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Environmental Laws, Economics, and Ethics

# Overview of Chapter 2

- Brief Environmental History of the United States
- U.S. Environmental Legislation
- Economics and the Environment
  - ▣ Environmental Problems in Central and Eastern Europe
- Environmental Justice
- Environmental Ethics, Values and Worldviews

# Northern Spotted Owl

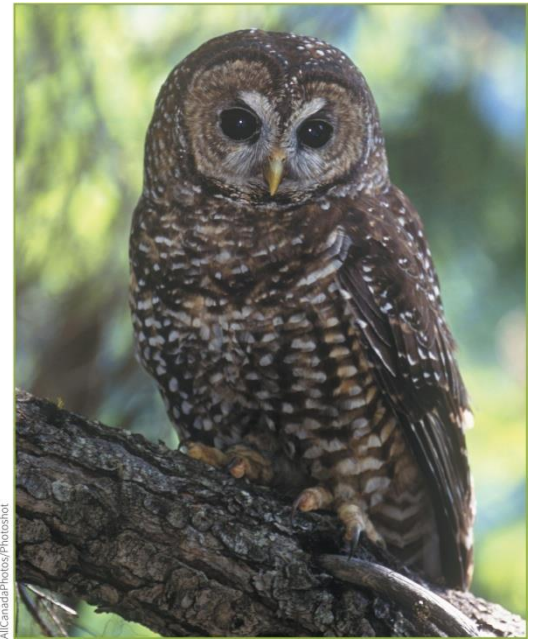
- Northern spotted owls live only in old-growth coniferous forests
  - ▣ Along with 40 other endangered or threatened species
  - ▣ <10% remain mainly in Pacific N.W. and Alaska
- In 1991, a court stopped logging in area of forest to protect owl habitat
  - ▣ Due to provisions in Endangered Species Act



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# Northern Spotted Owl

- Controversy suggested owls were being protected over timber jobs
  - ▣ Story complicated by automation of logging industry
    - Decreased jobs
    - Sped rate of logging
- 1994 Northwest Forest Plan
  - ▣ Watershed protection jobs
- Continual balance of protection and resource use



# Environmental History of U.S.

- 17<sup>th</sup> and 18<sup>th</sup> Centuries-  
Frontier Attitude
  - ▣ Natural resources seemed inexhaustible
  - ▣ Widespread environmental destruction



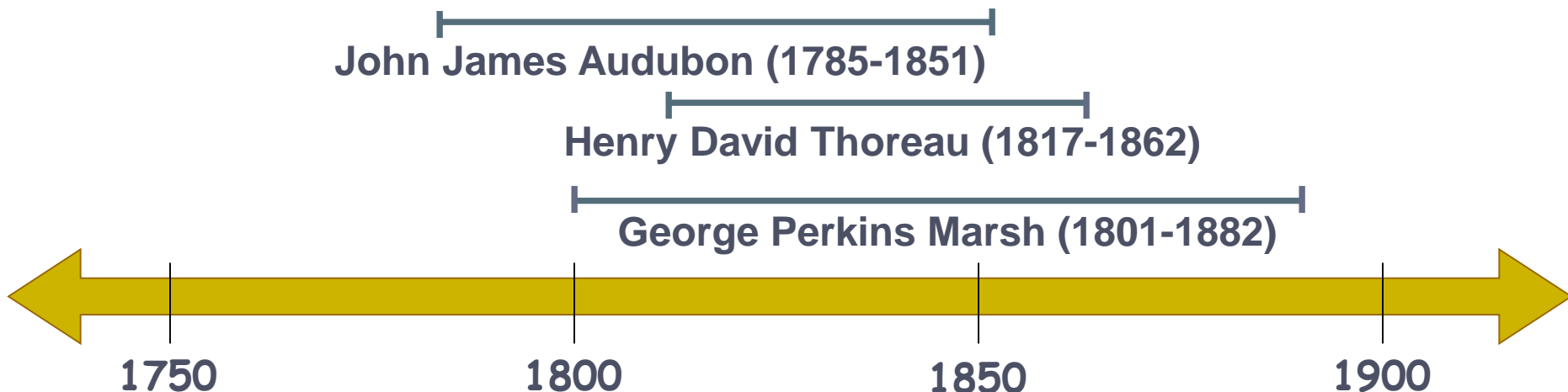
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Establishment of  
Jamestown, VA



# Environmental History of U.S.

- 19th century- U.S. naturalists voiced concerns about natural resources
  - ▣ Audubon- painted nature, which increased interest in environment
  - ▣ Thoreau- author on harmonizing life with nature
  - ▣ Marsh- wrote Man and Nature



