

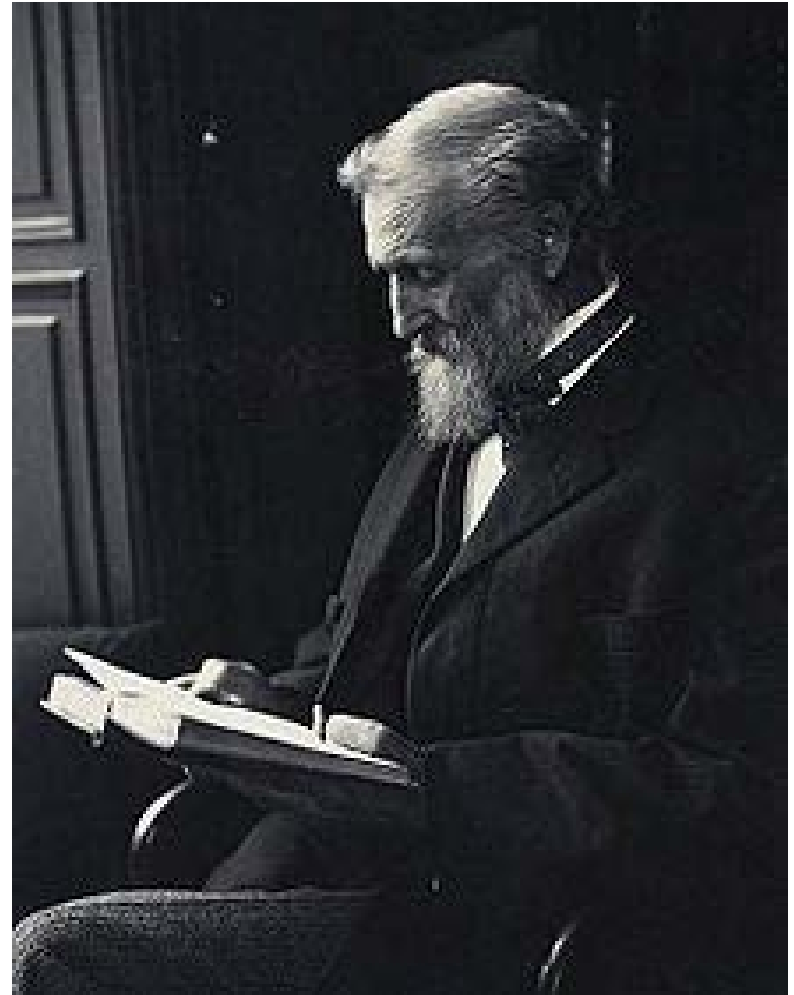
# Heroes, Disasters, and Solutions in Environmental Science

# Heroes



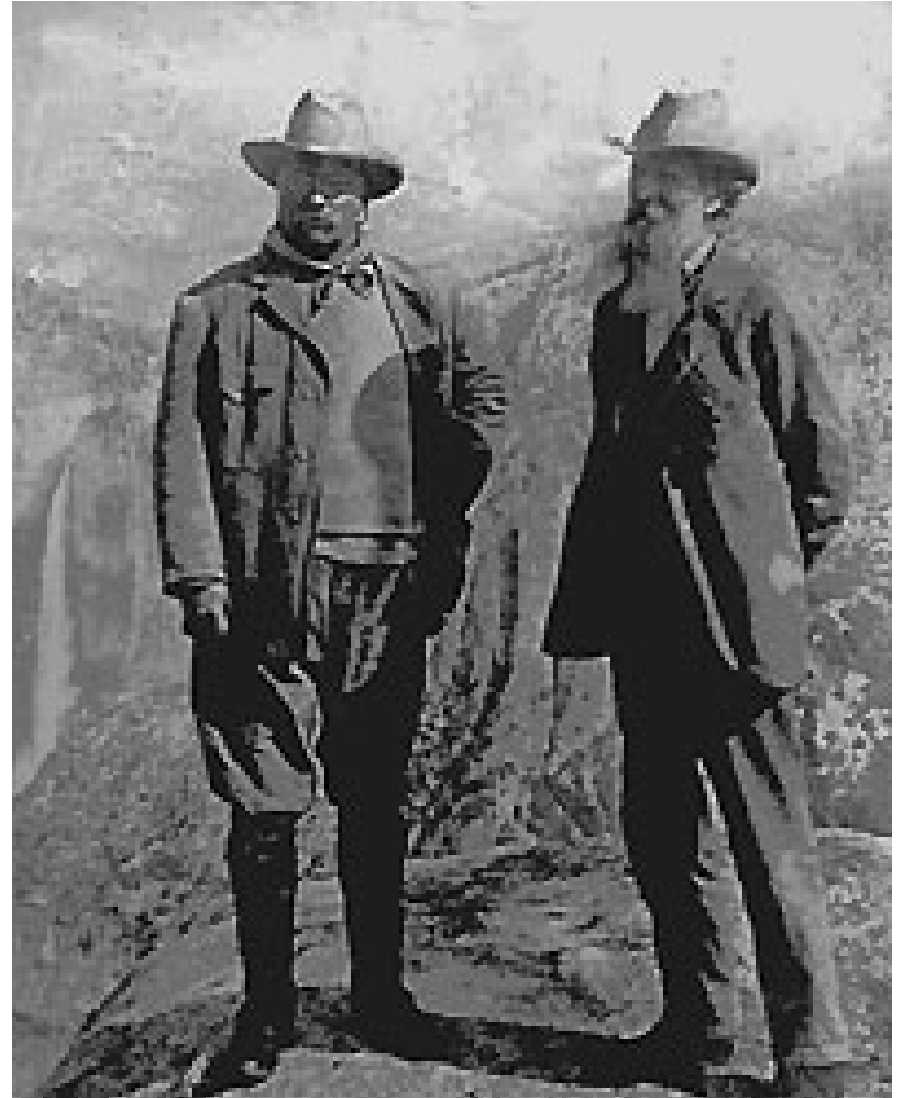
# John Muir

- Petitioned to establish national parks and preserve wilderness
- First naturalist
- Founded the **Sierra Club**, an important conservation organization in the US



