Human Impact on Air & Water

Air Quality

Burning fossil fuels releases compounds that pollute the biosphere.

Forms of Air Pollution:

1) Smog

1) Ozone

1) Acid Rain

Smog

A type of air pollution caused by the interaction of sunlight with pollutants produced by fossil fuel emissions.

Full of particulates, which are microscopic bits of dust, metal, and unburned fuel (1-10 microns in size).

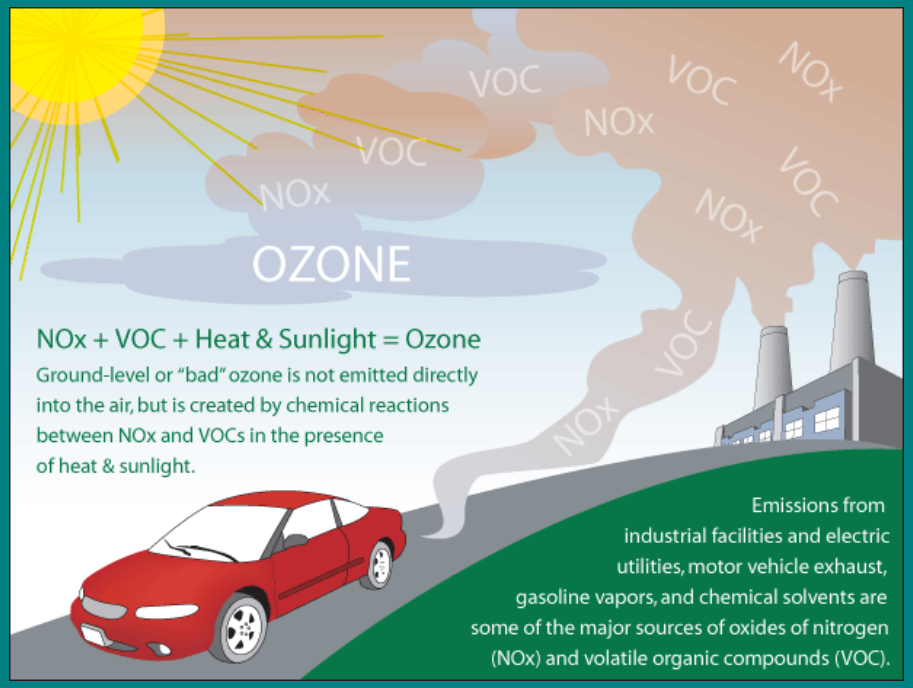
These can be inhaled and cause many health problems.

Bejing: After a day of rain After a day of Sun

Ozone

NO_2 produced in fossil-fuel combustion reacts with O_2 to create O_3 (Ozone). Ground level ozone is very dangerous to living things.

Can cause asthma, emphysema, and is very harmful to plants



Acid Rain

Type of precipitation (water formation) produced when pollutants in the water cycle cause rain pH to drop below normal levels.

pH: amount of H+ ions in a solution.

Lots of H+ = Low pH

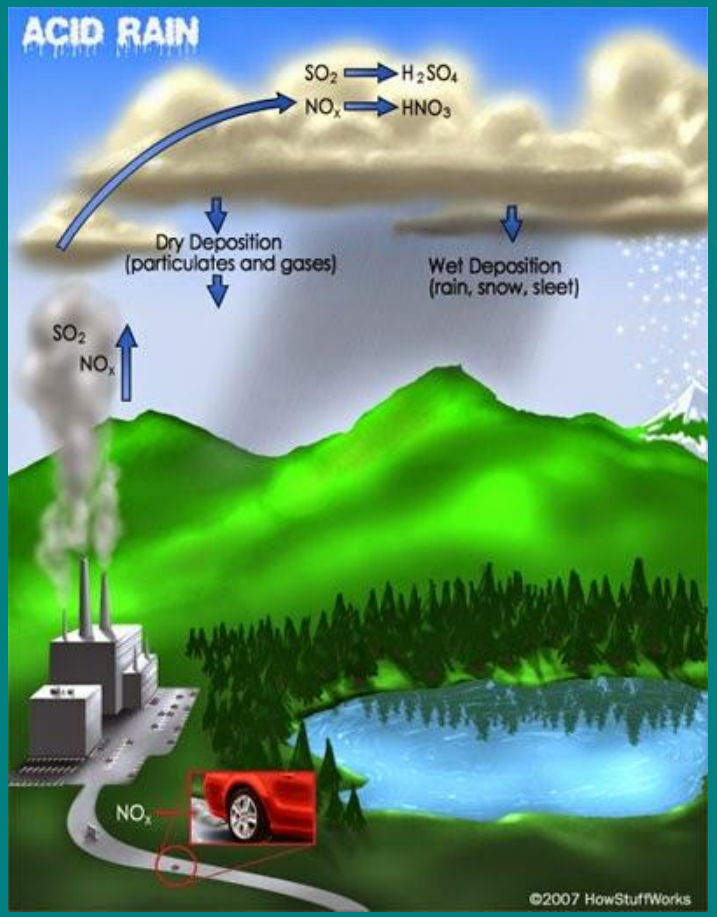
pH scale: 1-14

Neutral pH= 7

Normal Rain slightly acidic (5.6)

Acid Rain any pH less than this.

