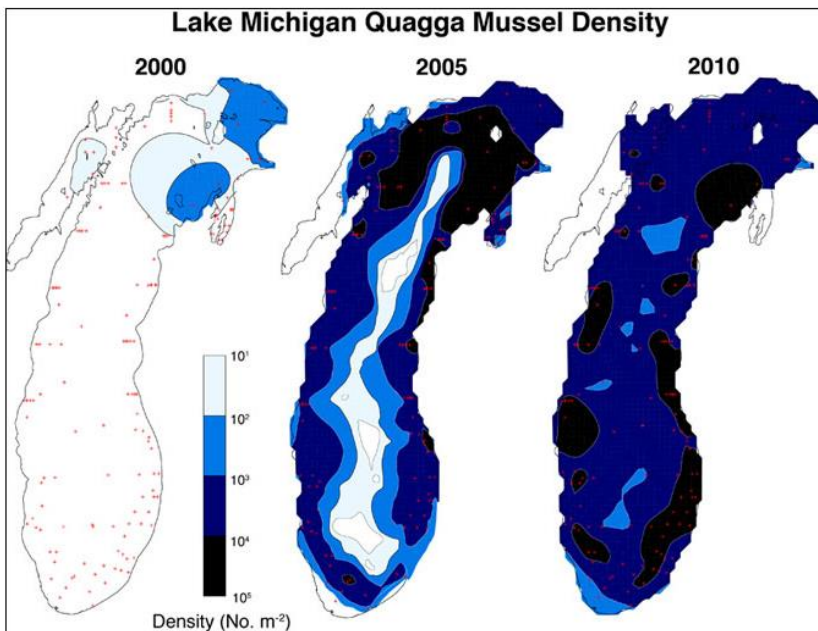
The Saint Lawrence Seaway is an international waterway. It provides a passage for boats traveling between the Midwest and the Atlantic Ocean. In 1959, the seaway was built on the St. Lawrence River and the smaller channels between the Great Lakes.

Building this seaway created a “fourth coast” for North America. It allows access to the industrial and agricultural heartland of North America. The ports of the Great Lakes have benefitted because it makes transporting and trading their goods easier and more efficient.

Historically, waterways in the north either completely or partially freeze in the winter. After the invention of icebreakers (a type of ship) and air pumps, people could control ice formation in the seaway. This extended the shipping season to 250 days (mid-April to mid-December).



Eventually, hydroelectric facilities were added which provide electricity for the surrounding areas. One unexpected side effect of the seaway has been the introduction of invasive non-native aquatic species into the Great Lakes and other waterways, like the zebra and quagga mussels, zebra and quagga mussels



## The Gulf Oil Spill Started April 20, 2010

The Gulf oil spill is recognized as the worst oil spill in U.S. history. Within days of the April 20, 2010 explosion and sinking of the Deepwater Horizon oil rig in the Gulf of Mexico that killed 11 people, underwater cameras revealed the BP pipe was leaking oil and gas on the ocean floor about 42 miles off the coast of Louisiana. By the time the well was capped on July 15, 2010 (87 days later), an estimated 3.19 million barrels of oil had leaked into the Gulf.



Immediately after the explosion, workers from BP and Transocean (owner of the Deepwater Horizon rig), and many government agencies tried to control the spread of the oil to beaches and other coastal ecosystems using floating booms to contain surface oil and chemical oil dispersants to break it down underwater. Additionally, numerous scientists and researchers descended upon the Gulf region to gather data. Researchers are still trying to understand the spill and its impact on marine life, the Gulf coast, and human

communities.

There were some immediate impacts to the animals of the Gulf of Mexico that could be seen with the naked eye: pelicans black with oil, fish belly-up in brown sludge, smothered turtles washed up on beaches. But not much time has passed since the spill, and it will take many more years of monitoring and research to understand what happened. There were some reports of deformed wildlife after the spill. For years following the spill there were reports of fish with lesions and deformities, and some reports of eyeless and deformed shrimp after the spill. However, consuming Gulf seafood is now completely safe.

Over 1,000 miles of shoreline on the Gulf of Mexico, from Texas to Florida, was impacted by oil from the Deepwater Horizon blowout. Much of this area has been cleaned, but eroded shorelines are taking longer to recover and erosion rates have accelerated in these areas.



