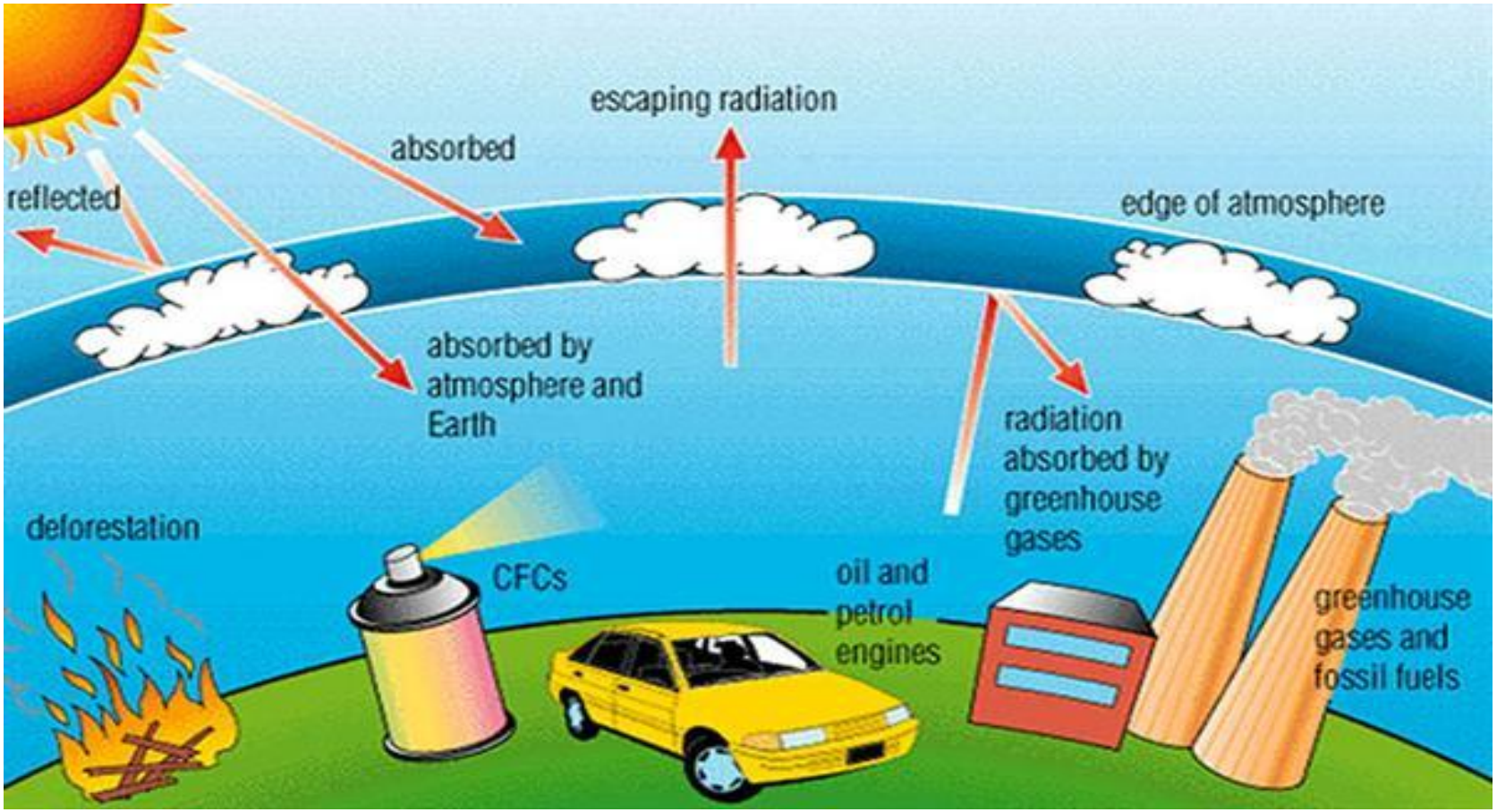
Human Impact on Climate

Review Slide – Greenhouse Effect



- The Earth's average temp is 57º F (14º C)
  - Without the natural greenhouse effect the average temp. would be -2º F (-19º C)