# Teddy Roosevelt

- Set up the **US Forest Service**
- Appointed **Pinchot** the first US Forest Service Chief (motto was Land used for human benefit, but not abused)



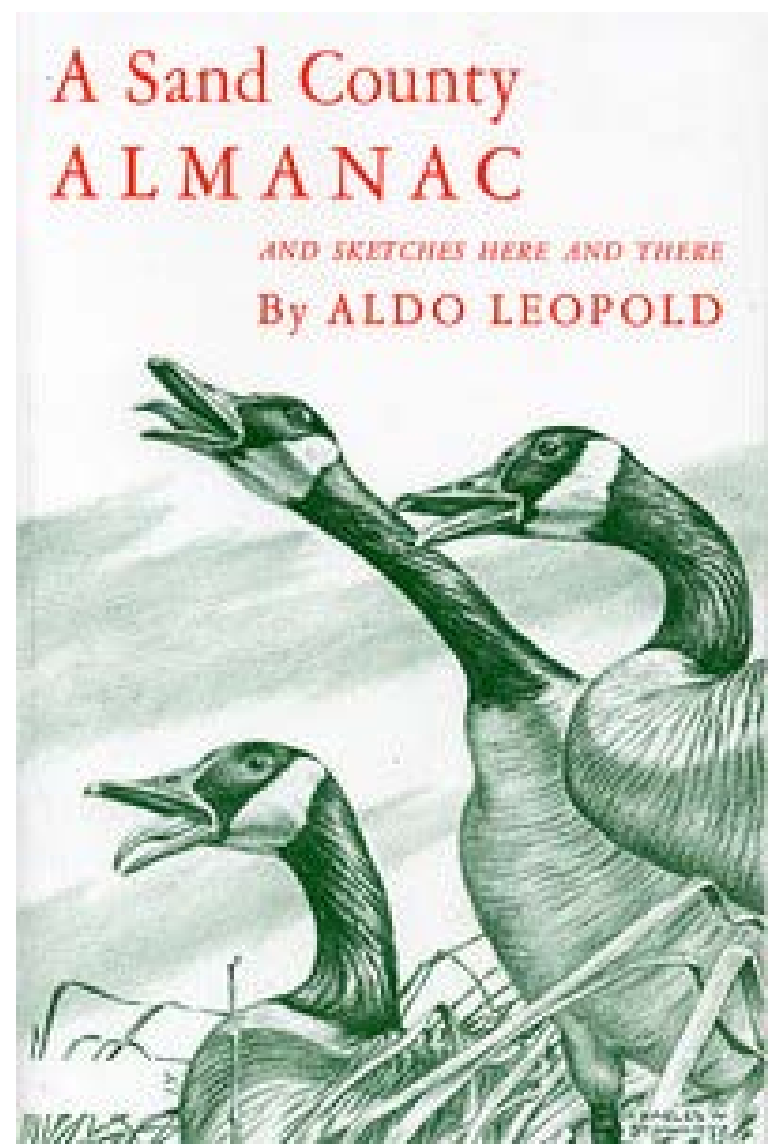
# Yellowstone, Yosemite, Sequoia

- First US National Parks
- Set aside natural space to preserve



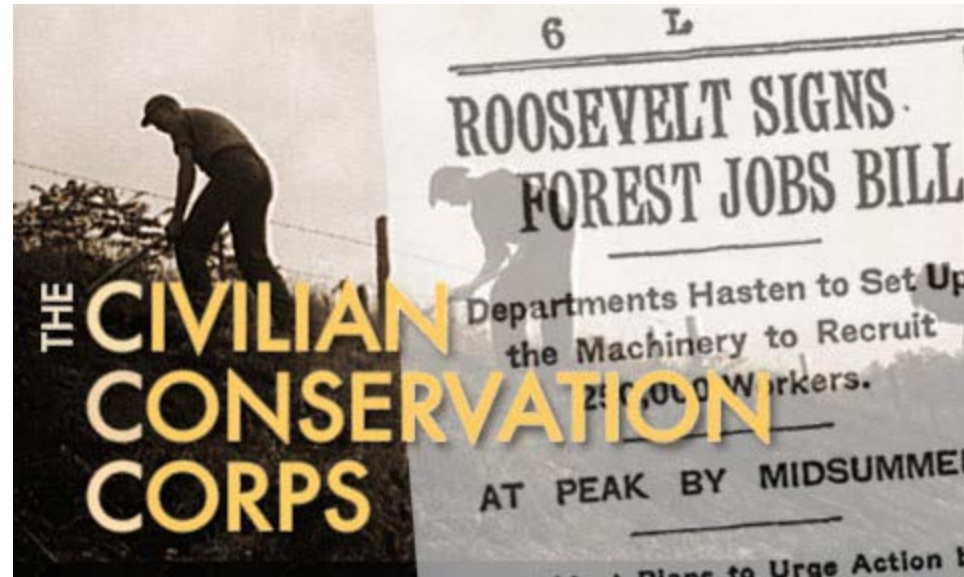
# Aldo Leopold *Sand County Almanac*

- Land ethic
- A responsible relationship between people and the land they inhabit
- "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."



