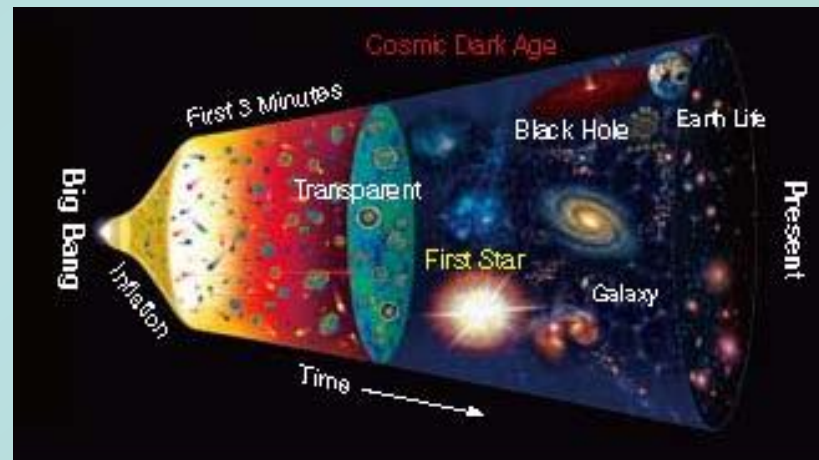


# The history of environmental science



# Earth (and the other planets in our solar system) are roughly 4.6 billion years old

- Formed by collision of rocks, minerals and elements



Adapted from "Physics of the history of the universe"  
by Yasun Fukui *et al*

# 3.8 billion years ago – first evidence of life on Earth

- Simple single-celled organisms
- Evidence of natural environmental changes (ice ages etc.)



# Waves of extinctions followed colonization patterns of humans

- 90,000 years ago - *Homo sapiens* migrated out of Africa to the Middle East
- 40,000 years ago to Europe and Australia
- 12,500 years ago to North America
- 8,000 years ago to the Caribbean
- 2,000 years ago, humans colonized Madagascar and quickly drove elephant birds, hippos, and large lemurs extinct.







# 10,000 – 12,000 years ago

- Agricultural Revolution
- SWIDDEN (Slash and Burn)



# Black Plague

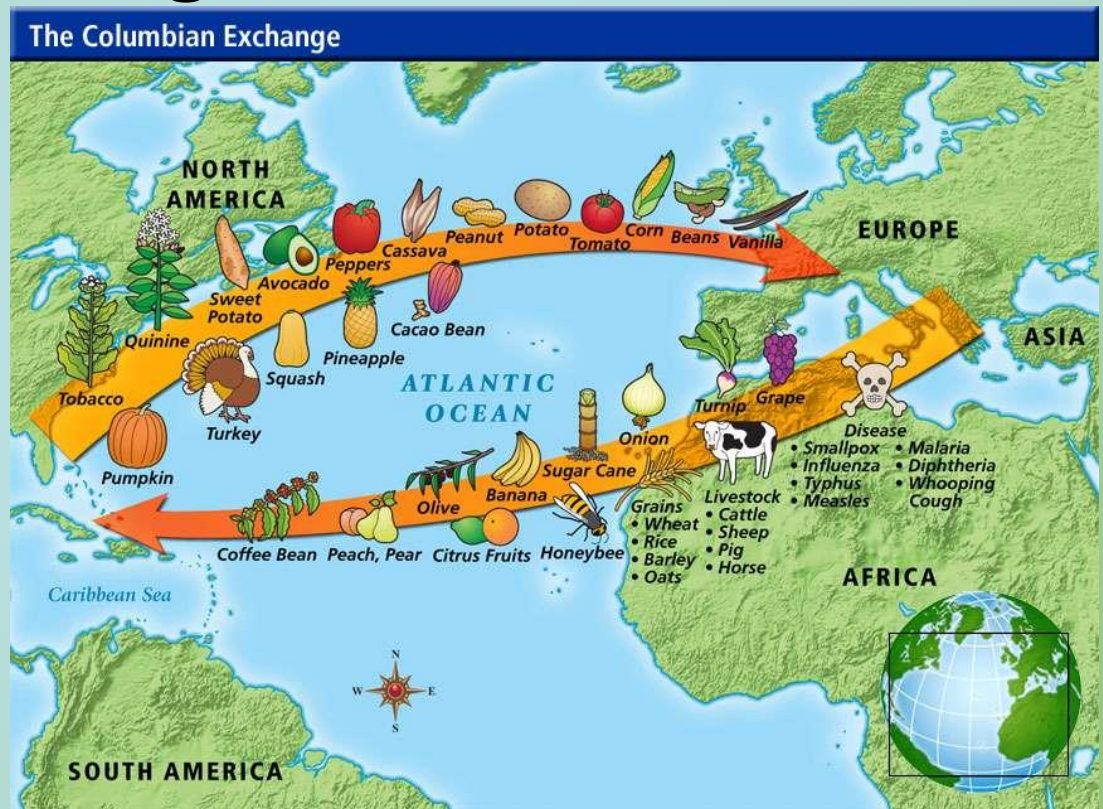
- 1347-1351
- Wiped out 1/3 to 1/2 of Europe