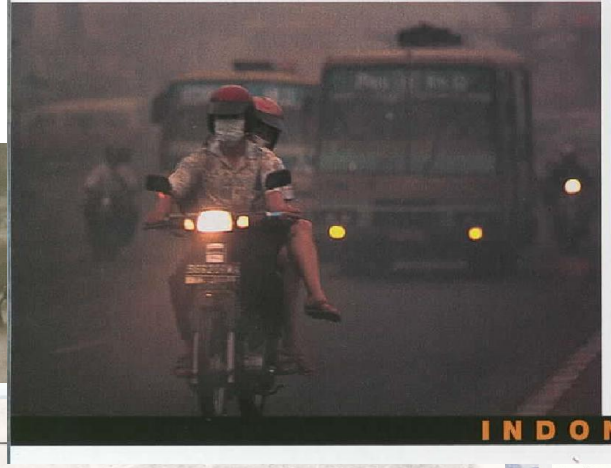
4 Greenhouse Gases

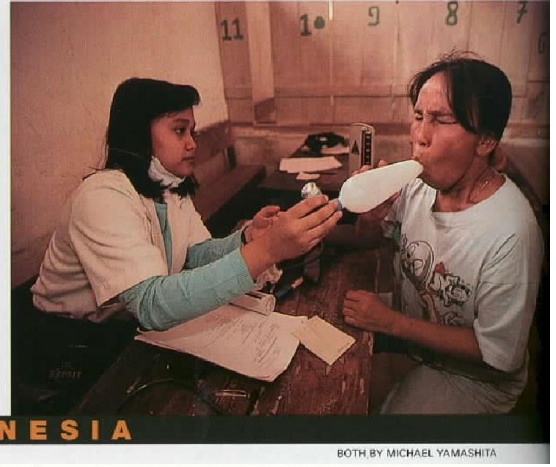
- **Water Vapor** (**H_2O**): Water Cycle
- **Carbon Dioxide** (**CO_2**): Sources: burning of fossil fuels, solid waste, trees and wood products, etc. Sinks: plants and oceans
- **Methane** (**CH_4**): fossil fuels, livestock, decay of waste in landfills.
- **Nitrous Oxide** (**N_2O**): agriculture, industries, fossil fuels, and solid waste.

Climate Change Will Threaten the Health of Many People

- Global warming will increase human deaths from:
  - Heat stroke
  - Increased flooding
  - Malnutrition and starvation from disruption of food supply
  - Spread of tropical diseases to temperate regions
  - More insects, microbes, toxic molds, and fungi
  - Increase in some forms of air pollution, more O_3
  - Decreased amount of vital natural capital
  - Increased number of environmental refugees
  - Increased poverty