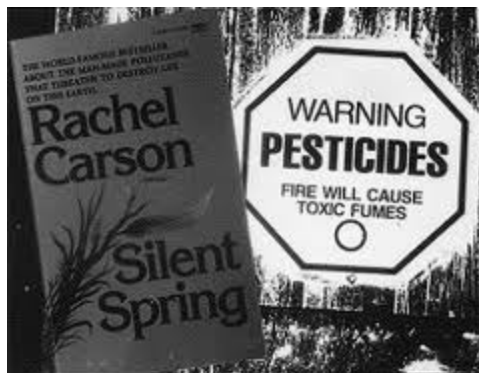
# Civilian Conservation Corps

- Work Relief Program
- Built national park infrastructure (roads, trails, bridges, replanted forests)
- Greater appreciation for great outdoors



# Rachel Carson-Silent Spring

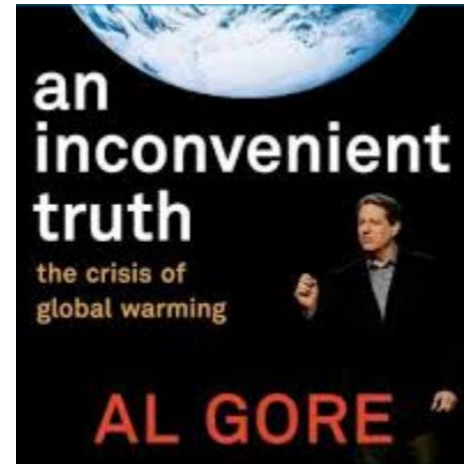
- Launched contemporary environmental movement
- Outlined effects of DDT in the food chain, particularly on birds





# Other Heroes (arguably)

- Al Gore: Brought Climate change into public discussion with “An Inconvenient Truth”
- Richard Nixon: Started the EPA (Environmental Protection Agency)



- Protect human health and the environment
- Enforces federal environmental laws, writes regulations, and sets environmental standards for pollutants

# Disasters

# Industrial Revolution

- Machines do work
- Pollution (air, water)
- Deforestation
- Unlimited resource use
- Move away from nature

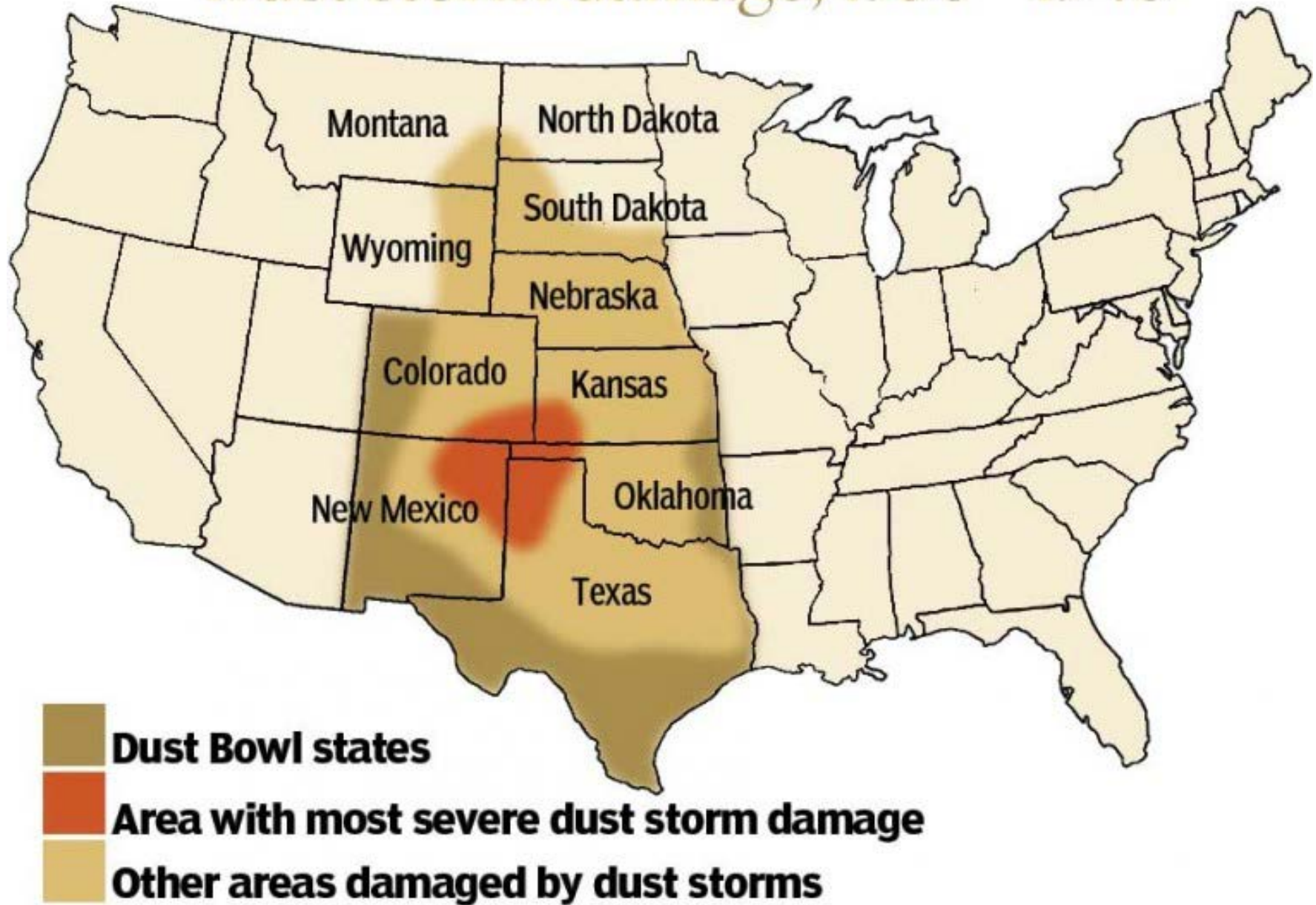


# Dust Bowl

- Severe dust storms caused agricultural and ecological damage to great plains
- Poor agricultural techniques
- Massive erosion
- Many children died