# Columbian Exchange

- Tribal Era 5 to 10 million people in North America from 10,000 years ago until the Columbian exchange (15<sup>th</sup> & 16<sup>th</sup> centuries)
- Huge impact





# Frontier Era

- Westward expansion of European Americans (late 1600s – 1912)



# 1844 Great Auk



- Went extinct when the last pair were harvested in ICELAND.



**1872**



- Yellowstone National Park Established.
- American Forest Association organized by private citizen
- American Public Health Association formed by a group of physicians

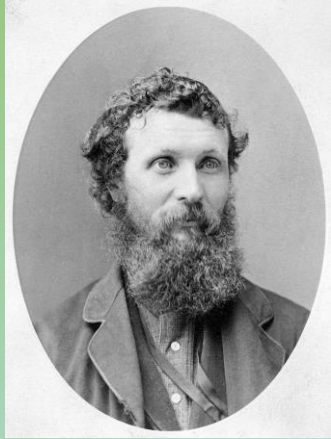
# 1880 KILLER FOG

- In London



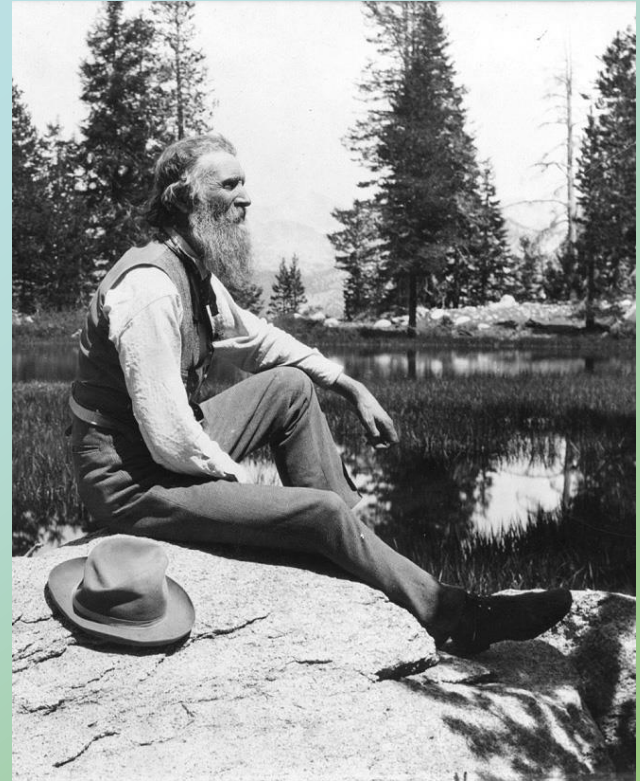


# 1892 Sierra Club co-founded



- Lead by John Muir
- Promote increased preservation of public land

- Known as the “Father of National Parks”



# 1892 MORE KILLER FOG

- Kills 1000 people





# 1899 -1900

## Passenger pigeons

- The last reported individuals in the wild were shot at Babcock, Wisconsin in 1899, and in Pike County, Ohio on March 24, 1900. Some individuals, however, remained in captivity.
- The last Passenger Pigeon, named Martha, died alone at the Cincinnati Zoo at about 1:00 pm on September 1, 1914.