Threatens water supplies and plant life. Can result in growth rate declines. Makes plants more vulnerable to disease and weather.



Acid Rain

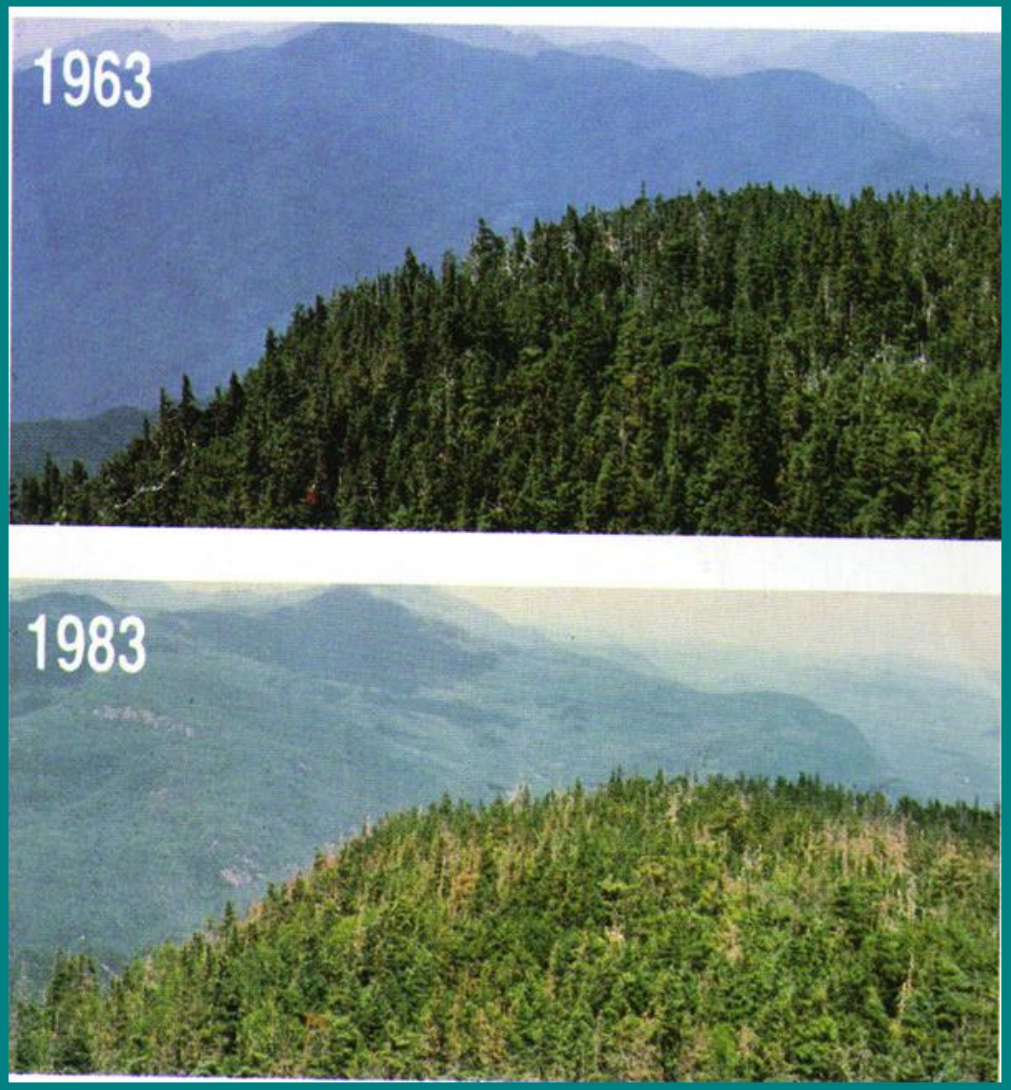
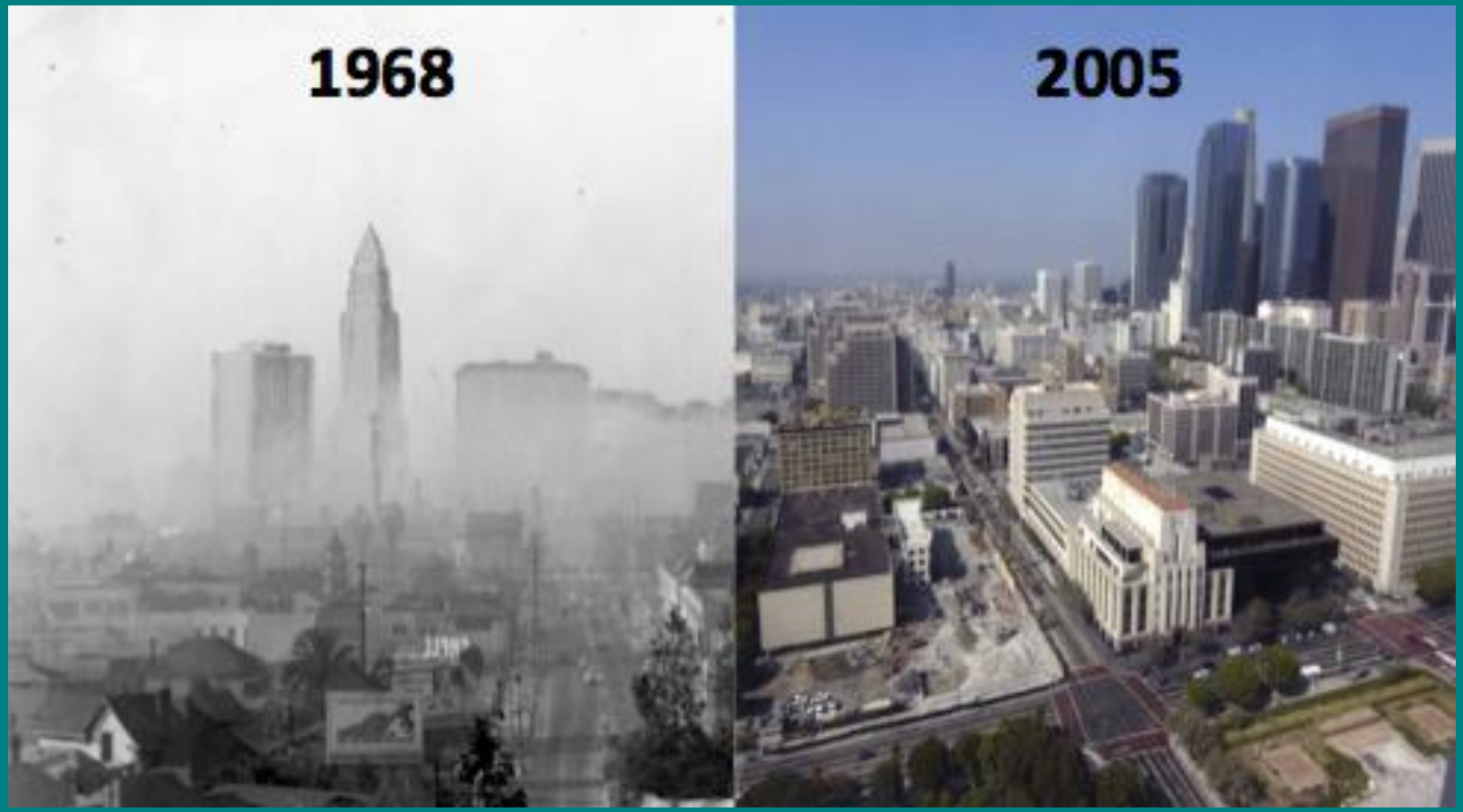