# Dust storm damage, 1930 - 1940



# Minamata, Japan

- 1950's
- Chisso chemical company dumps waste into Minamata bay, including mercury
- Mercury accumulates in fish and causes nervous system damage, birth defects, muscle convulsions



# Lake Erie

- Lake Erie became polluted from heavy industry
- Patches of lake were dead with runoff and sewage
- Weeds, algae, and trash fish outcompeted native fish



# Cuyahoga River

- Oil slicks from industry, debris, and sewage caused to burn
- In Ohio
- At least 13 fires have been reported





# OPEC oil embargo

- OPEC countries stopped selling US oil because of our support of Isreal
- Gas rationing, stations ran out of gas, and there was an energy emergency



*OPEC Embargo*

October 17, 1973

# Love Canal, NY

- Hooker chemical company buried hazardous chemicals in a canal, sold to a developer for \$1.00.
- Schools and homes were built on top
- People got sick and sued
- CERCLA legislation created because of it



# 3 mile island

- Partial nuclear meltdown
- 40 mile radioactive cloud
- Created nuclear safety concerns



# Bhopal, India

- Pesticide company had methoisocyanide explode (MIC)
- At least 10,000 and as many as 25,000 died

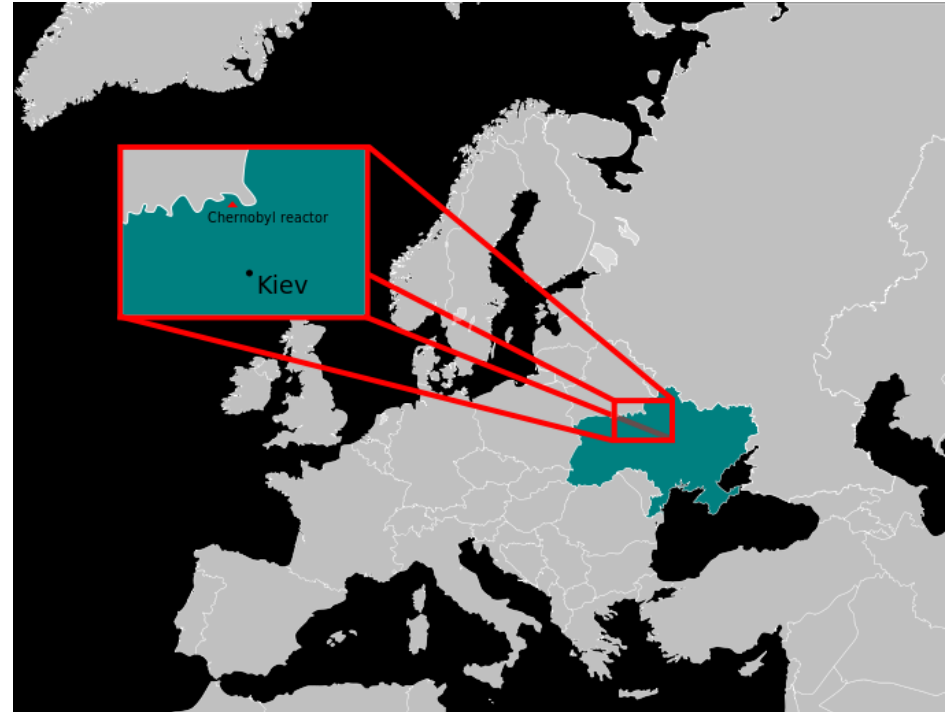


*This victim of the Bhopal disaster became a symbol of the destructive power of MIC*



# Chernobyl, Ukraine

- Nuclear disaster
- Explosion and fire sent radioactive particles over USSR and Europe
- City was evacuated and abandoned
- 31 reported deaths and countless illnesses
- Fueled fears of nuclear power plants