# Lacey Act (1900)

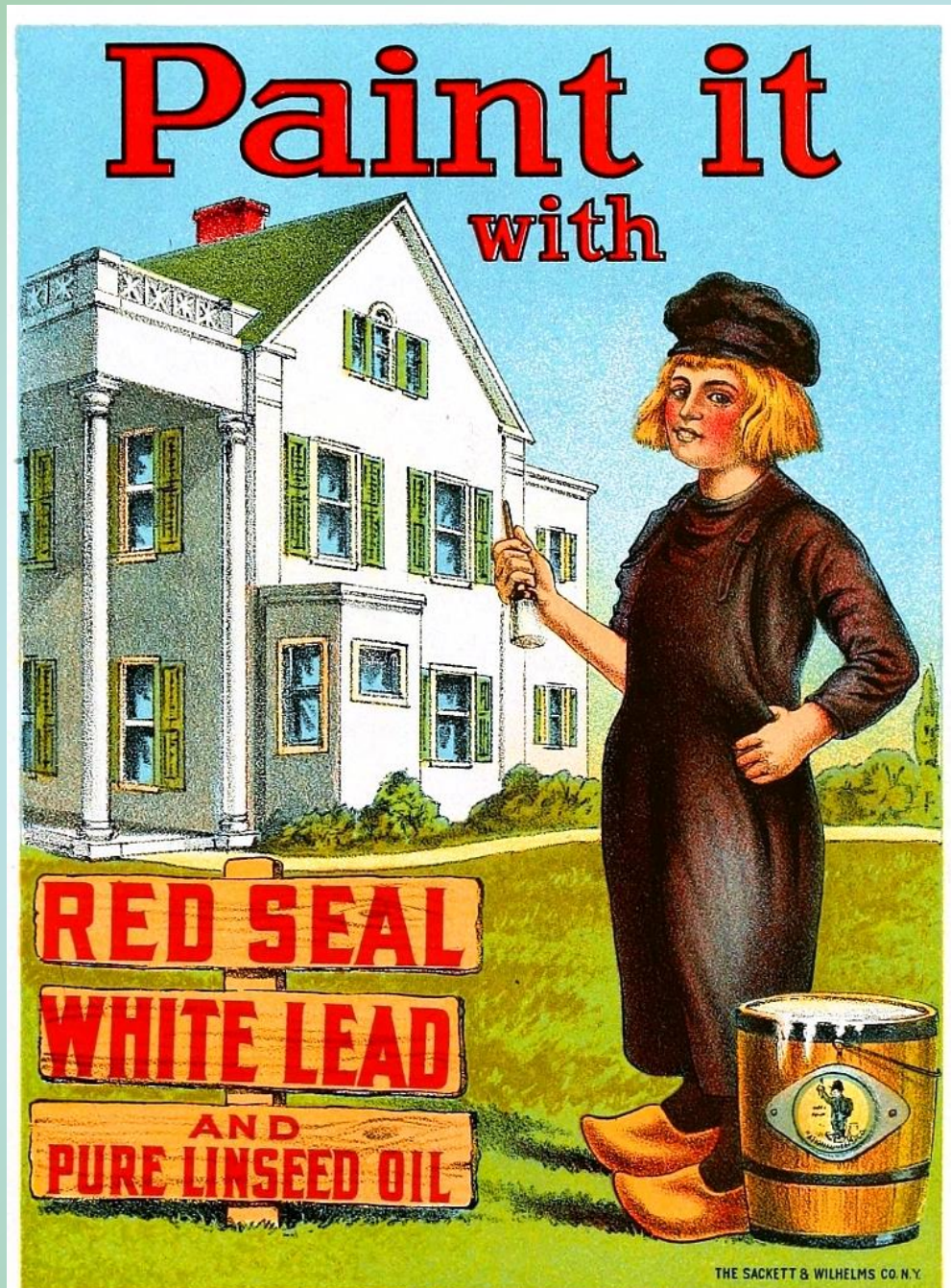
- BANS INTERSTATE SHIPMENT OF BIRDS KILLED IN VIOLATION OF STATE LAWS.





1904

- Child lead poisoning linked to lead-based paints





- US FOREST SERVICE created
- Gifford Pinchot (student of John Muir) placed as Head of Forest Service
- Audubon Society founded by private citizens to preserve Country's bird species

1905



# 1906

- San Francisco Earthquake and Fire



# No water to put out fire

- 3,000 died
- 80% of city  
destroyed
- Broke natural gas  
lines





# Antiquities Act (1906)

- Allows president to set aside areas on federal lands as National Monuments
- First one est. by Teddy Roosevelt



# PURE FOOD AND DRUG ACT(1906)

- Federal law that provided the federal inspection of meat products and forbade the manufacture, sale, or transportation of poisonous patent medicines (Wikipedia, 2012)
- Upton Sinclair *The Jungle*
- Florence Kelley (fought “sweat-shop” conditions)

Collier's  
THE NATIONAL WEEKLY



DEATH'S LABORATORY

Patent medicines are poisoning people throughout America to-day. Babies who cry are fed landmines under the name of syrup. Women are led to injure themselves for life by reading in the papers about the missing of husbands. Young and boys are robbed and contaminated by vicious criminals who lure them to their doom through seductive advertisements.

DRAWN BY A. W. BOWEN





# 1908

- Swedish chemist and physicist **SVANTE ARRHENIUS** argues that increased emissions from burning fossil fuels will lead to global warming





# National Park Service Act (1916)

- Creates National Park System and Services

Apostle Islands National  
Lakeshore  
Photo by Time Wilson



# Swine Flu Epidemic (1918)

- First “modern” pandemic as a result of increased mobility of humans on the planet.
- Spreads across the world in the matter of months.