DROUGHTS





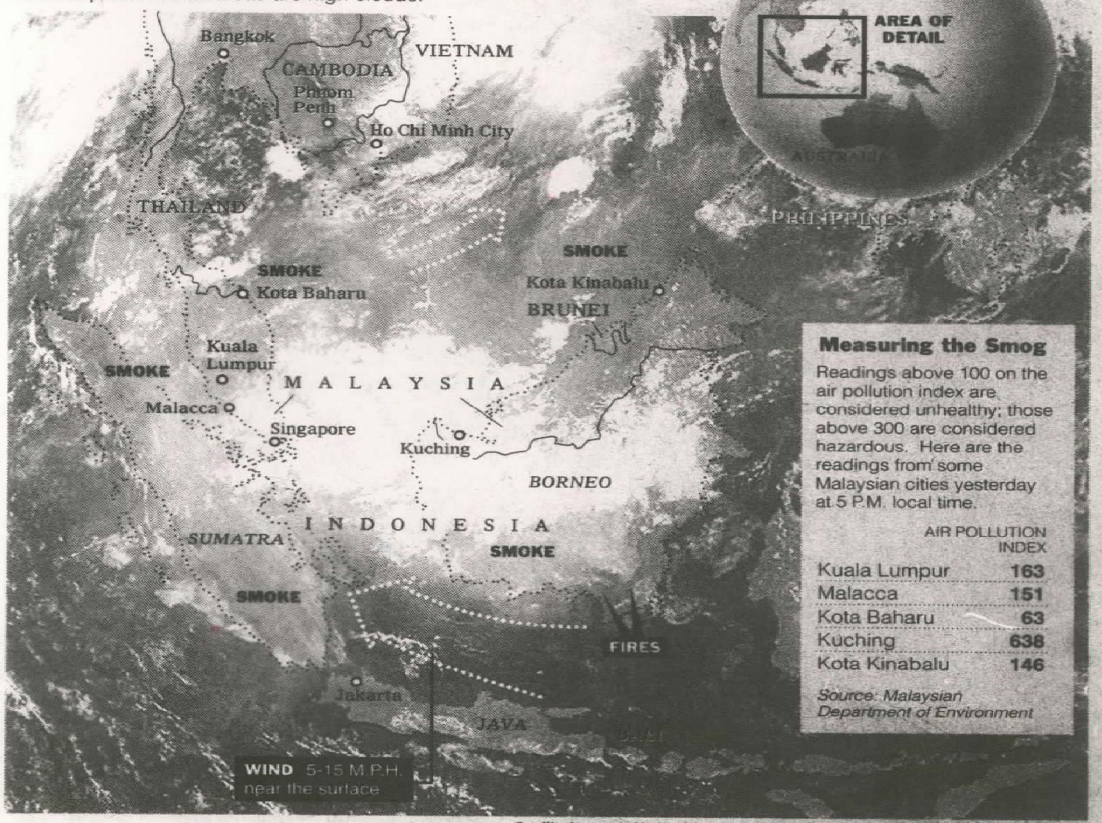
INDONESIA

BOTH BY MICHAEL YAMASHITA

ATIONAL THURSDAY, SEPTEMBER 25, 1997

A Pall Over Southeast Asia

The widespread effects of huge forest fires are visible in this satellite photo. White areas are high clouds.



Measuring the Smog

Readings above 100 on the air pollution index are considered unhealthy; those above 300 are considered hazardous. Here are the readings from some Malaysian cities yesterday at 5 P.M. local time.

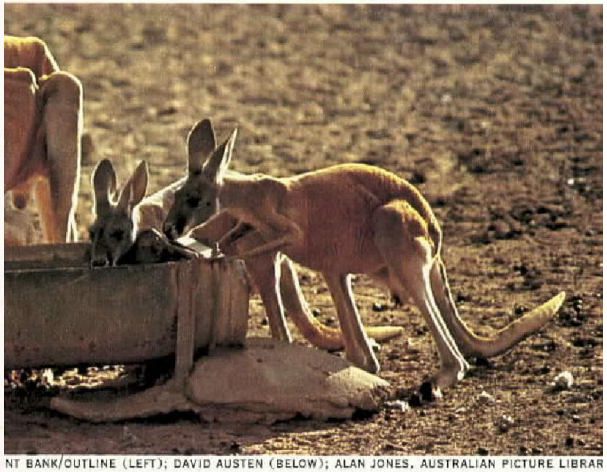
	AIR POLLUTION INDEX
Kuala Lumpur	163
Malacca	151
Kota Baharu	63
Kuching	638
Kota Kinabalu	146

Source: Malaysian Department of Environment

Satellite image via National Oceanic and Atmospheric Administration/The New York Times

er day of New South y was ! their constant nped by norning, h of scrub nals carcass and skin, and hunting quotas have not been met. Some ranchers believe that during the drought they were feeding three to four kangaroos for every one of their own sheep.

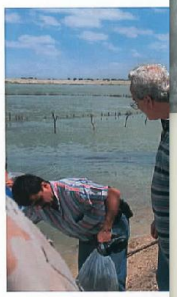
*Water finally became so scarce that at the Wardell Station, or ranch, it had to be trucked in (**bottom**) to replenish stock ponds.*



NT BANK/OUTLINE (LEFT); DAVID AUSTEN (BELOW); ALAN JONES, AUSTRALIAN PICTURE LIBRAR

FLOODS

Peru



LAKE OF THE DUNES

Like a 90-mile-long mirage, an El Niño-fed lake ten feet deep spread across the floor of Peru's Sechura Desert, usually one of the driest places on Earth. Over the