Fig. 11. A sandstone figure on an early eighteenth-century building in Germany shows the effects of twentieth-century air pollution. The photograph on the left dates from 1908, the one on the right from 1969. Calcium-containing stones such as limestone and sandstone are particularly vulnerable, but other materials, including brick, concrete, glass, and metal, are also affected.

LA Pollution then and now



Water Quality

Pollution can also have major impacts on water ecosystems.

Effect #1:

Detergents and fertilizers can stimulate plant and algae overgrowth in lakes.

Water Quality

Effect #2:

Medical waste can expose fish to hormones that can cause them to change gender.

Water Quality

Effect #3:
Amphibians with water permeable skin come into direct contact with pollutants, that can cause deformities like extra arms and legs.

Indicator Species

These previous organisms are all examples of indicator species, a species that provides a sign, or indication of the quality of the ecosystem's environmental conditions.

Indicator Species

Algal blooms are indications of negative effects on the ecosystem.

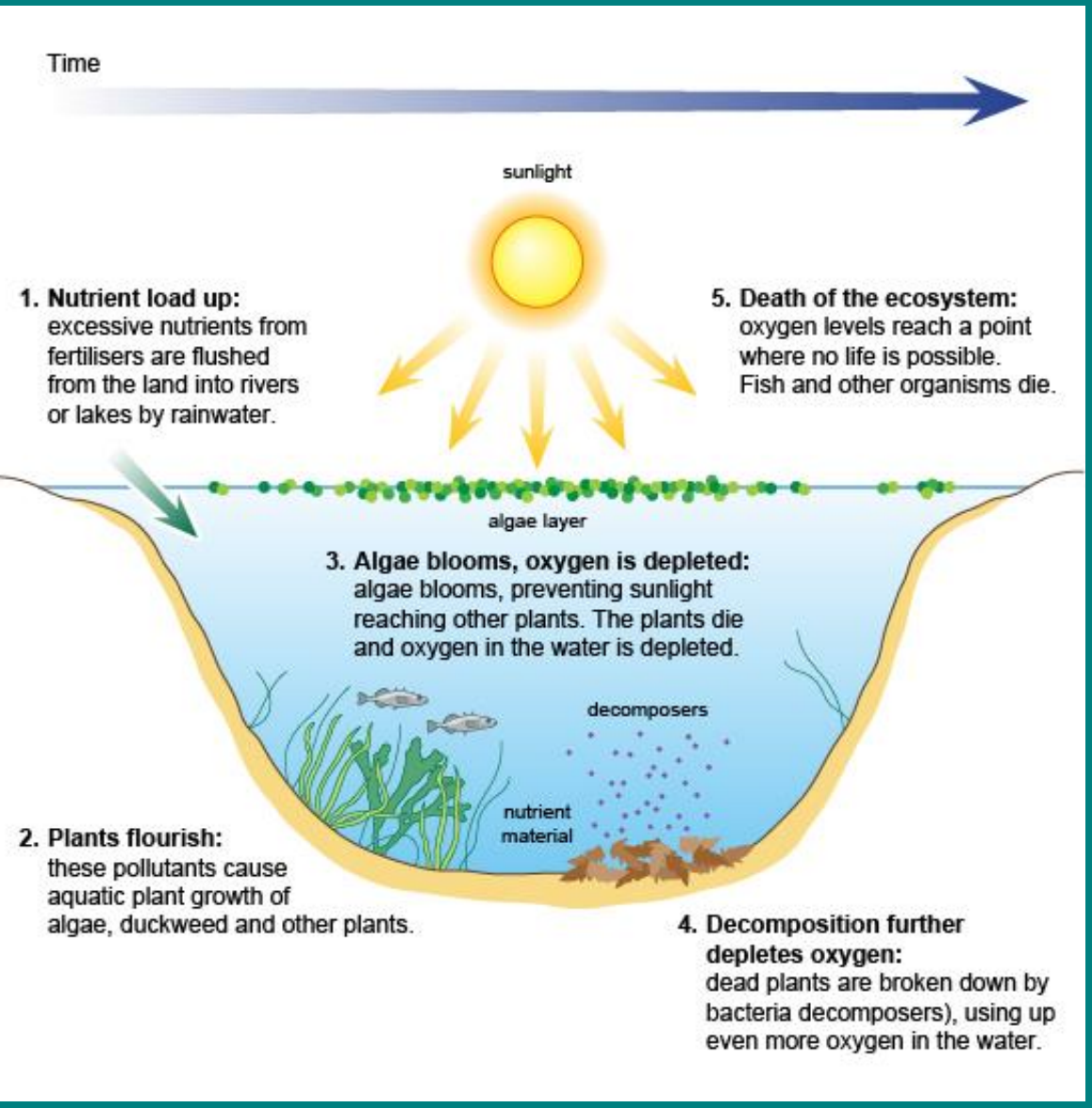
Detergents and fertilizers provide nutrients for large algal populations that then suck all the oxygen out of the area, killing anything living there.

This keeps detritivores from breaking down waste materials, and the lake or pond will eventually fill up, which is called eutrophication.