# 1930s

- Great Depression
- Dust Bowl





# Soil Conservation Act (1935)

- Creates soil erosion service



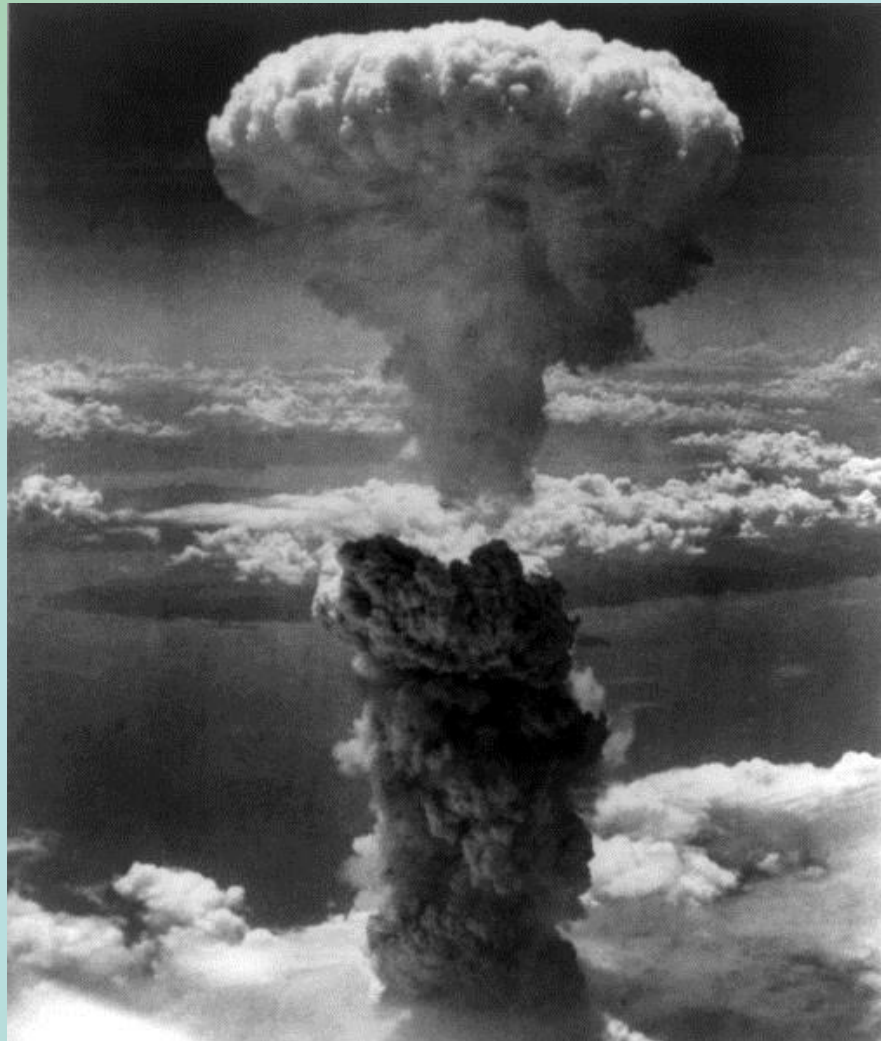
# Joshua Tree



**Minerva  
Hamilton  
Hoyt**

- Proclaimed National Monument:1936.
- Wilderness Designation:1976.
- Designated a National Park:1994 (Desert Protection Act added 234,000 acres).

# 1945 Hiroshima/Nagasaki





# Atomic Energy Act (1946)

- Also called McMahon Act
- Limits release of nuclear technology
  - Not even allies

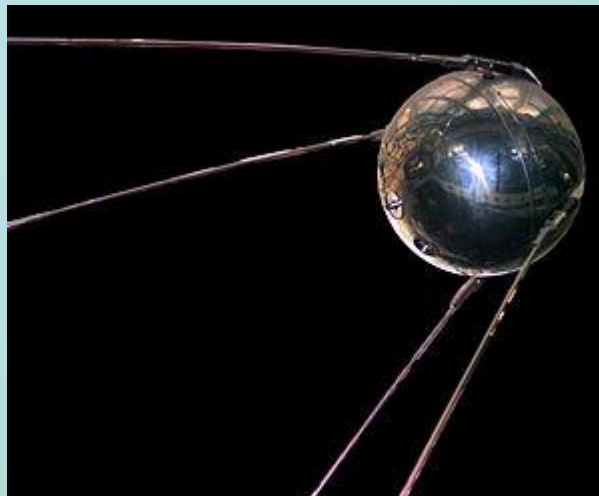
# 1952

- More London killer fog
- Over 1000 people die in few weeks



# SPUTNIK (1957)

- Russians launch the first object into orbit.
- Starts space race
- Leads to huge amounts of money invested into science education in the US







# Delaney Clause 1958

- Provision of in the amendment which said that if a substance were found to cause cancer in man or animal, then it could not be used as a food additive.
- **Title 21 amended:** Federal Food, Drug, and Cosmetic Act
- Although most additives and the known contaminants are present in minute quantities in the diet, little is known about the chronic effects of low levels of chemicals on human health