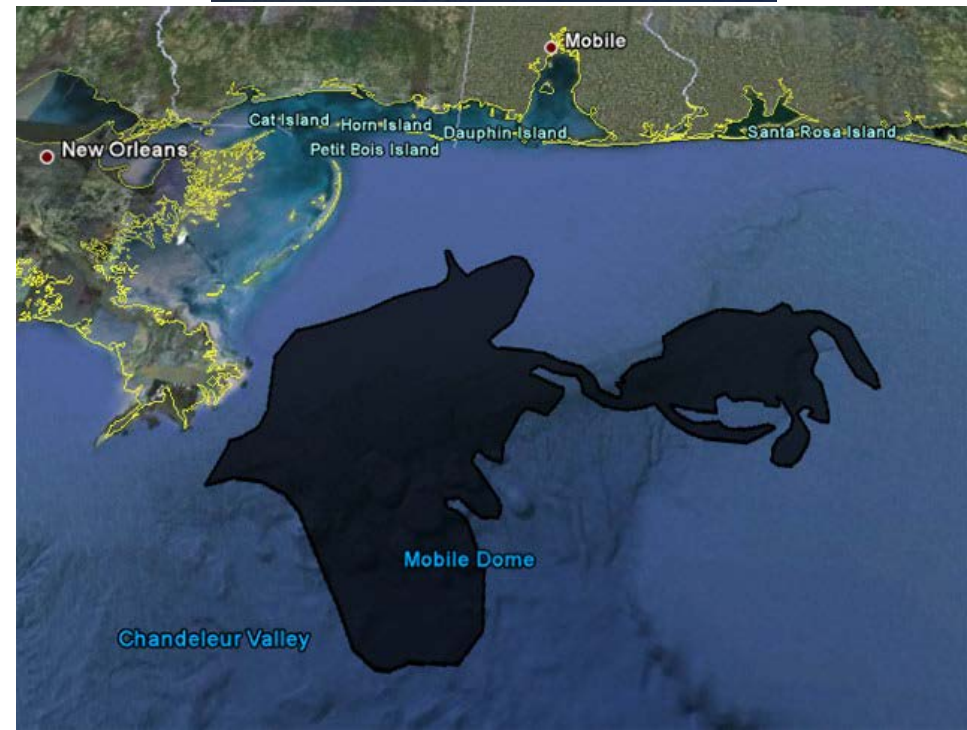
# Exxon Valdez

- Oil spill in Alaska's prince william sound
- 750,000 barrels of oil
- Remote location made clean up difficult
- Exxon was slow to clean up
- Many animals effected including salmon, bald eagles, otters



# Deepwater Horizon/BP Oil Spill

- 2010
- Well leaked oil for 87 days under gulf of mexico
- Extensive damage to environment and human health
- BP took responsibility and paid for cleanup



# Fukushima, Japan

- 2011
- Nuclear power plant meltdown after tsunami
- Fallout in soil and water around the plant