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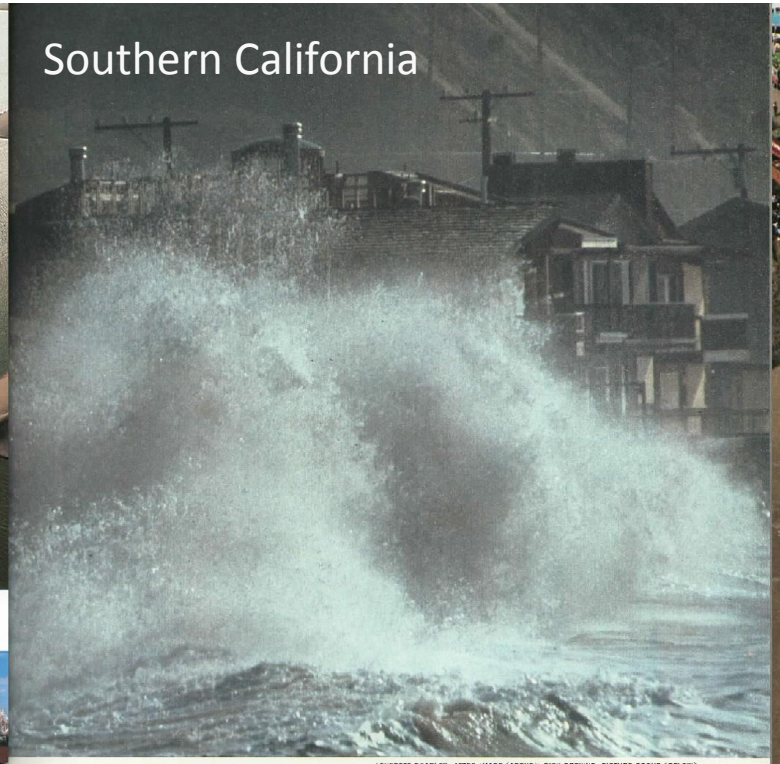
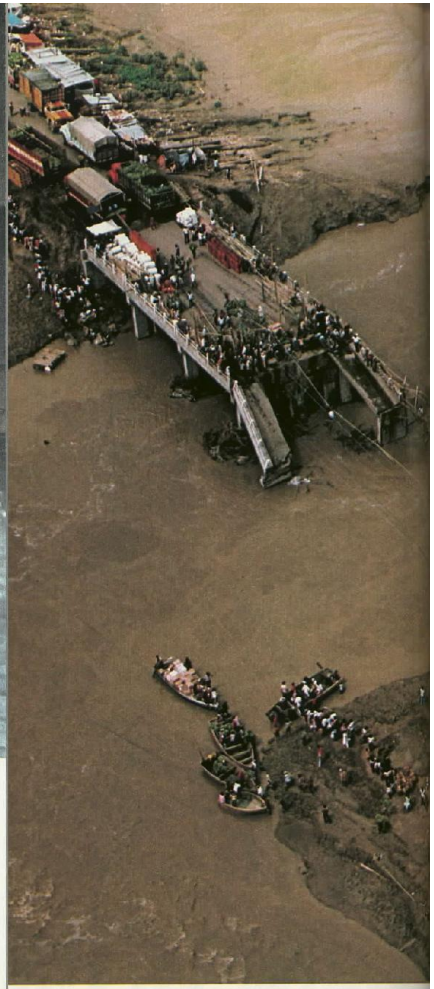


LEVERETT BRADLEY, AFTER IMAGE (ABOVE); RICK BROWNE, PICTURE GROUP (BELOW)