# Silent Spring (1962)

- Rachel Carson's book publicizes the harmful effects of pesticides on the environment ultimately leading to the ban of DDT which saved the bald eagles



# New York 1963

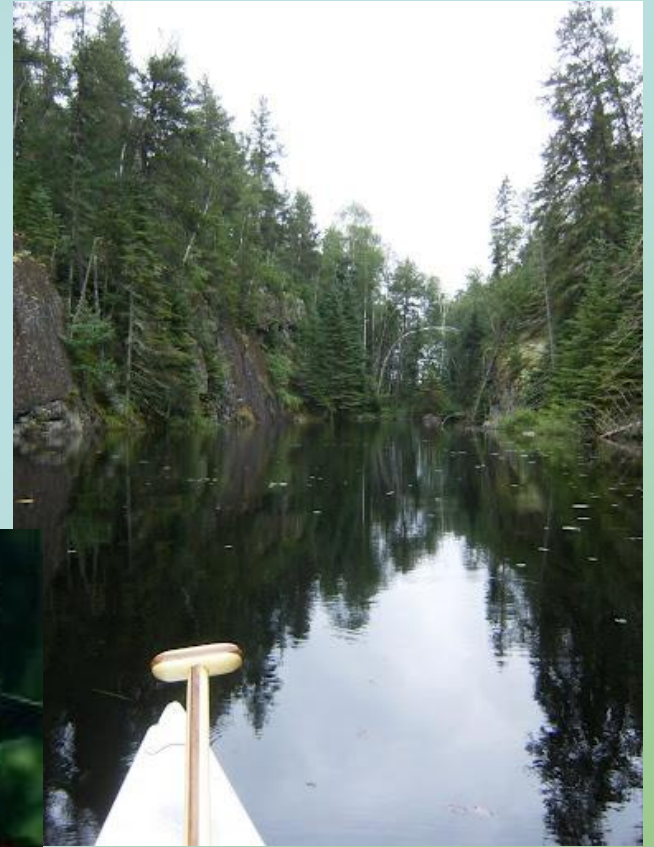
- 300 deaths and thousands ill from air pollution in New York City
- Clean air Act begins regulation, stricter amendments in 1965, 1970, and 1990





# Wilderness Act (1964)

- Establishes national wilderness system
- Sigurd Olson



# A RIVER IN OHIO CATCHES ON FIRE!

- Oil pollution in river ignites and burns for 8 days. Coyuhoga River that poured into Lake Erie
- Sometimes the AP Exam will refer to this as the Coyuhoga River, other times as Lake Erie.
- Helped spur the environmental movement



# Resources Recovery Act (1970)

- Started recycling
- Encourages waste reduction, deals with solid waste
- Started research

Fresh Kills Landfill  
near New York City





# FIRST EARTH DAY 1970

- EPA established (by Nixon)
- OSHA (Occupational Safety and Health Act)



# Ocean Dumping Act (1972)





# Endangered Species Act (1973)

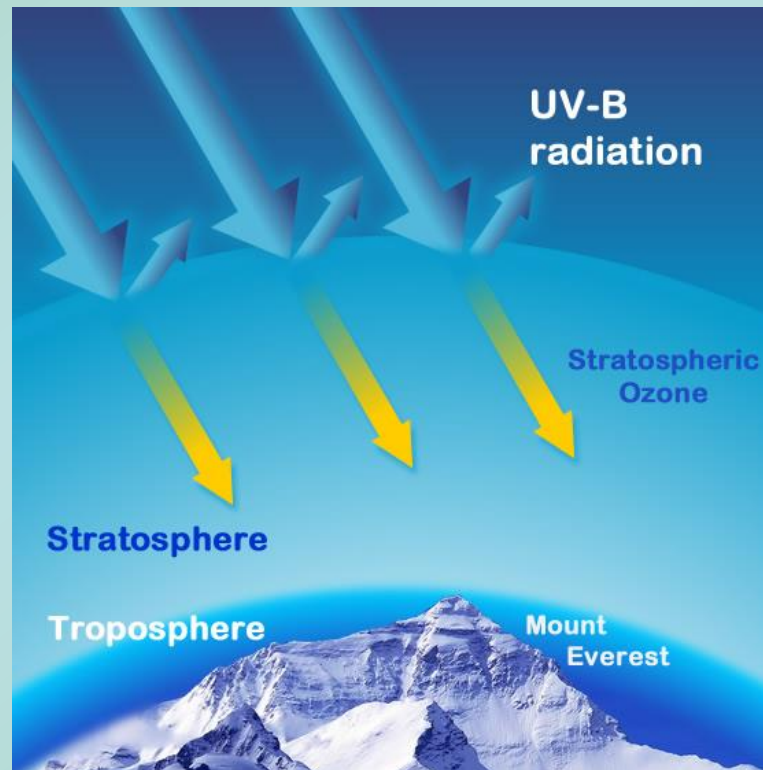
- Sets aside funds to protect endangered species
- Outlaws international trade in endangered species





# 1974

- Chemist Sherwood Roland and Mario Molina suggest CFCs are depleting ozone layer.