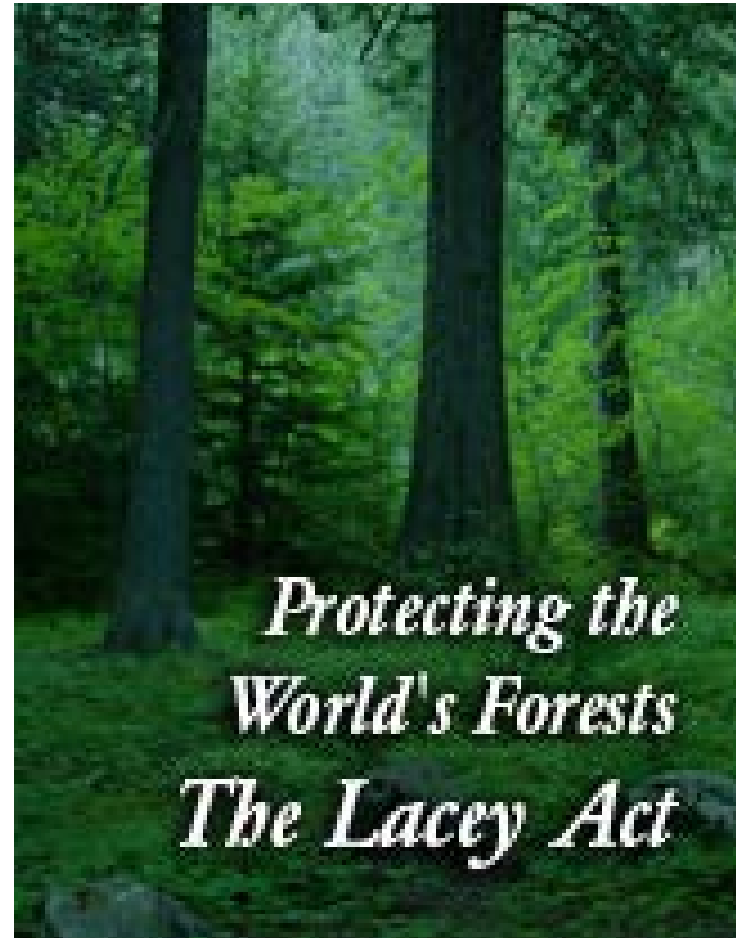




# Laws and Treaties

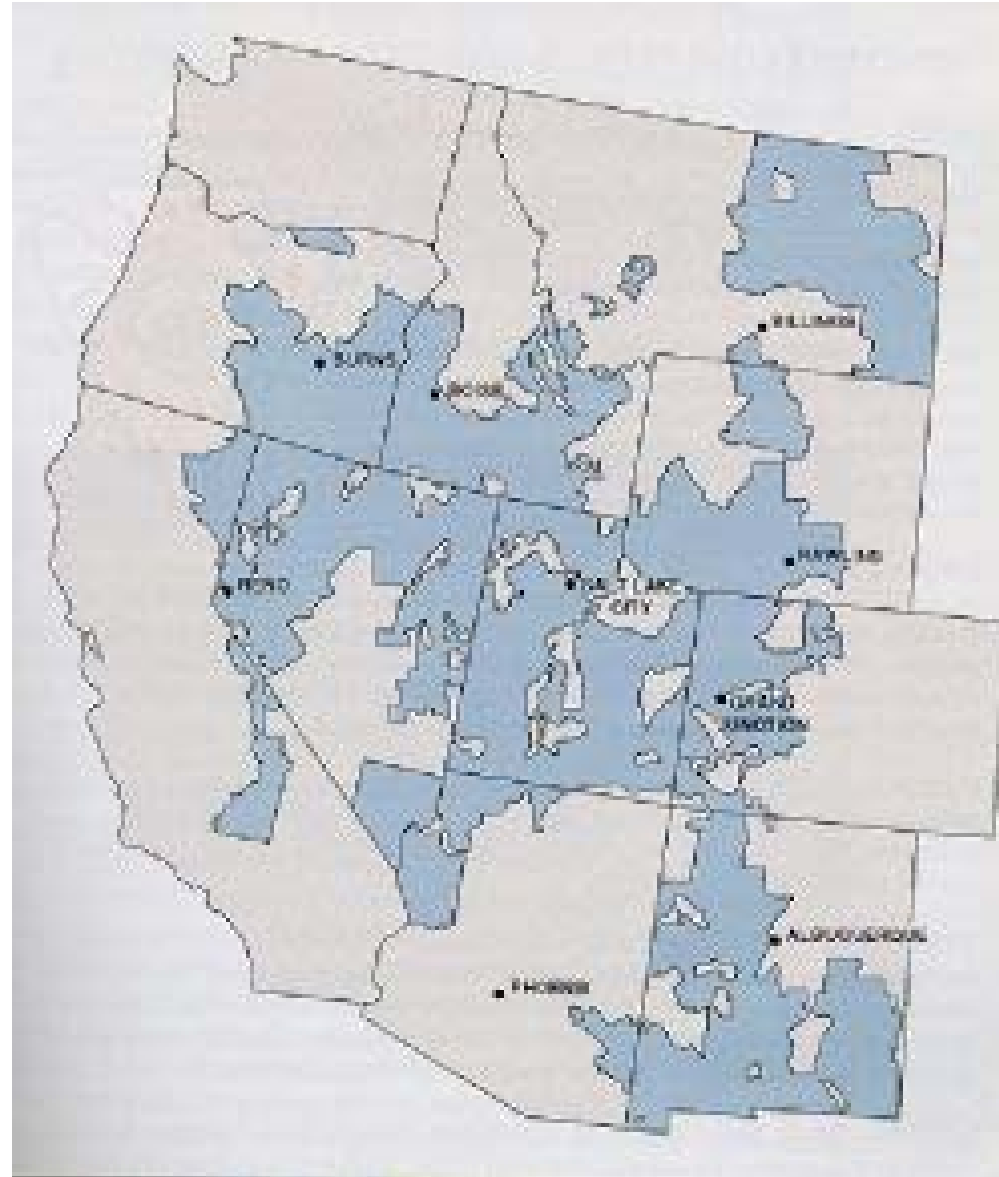
# Lacey Act

- Prohibits trade in wildlife, plants or fish that have been obtained illegally.
- Was initially enacted to protect birds in FL
- Most recent case was in 2009 against Gibson Guitars



# Taylor Grazing Act

- Intended to stop overgrazing in the mid west
- Requires grazers to purchase grazing permits.



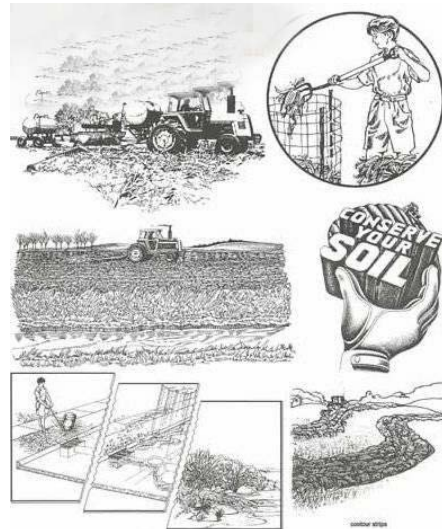
# Migratory bird hunting stamp act

- Duck stamp act
- Bird hunters (or duck hunters) must purchase a valid hunting stamp or license



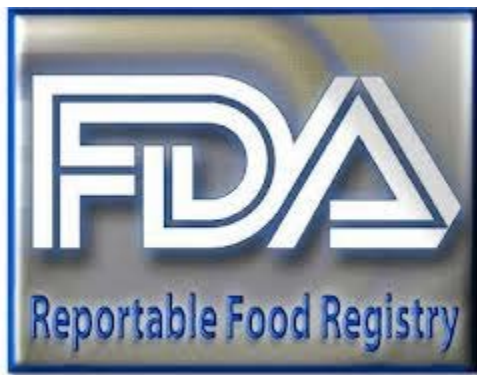
# Soil Conservation Service

- Mission is to help farmers take better care of the land
- Name changed to “Natural Resources Conservation Service” in 1994



# Food, Drug and Cosmetic Act

- Creation of the FDA to oversee the safety of food, drugs, and cosmetics



# Price Anderson Act

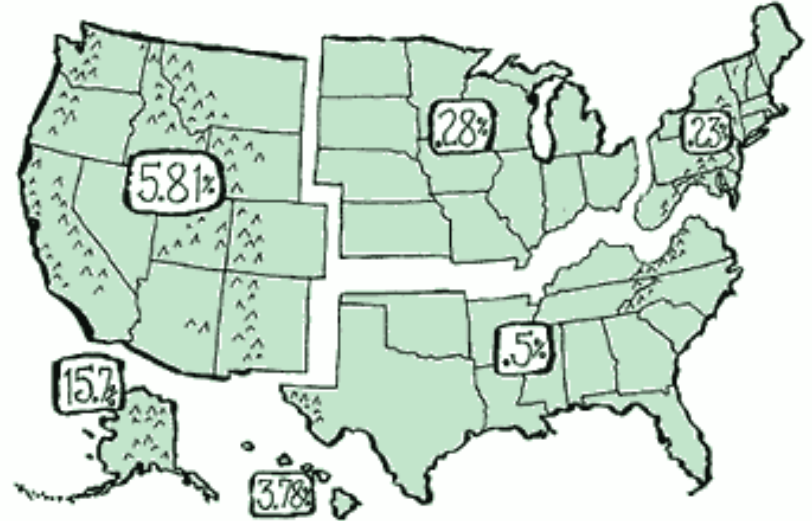
- Limits liability of an nuclear power plants in the US
- Nuclear power plants would not be financially responsible for any claims over \$12.6 billion