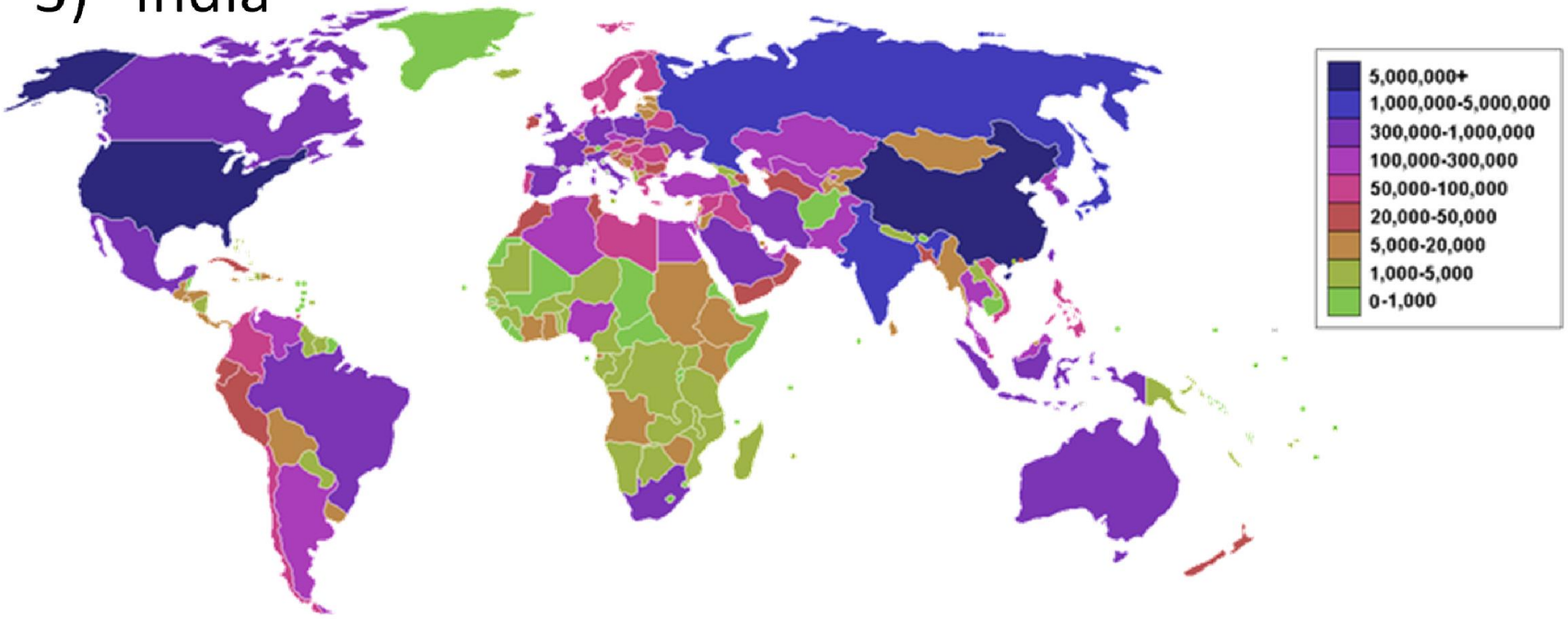


Strung with utility and conveyor lines, the abutments of a bridge washed out between Guayaquil and Salinas stand loaded with supplies and passengers awaiting makeshift arm water pushing against the coast triggered floods and killed scores of Ecuadorians and caused about 400 million

National Geographic, February 1984

Human Activities

- Countries with the largest CO_2 emissions
  1) China
  2) United States
  3) India