# Resource Conservation and Recovery Act (1976)

- Requires tracking of hazardous waste
- Love Canal



# Clean Water Act (1977)



- Strengthens drinking water regulation.



# 1978 LOVE CANAL EVACUATED



# 1979 accident at Three Mile Island

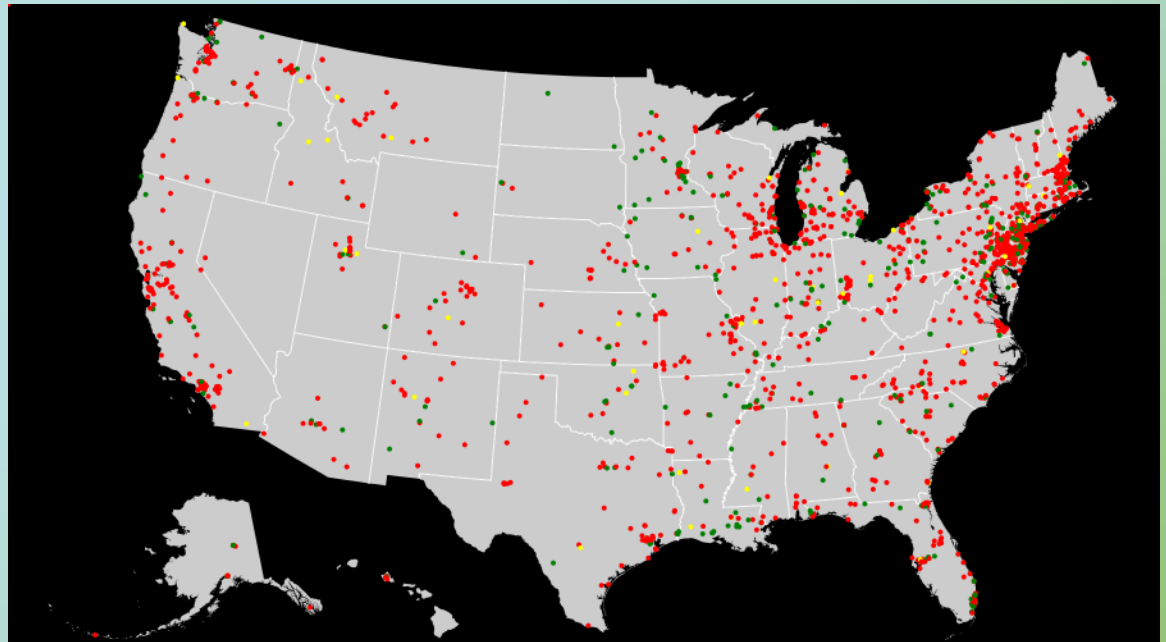
- Oil shortage because of revolution in Iran too.

Clean up of Three Mile Island took until 1993 and cost \$1 Billion



# Comprehensive Environmental Response, Compensation, and Liability Act [**CERCLA**](1980)

- Created a **SUPERFUND** to pay for clean up for things such as LOVE CANAL
- Mainly abandoned industrial sites and arsenals