Caspian Sea

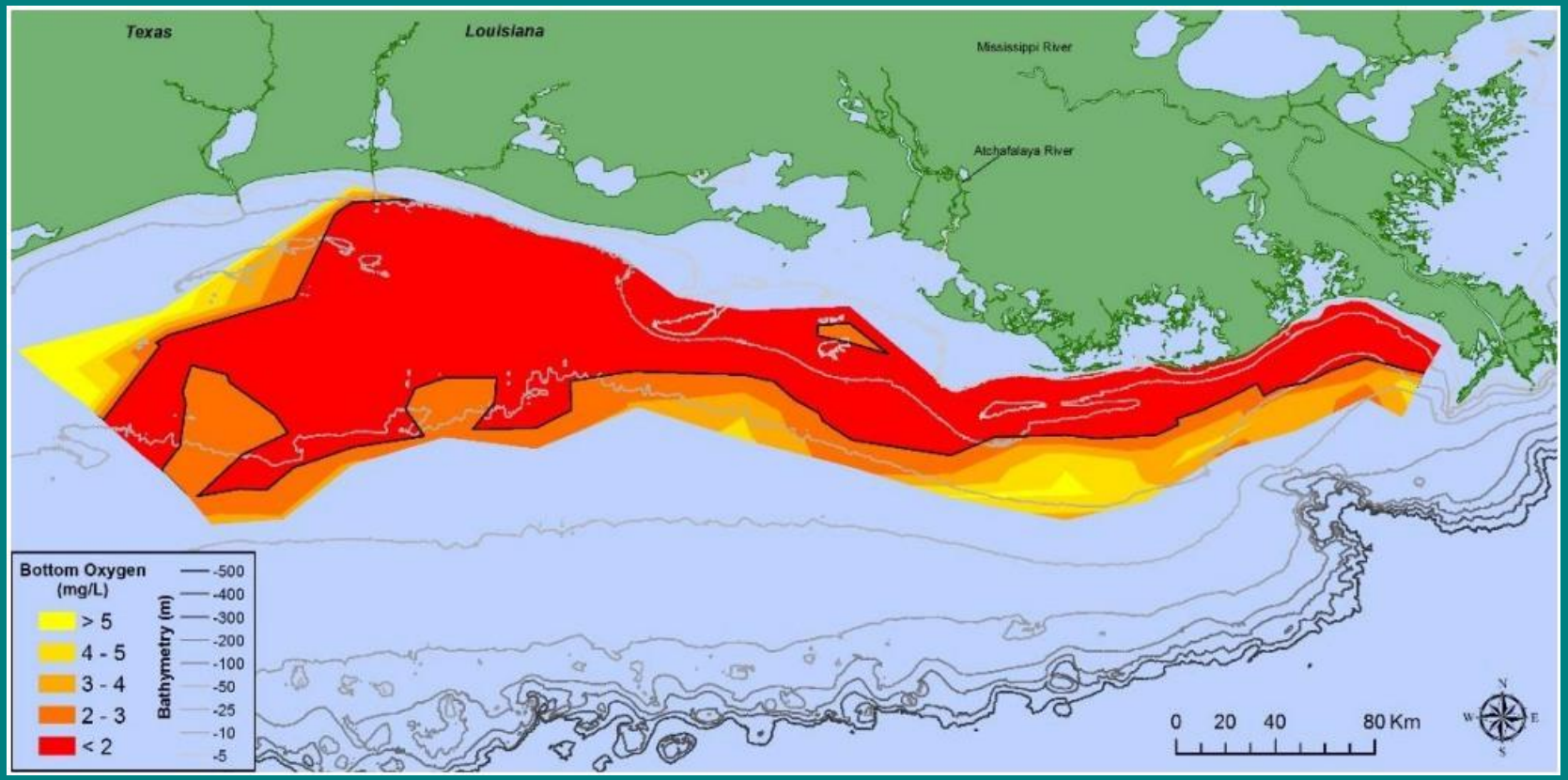
Algal Bloom in Florida, 2018

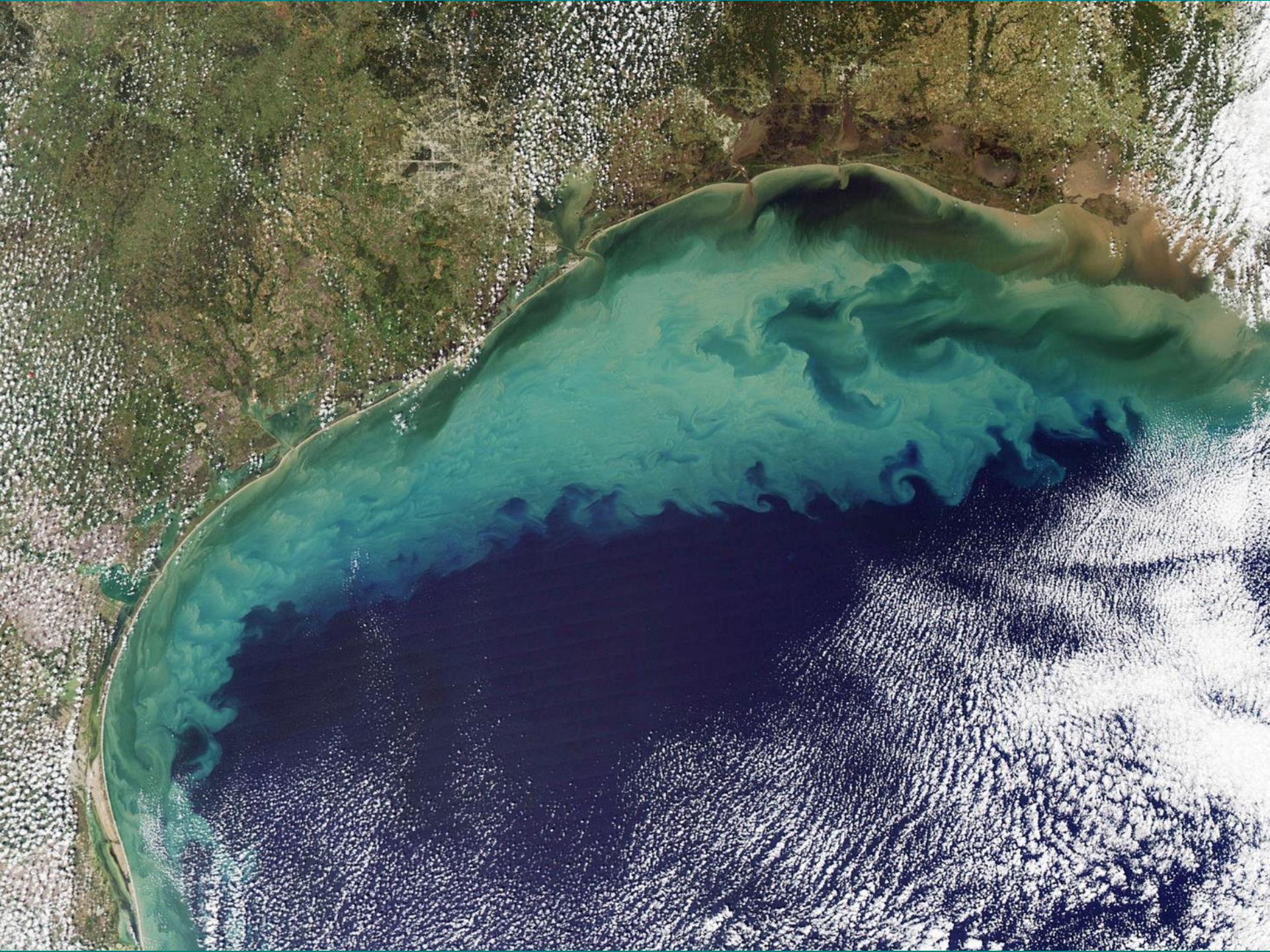
Eutrophication



Eutrophication

Eutrophication can create dead zones, areas in the body water devoid of oxygen.