Global Emissions Atlas

10 Indicators of a Human Fingerprint on Climate Change

Less heat escaping to space

Shrinking thermosphere

Cooling stratosphere

Rising tropopause

Less oxygen in the air

More fossil fuel carbon in the air

30 billion tonnes of CO_2 per year

More heat returning to Earth

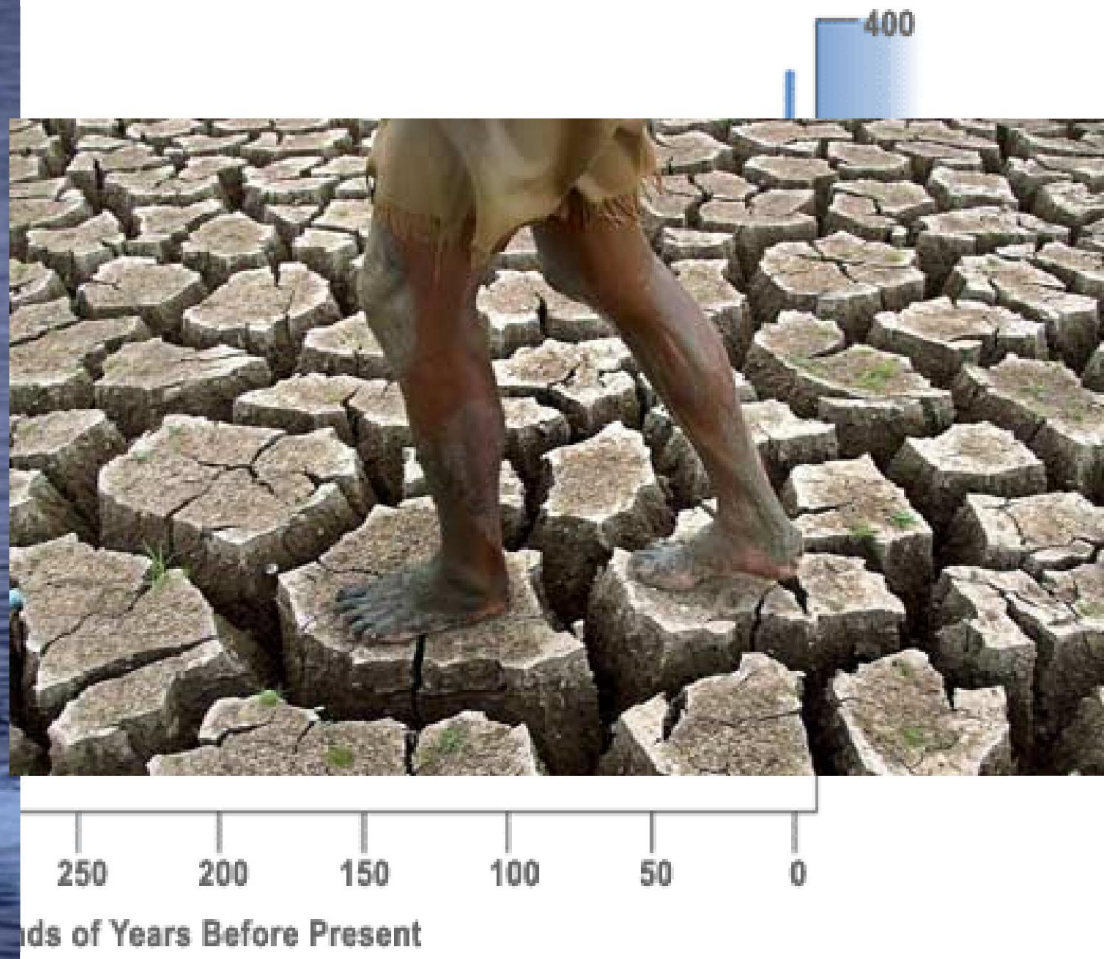
Nights warming faster than days

More fossil fuel carbon in coral

Deforestation

- Clearing of forests on a massive scale
- Forests are cleared for lumber, paper products, agriculture and urban sprawl
- Effects on Ecosystem:
  - Significant loss of habitat (70% of land animals/plants live in forests!)
  - Drives climate change
    - Forest soils are moist, but without tree cover will dry out
    - Help perpetuate water cycle
    - Absorbs greenhouse gases (carbon sink)

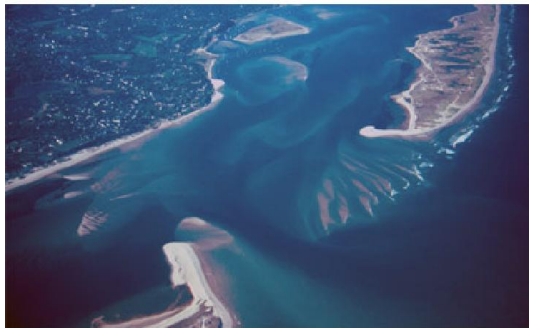
- Global warming: global temperatures rises due to increase in CO2 levels. Can cause sea level rise.