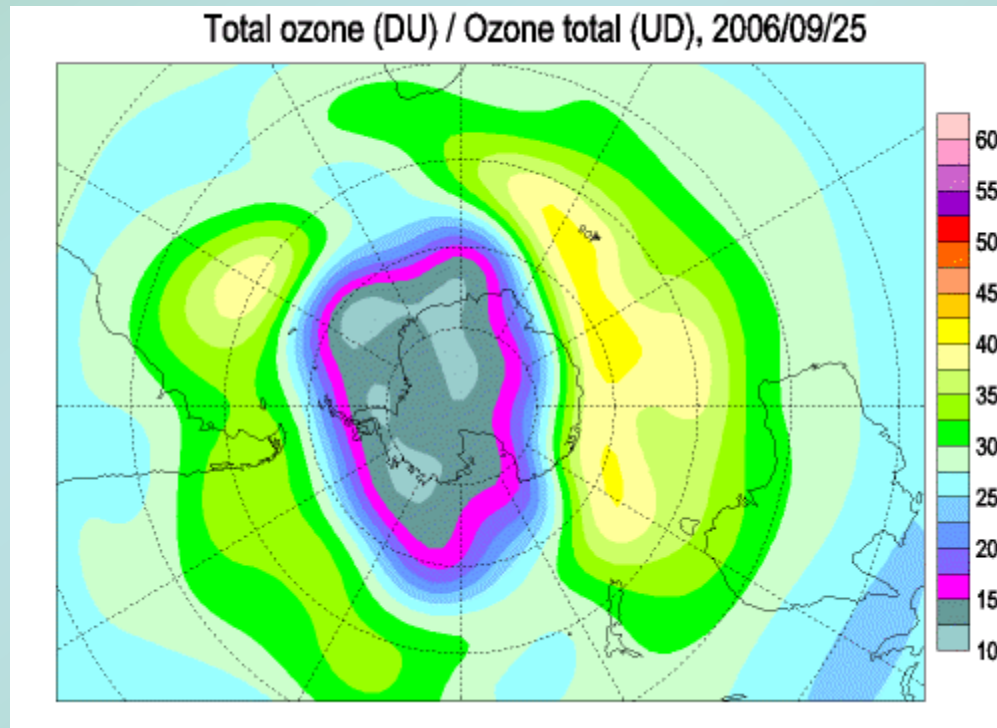


# 1983

- US EPA and National Academy of Sciences publish reports finding that build-up of carbon dioxide and other greenhouse gases will lead to global warming.