## Natural Lakes of Texas

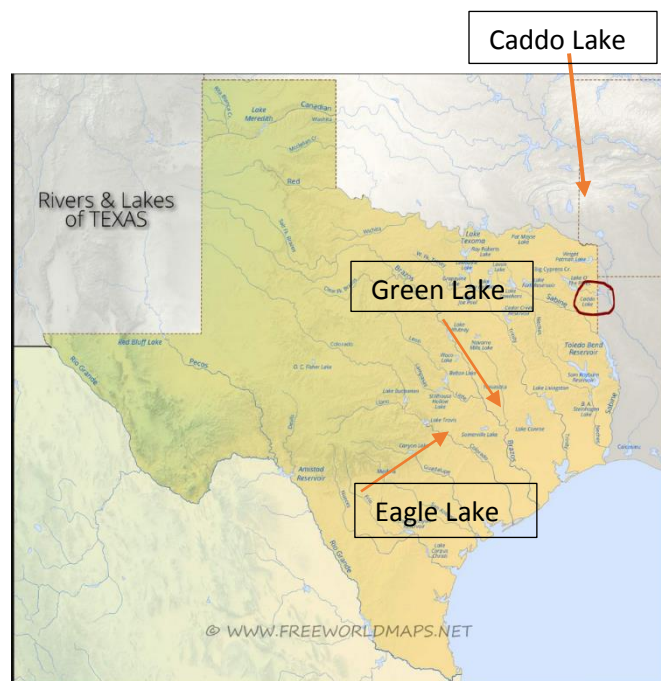


Natural lakes in Texas are few, basically due to the terrain of the region. Nevertheless, there exist a few natural lakes. Natural lakes in Texas are not popular and access to some is restricted. Most of the lakes are on the eastern side of the state and are mainly formed from rivers. They were formed after a section of water which was part of the main river was left isolated after course of the river

shifted. The most famous natural lake of Texas is the Caddo.

The lake formed as a result of log jam along Red River. Lake Caddo is located near the border of Texas and Louisiana. Flooding of water on a flat basin of land along a river led to its formation. Cottonwood trees grew to form a natural barrier on the Red River making water form into a lake.

The lake existed as a natural formation until 1873 when the great raft was blasted by the US military, leading to water flowing downwards with the lake subsequently drying and forming a swamp. However, in 1914 a manmade concrete dam was erected causing the water to accumulate again and forming the lake as we know it today.



### Other Natural Lakes in Texas

The Green Lake, located in Calhoun County east of River Guadalupe, covers more than 10,000 acres (40 km<sup>2</sup>). The lake has fresh water and supports aquatic life. However, human invasion has disrupted the natural ecosystem. The Lake is currently shallow, silt-filled, and almost a lifeless pool.

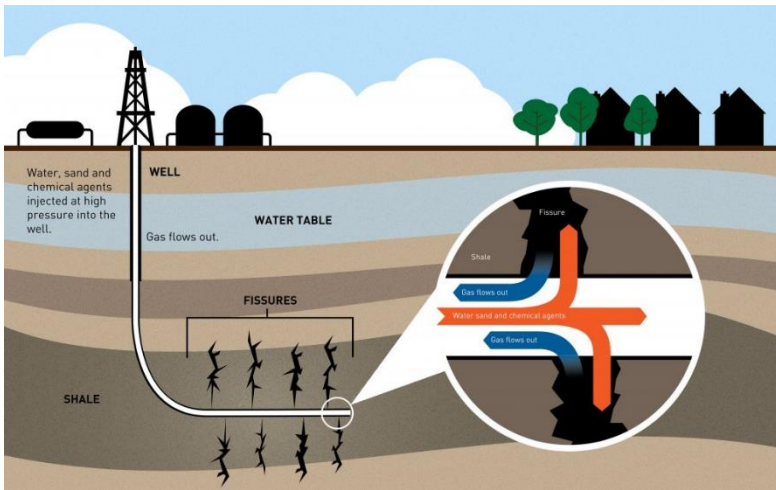
Eagle Lake is located near the Colorado River. Water levels have shrunk hindering the thriving of flora and fauna. Occupying almost 1,500 acres, the lake has seen the diminishing number of fish species, wintering waterfowl, and other species of plant largely because the lake is a private property.

# Fracking

## Case Study: Earthquakes triggered by fracking or waste water disposal?

Hydraulic fracturing involves drilling a long steel pipe into the earth until it hits the ground layer containing oil or natural gas. It then turns and extends horizontally, before 'fracking fluid' is pumped through the pipe at high pressure. Fracking fluid, which contains water, salt, sand and additives, cracks the

underground rocks to release natural gas and oil and allows it to be extracted from the ground. This can provide a better way to access many other natural deposits of oil and gas than it was done before. This means that more oil and gas can be used for heating, cooking and powering cars. So what problems exist?



“Hydraulic fracturing causes earthquakes in western Canada, according to research published Thursday in Science. The small earthquakes ‘were always during or right after fracking, and they’re also confined to a limited area,’ University of Calgary geophysicist. Before fracking, the sparsely populated area in Alberta, Canada did not have a history of seismic activity. The results defy the belief that the disposal of waste water is the only source of man-made earthquakes with fossil fuel extraction technique. The U.S. Geological Survey has maintained that fracking is not the cause of most induced earthquakes. However, earthquakes have occurred in Oklahoma and nearby states as a result of waste water.”