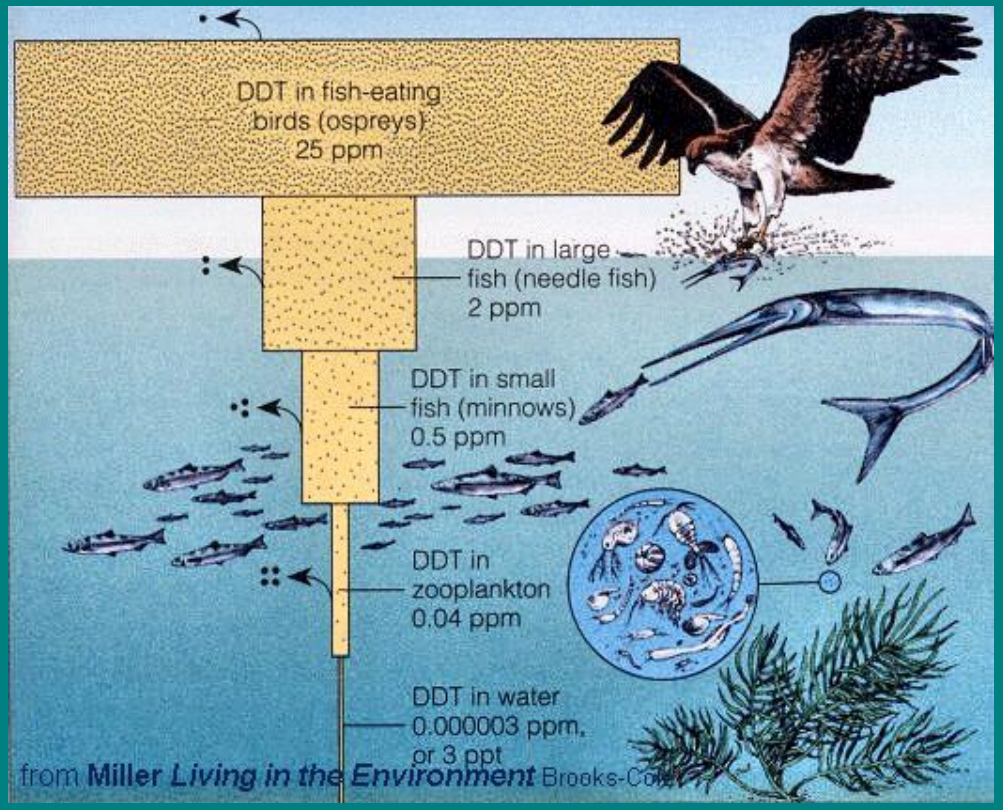




Biomagnification

Pollutants can move from one organism to another through a process called biomagnification. This occurs when a pollutant moves up the food chain as predators eat prey, and ends up accumulating in higher concentrations in the bodies of predators.

Scientists measure pollutants this way in parts per million (ppm).



Plastic in our Oceans

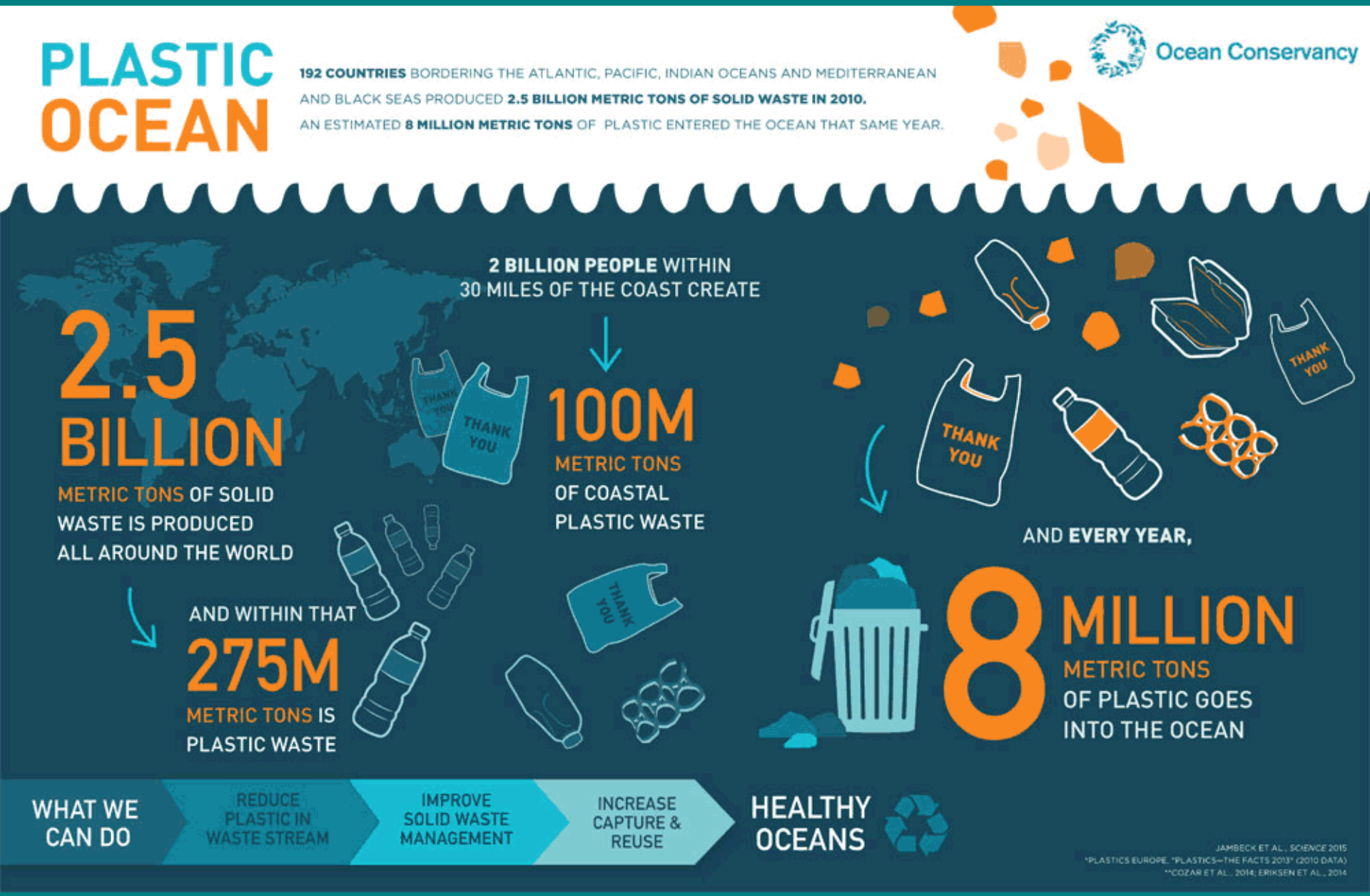
So much plastic is in the ocean, that soon we will end up with a pound of plastic for every 3 pounds of fish in the sea.