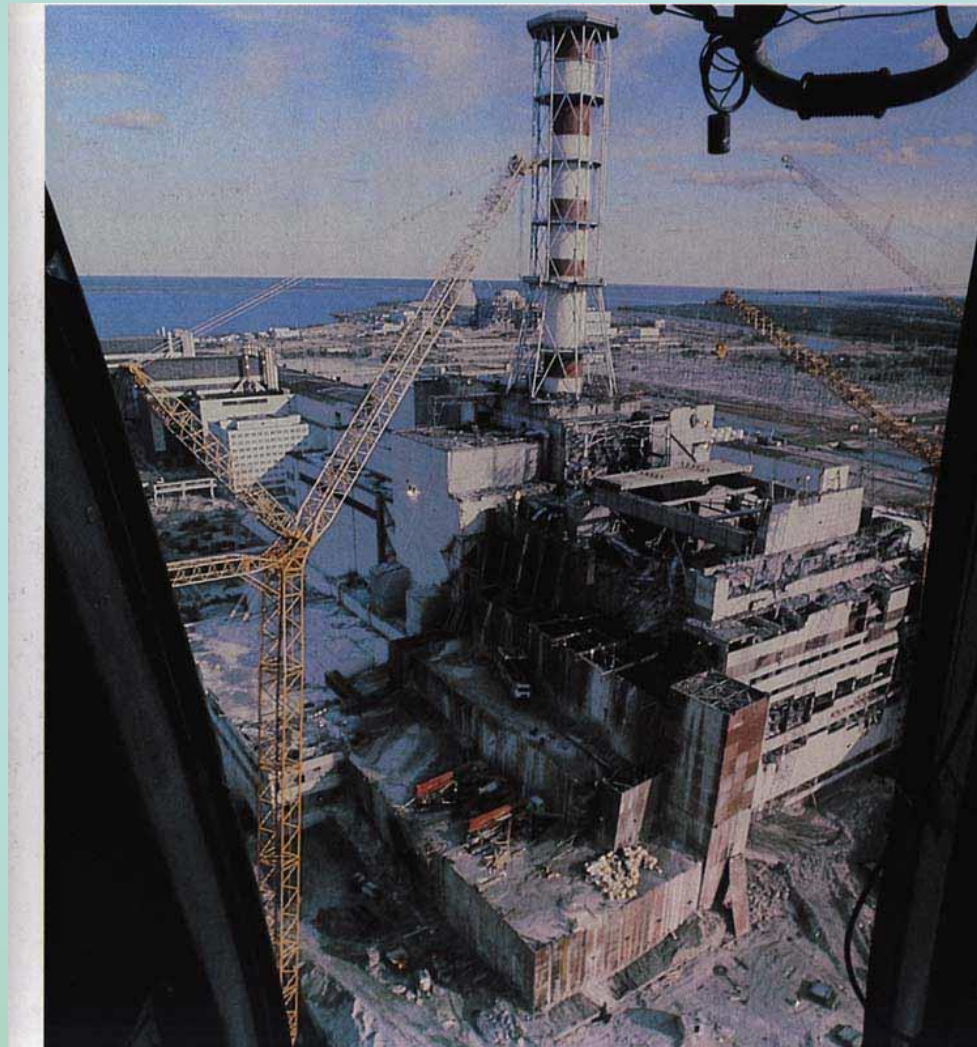
# 1985

- Scientists discover hole in the ozone layer over Antarctica



# Chernobyl (1986)

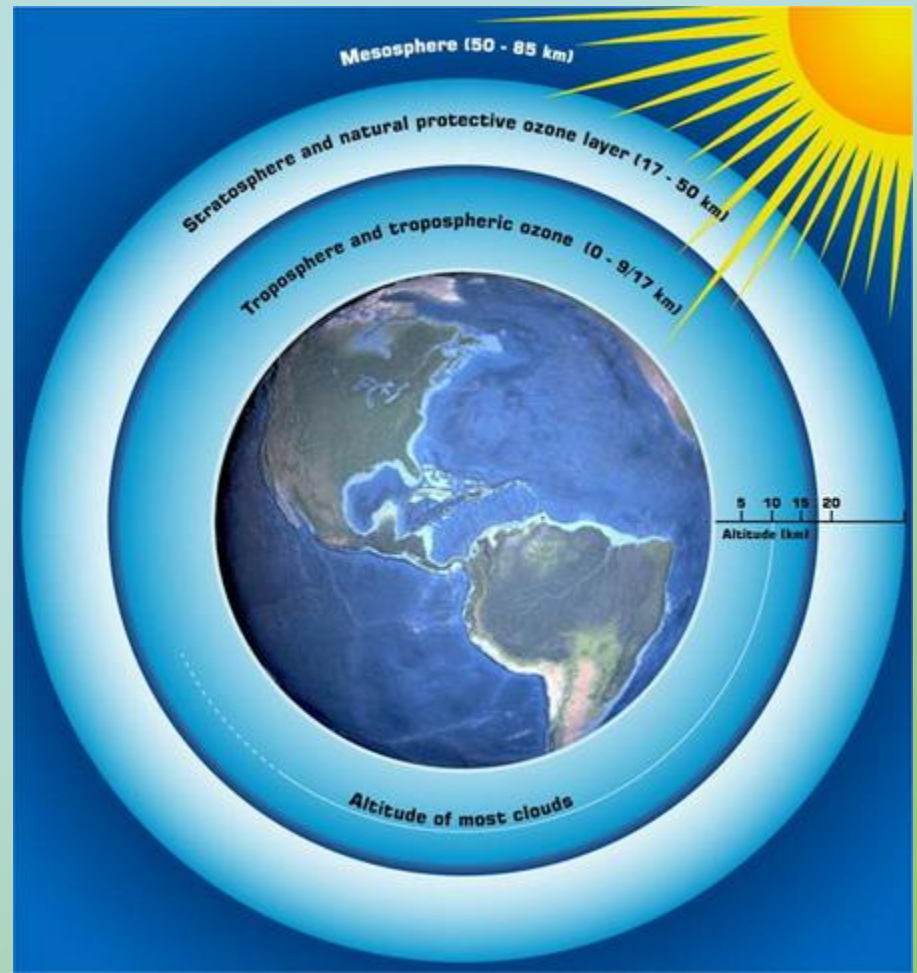
- Nuclear power plant near Belarus in USSR experiences a meltdown
- [http://todayspictures.slate.com/inmotion/essay\\_chernobyl/](http://todayspictures.slate.com/inmotion/essay_chernobyl/)





# Montreal Protocol (1987)

- Goal is to cut emissions of CFCs in half by 24 countries



# Exxon Valdez Oil Spill (1989)



# Clean Air Act (1990)

- Becomes stricter on sulfur dioxide and nitrogen oxides
- Allow trading of air pollution credits





# Map it!!!

- Sketch the continents
- Label the continents
- Label major countries and states



# 1996

- Lead phased out of gasoline.



# The Kyoto Meeting (1997)

- 172 countries meet in Japan to negotiate a treaty to slow global warming by cutting emissions of green house gases (the US did not ratify).





# 2000

- Considered by environmentalists to be one of the worst environmental presidents in US History
- Rolled back over 200 environmental protection policies during his reign



Austin, Texas, Dec. 20, 2000:  
**"Natural gas is hemispheric. I like to call it hemispheric in nature because it is a product that we can find in our neighborhoods."**

# 2004 Wangari Maathai

- Wins Nobel Peace Prize

Wangari Maathai was the first woman from Kenya to receive a PhD, she went on to start the GREEN BELT MOVEMENT that empowered women throughout Africa to replant native trees.

She was arrested multiple times, her autobiography is said to be amazing.

*UNBOWED*



# 2006 “An Inconvenient Truth”



- Al Gore
- Fairly good way of getting out the word on Global Warming
- Some of the information over-simplified





# Which of the following is directly linked to CERCLA?

- A) Migratory Birds
- B) Biodiversity
- C) Nuclear Power
- D) Endangered Species
- E) Superfund

# Which was the largest Nuclear Accident?

- A) Chernobyl
- B) Fukushima
- C) Three-mile Island
- D) Love Canal
- E) Cuyahoga River