# Wilderness Act

- Defined wilderness and protected 9.1 million acres
- National Wilderness Preservation System
- Roadless areas

PERCENTAGE OF ACRES DESIGNATED AS WILDERNESS





# Environmental Policy Act

- Promote and enhance environment
- Establish presidential council on environmental quality
- Construction must include and environmental impact statement



# Environmental Protection Agency (EPA)

- Protect human health and the environment
- Enforces federal environmental laws, writes regulations, and sets environmental standards for pollutants



# Clean Air Act

- Sets standards for air pollutants



THE CLEAN AIR ACT



# Endangered species act

- Preserves endangered species and their habitat above economic considerations
- Species that have a high risk of extinction



# FIFRA

- Federal control of pesticide sale, distribution, and use
- Must be labeled with directions and will not cause unreasonable harm to the environment

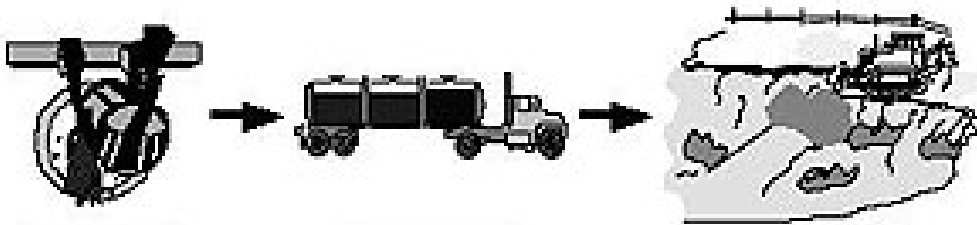


# RCRA

- Requires manufacturers of hazardous waste to be responsible for it from “cradle to grave.”



## RCRA's Cradle-to-Grave Hazardous Waste Management System



**Hazardous  
Waste  
Generation**

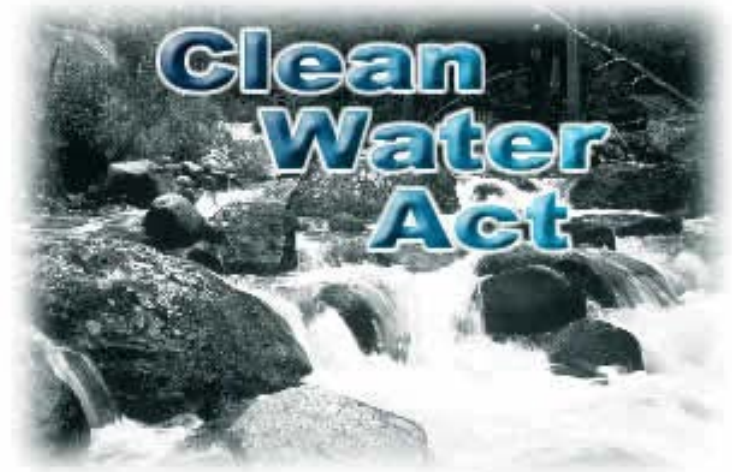
**Hazardous  
Waste  
Transportation**

**Hazardous  
Waste  
Disposal**



# Clean Water Act

- After Cuyahoga river fire
- Goal is to make surface waters swimmable and fishable



**swim**



**drink**



**fish**



# Surface Mining Control and Reclamation Act

- Requires mining companies to reclaim land after mining it (put it back the way they found it)





# Alaskan Lands Act

- 100 million acres designated wilderness area
- No resource extraction on these lands
- Controversial because of oil projected to be there



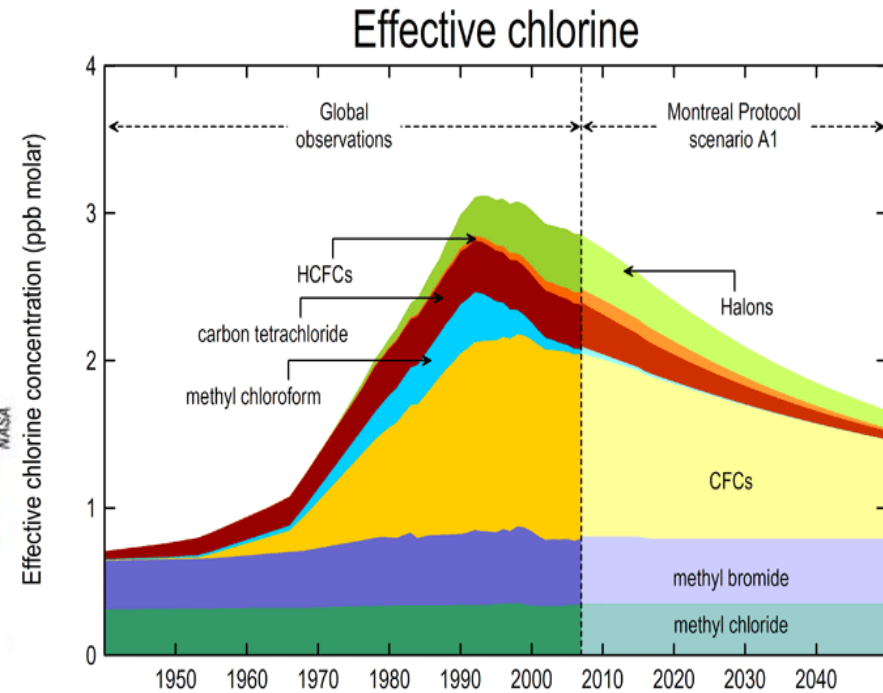
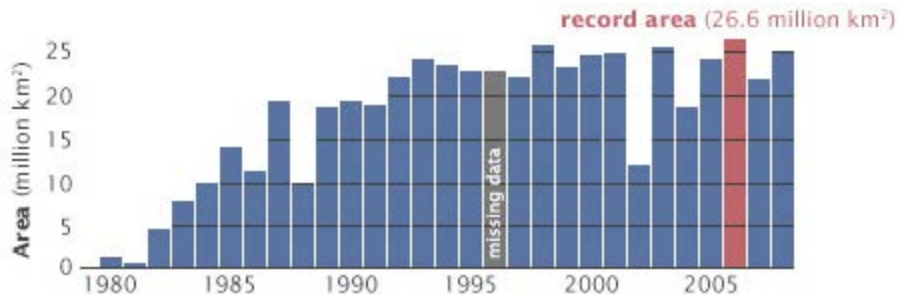
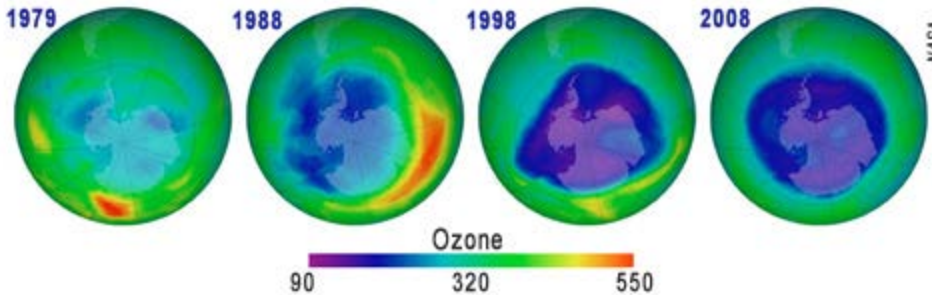
# CERCLA – Super fund