# Environmental History of U.S.

## □ General Revision Act

- Gave president authority to establish forest reserves

- Presidents Harrison, Cleveland, Roosevelt

  - Put 17.4 million hectares into reserve

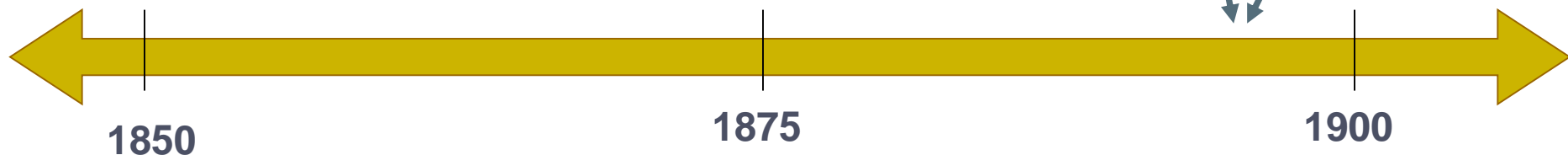
- President Roosevelt

  - Added additional 6.5 million hectares before signing bill preventing further forest reservation, appointed Pinchot first head of U.S. Forest Service

1875 American  
Forestry Association  
formed

1890 Yosemite and  
Sequoia National  
Parks Established

1891 General  
Revision Act



# Environmental History of U.S.

- Utilitarian Conservationist
  - ▣ Value natural resources for their usefulness
  - ▣ Roosevelt
- Biocentric Preservationist
  - ▣ Protect nature because all life deserves respect
  - ▣ John Muir (founded Sierra Club)
    - Fought for National Parks

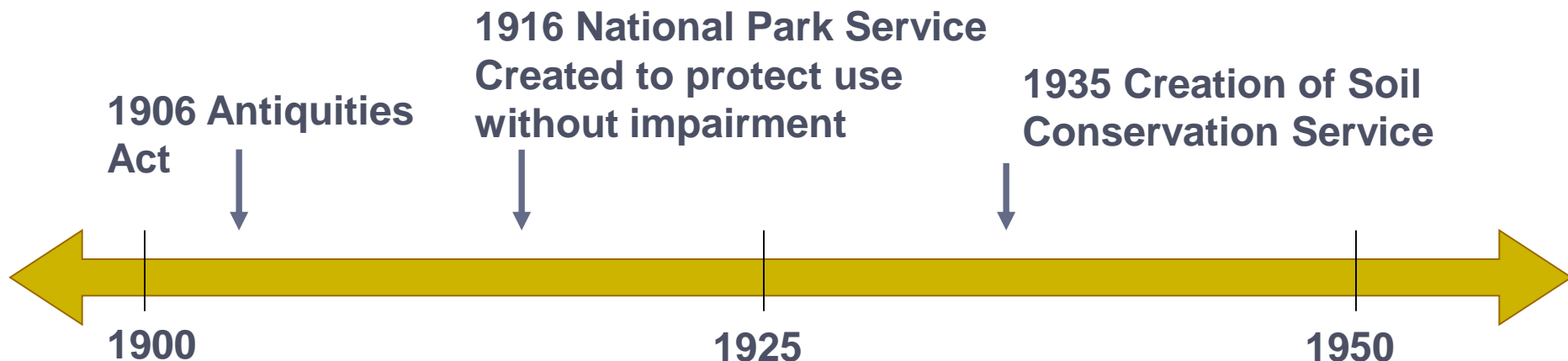


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# Environmental History of U.S.

- Antiquities Act
  - ▣ Allows president to set aside sites of scientific or historical importance (monuments)
- Franklin Roosevelt
  - ▣ Established Civilian Conservation Corps
  - ▣ Established Soil Conservation Service in response to American Dust Bowl (1930s)



# Environmental History of U.S.

- Public concern about pollution, and resource quality grew 1960s
- Book *Silent Spring* raised public awareness about DDT and pesticides poisoning wildlife and food supplies
  - ▣ Rachel Carson, marine biologist
- Population ‘problem’ raised by Paul Ehrlich’s *The Population Bomb*



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# Environmental History of U.S.

- Environmentalism rose in 1970s
- First Earth Day celebrated in 1970 by ~20 million people
- “Think Globally, Act Locally”