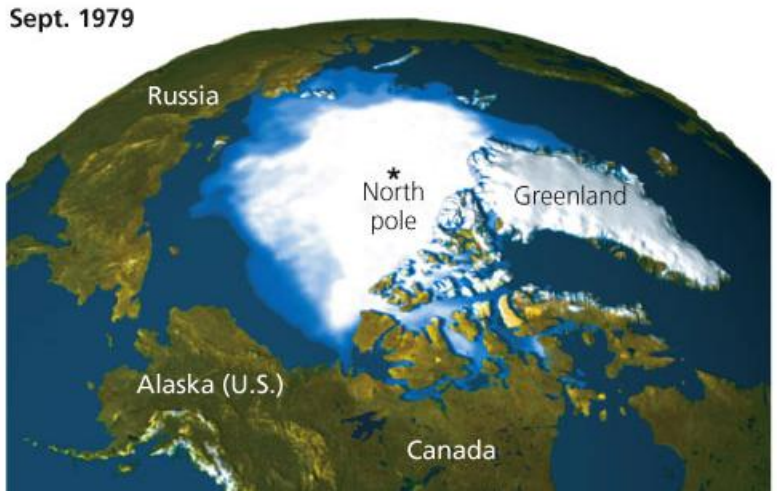
Sea Levels Are Rising

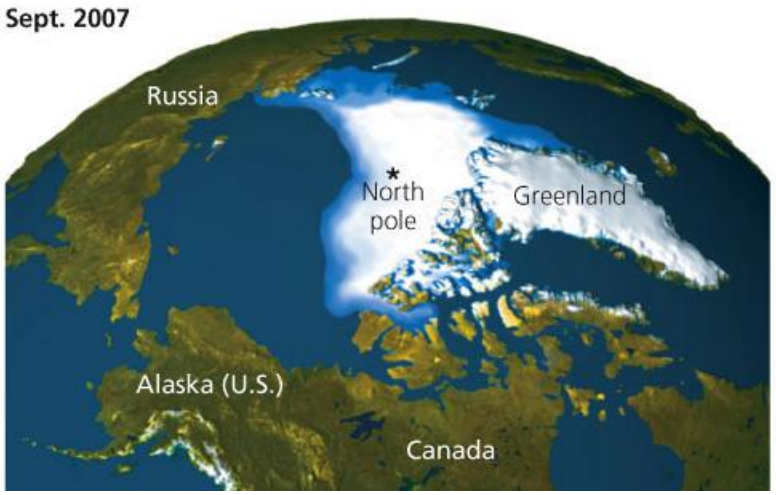
- 13% of the world's urban population lives near sea level
- Many cities would be devastated by even relatively small increases in sea level

Areas of Florida to flood if average sea level rises by one meter



Ice and Snow Are Melting





Contributions to sea level rise

Thermal Expansion of seawater - As water molecules heat up, they expand and take up more space, causing sea levels to rise

- Rise in global temperatures
- Melting of glaciers and ice caps
  - Adds tons of fresh water to the oceans

A recent study says oceans will rise between 2.5 and 6.5 feet by 2100

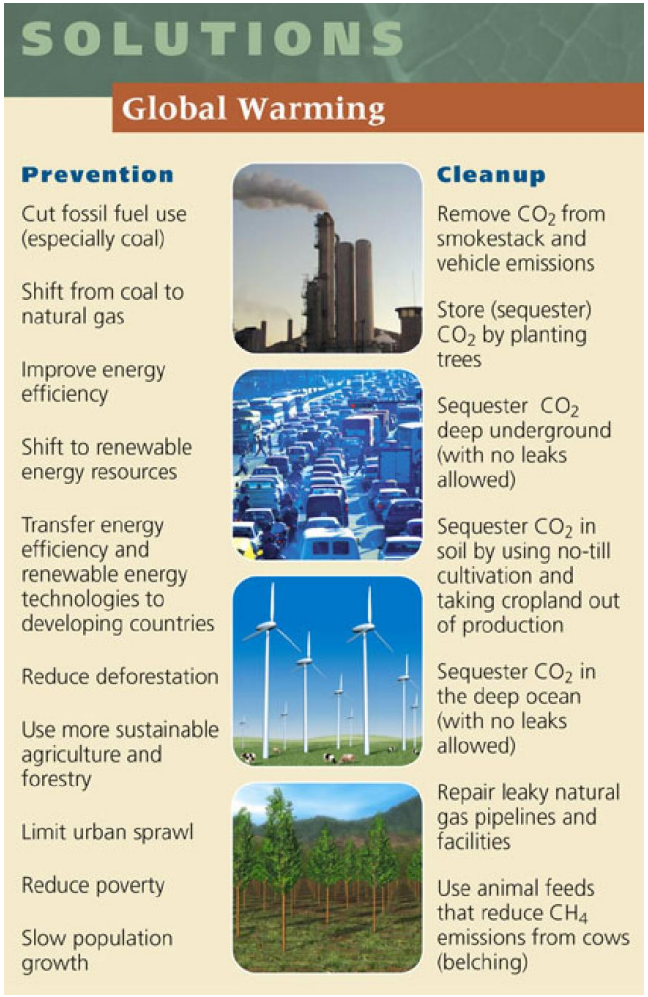
Can the Oceans Save Us?

- The oceans can absorb large amounts of CO_2
- *Problems*:
  - The warmer water is, the less CO_2 it can hold
  - CO_2 levels increase ocean acidity
    - Effect on coral reefs – dissolves the calcium carbonate

Solutions

- Why is Global Climate Change Hard to Stop?
  - Global
  - Long term
  - Political
  - Uneven resources
  - Impact to the economy and lifestyles

What are our options?

- ***Mitigation*** – the act of decreasing or reducing something

- What can we do?
  - Reduce Greenhouse Gases
  - Improve Energy Efficiency
  - Renewable Energy
  - Reduce, Reuse, Recycle
  - Know and Reduce Your Carbon Footprint