Plastic in our Oceans

- Plastics can affect up to 96% of biodiversity in the oceans.
- Plastic does not decompose or break down, it just gets smaller (microplastics) that can be taken up by all types of life.
- Seabirds, whales and turtles are most vulnerable to plastic pollution.

Plastic in our Oceans

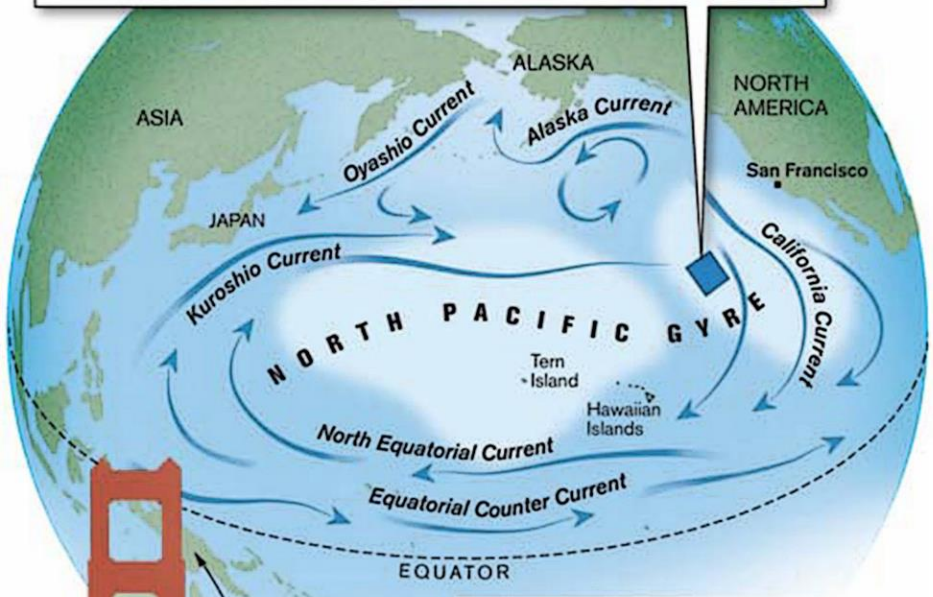
Plastic in our Oceans



The Great Pacific Garbage Patch

A mammoth garbage pit in the Pacific

The Great Pacific Garbage Patch swirls around an area of the Pacific Ocean about 1,000 miles west of California and the same distance north of the Hawaiian Islands – a week's journey by boat from the nearest port. Scientists disagree about its size, but a marine researcher in Long Beach says it's twice as big as Texas and weighs 3 million tons. Most agree that the mass of garbage is hurting marine life such as fish.



To learn more: For more information about the Great Pacific Garbage Patch, go to *algalita.org*, the Web site of the Algalita Marine Research Foundation, which has monitored and publicized the patch for 10 years.

How to help: To limit the ever-growing patch of garbage floating in the Pacific:

- ▶ Reduce use of plastics when possible.
- ▶ Use a reusable bag when shopping.
- ▶ Take your trash with you when you leave the beach.
- ▶ Make sure your trash bins are securely closed and keep all trash in closed bags.

(Source: Chronicle research)

The Bay Area: For an interactive map showing some of the worst trash problems on San Francisco Bay, go to *savesfbay.org/baytrash.*

JOHN BLANCHARD / *The Chronicle*

Plastic in our Oceans

Ways that you can make a difference:

- Stop buying single use plastics
- Stop using plastic bags
- Buy things locally instead of having them shipped from places like Amazon that have lots plastic packaging
- Recycle appropriate plastics
- Don’t buy products that have plastic microbeads

Vocabulary

Smog
Ozone
Acid Rain
Indicator Species
Eutrophication
Dead Zone
Biomagnification