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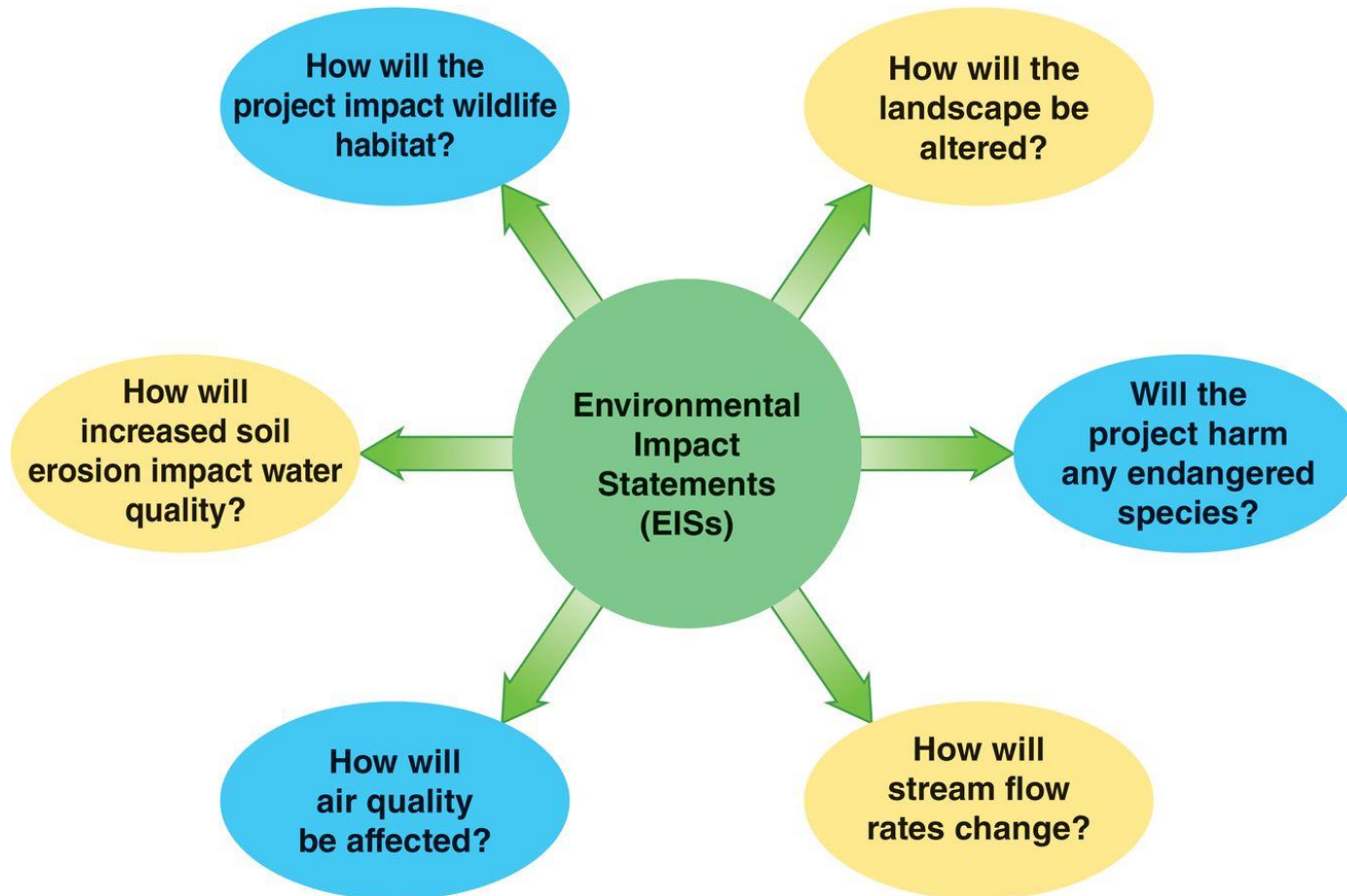