- Liability for hazardous waste polluters
- Establishes a fund to clean up abandoned hazardous waste sites (named super fund sites)



# Montreal Protocol

- International treaty to ban ozone depleting substances (CFC's)



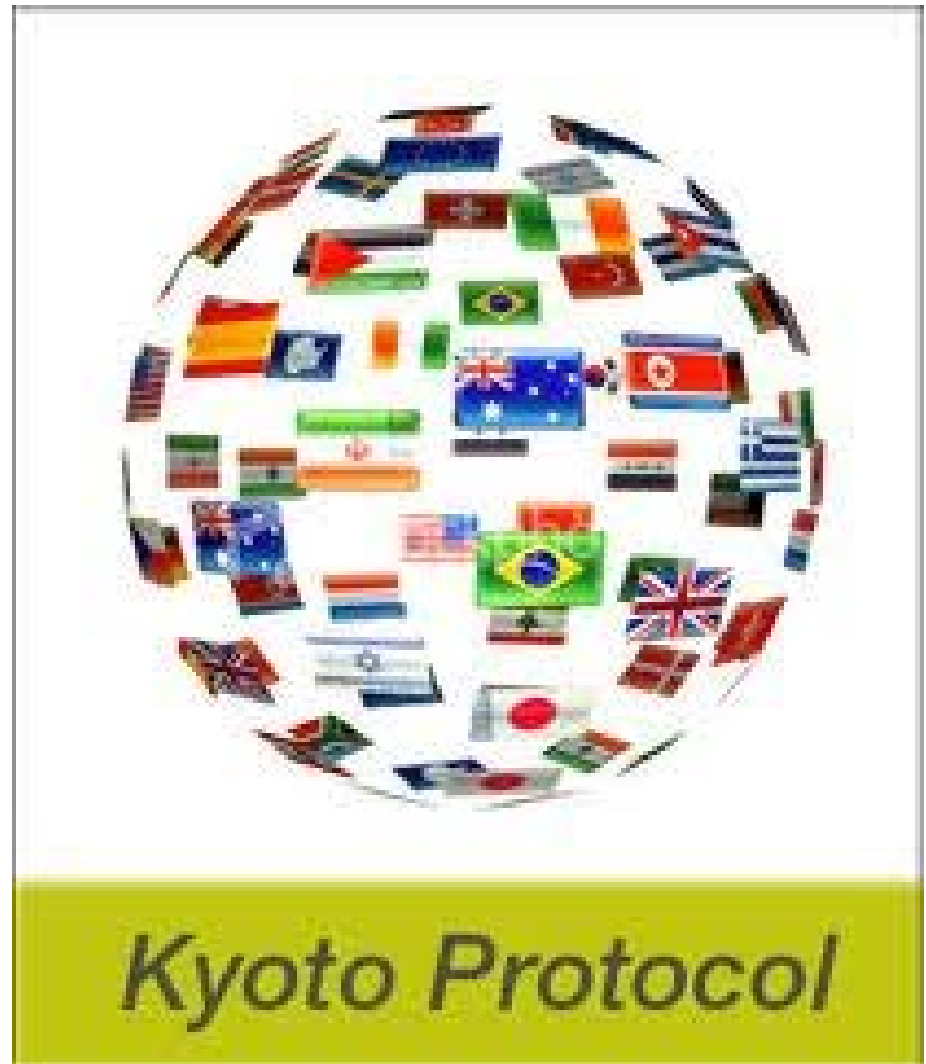
# Desert protection act

- Establishes Death Valley and Joshua Tree National Parks
- Deserts recognized as valuable ecosystems.



# Kyoto Protocol

- International treaty
- Sets CO<sub>2</sub> emissions standards
- US did not join



# International Treaty of Persistent Organic Pollutants

- POP are toxic chemicals that adversely effect human health and the environment
- The “dirty dozen”
- PCB’s, DDT, and dioxins are most commonly known
- Biomagnify in the food chain

**IPEN** International POPs Elimination Network



working together for a toxics-free future