1970s	1980s	1990s	2000s	2010s
<ul style="list-style-type: none"> <li>• <b>1970</b> Millions in United States gather for first Earth Day.</li> <li>• <b>1972</b> Scientists report most acid rain in Sweden originates in other countries.</li> <li>• <b>1973</b> Convention on International Trade in Endangered Species of Wild Fauna and Flora protects endangered species.</li> <li>• <b>1974</b> Chlorofluorocarbons are first hypothesized to cause ozone thinning.</li> <li>• <b>1976</b> Dioxin (poisonous chemical) released in industrial accident at pesticide plant in Italy.</li> <li>• <b>1979</b> Worst nuclear accident in U.S. history occurs at Three Mile Island nuclear power plant in Pennsylvania.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>1982</b> Convention on the Law of the Sea developed to protect ocean's resources.</li> <li>• <b>1984</b> World's worst industrial accident at pesticide plant in India kills and injures thousands.</li> <li>• <b>1985</b> Scientists discover and measure size of ozone hole over Antarctica.</li> <li>• <b>1986</b> World's worst nuclear accident up to that time occurs at nuclear power plant in Chernobyl, Soviet Union.</li> <li>• <b>1986</b> International Whaling Commission announces moratorium on commercial whaling.</li> <li>• <b>1987</b> Montreal Protocol requires countries to phase out ozone-depleting chemicals.</li> <li>• <b>1989</b> <i>Exxon Valdez</i> creates largest spill from an oil tanker in U.S. history.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>1990</b> First Intergovernmental Panel on Climate Change (IPCC) Assessment warns of possible global warming.</li> <li>• <b>1991</b> World's worst oil spill occurs in Kuwait during war with Iraq.</li> <li>• <b>1992</b> U.N. conference on Environment and Development (Earth Summit) held in Brazil.</li> <li>• <b>1994</b> International Conference on Population and Development held in Egypt.</li> <li>• <b>1995</b> Second IPCC Assessment warns of human influence on global warming.</li> <li>• <b>1997</b> Forest fires destroy more tropical forests than ever recorded before; Indonesia is particularly hard hit.</li> <li>• <b>1999</b> Human population reaches 6 billion.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>2000</b> Treaty on Persistent Organic Pollutants requires countries to phase out certain highly toxic chemicals.</li> <li>• <b>2001</b> Third IPCC Assessment cites strong evidence humans are responsible for most of observed global warming in past 50 years.</li> <li>• <b>2001</b> President Bush decides the United States will not ratify the Kyoto Protocol, which mandates reductions in CO<sub>2</sub> emissions to combat global warming.</li> <li>• <b>2002</b> Oil spill off Spain's coast raises awareness of ocean's vulnerability.</li> <li>• <b>2004</b> Record heat waves in Europe highlight threat of climate change.</li> <li>• <b>2007</b> Fourth IPCC Assessment concludes that it is "very likely" that global warming has been caused by human activity.</li> <li>• <b>2008</b> U.S. Supreme Court decides that EPA must regulate CO<sub>2</sub>.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>2010</b> The Deepwater Horizon, an oil drilling platform in the Gulf of Mexico, creates the largest oil spill in U.S. history.</li> <li>• <b>2010</b> At meetings in Cancun, Mexico, over 190 countries agree to a plan for monitoring and reducing greenhouse gas emissions.</li> <li>• <b>2010</b> NASA global temperature data show that 2010 was the hottest year on record.</li> <li>• <b>2011</b> A tsunami in Japan causes severe damage and radiation releases at several Fukushima Daiichi nuclear power plant reactors.</li> <li>• <b>2013</b> A "garbage patch" in South Pacific Ocean discovered, covering at least 700,000 km<sup>2</sup> of the ocean surface.</li> <li>• <b>2013</b> The EPA to begin regulating greenhouse gas emissions from coal-fired power plants.</li> <li>• <b>2014</b> Fifth IPCC Assessment concludes with even more confidence that human activities drive our changing climate.</li> </ul>

# U.S. Environmental Legislation

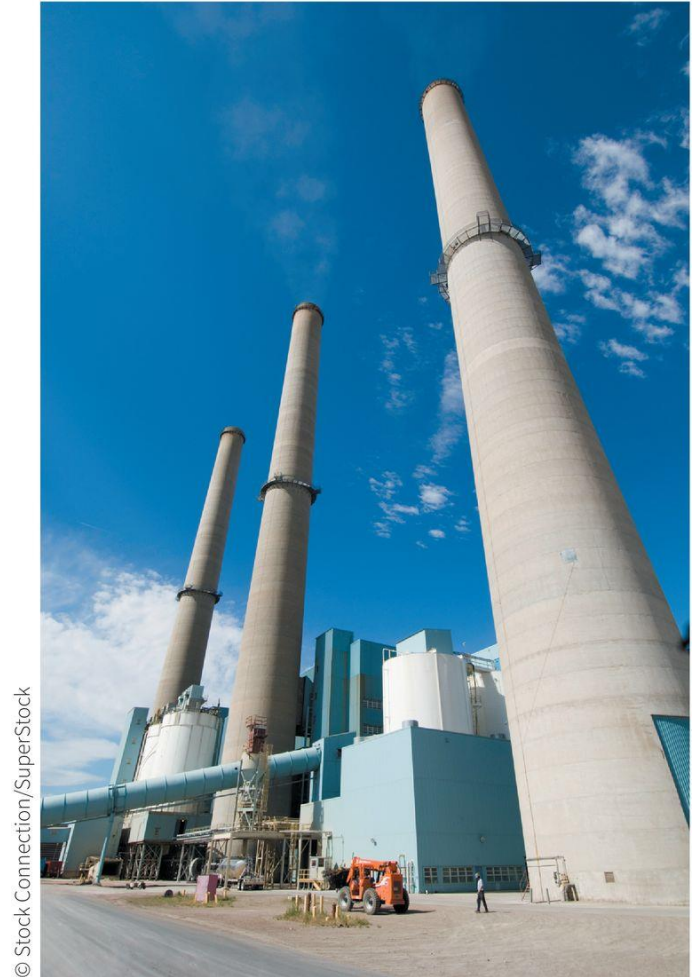
- Broad public desire for change
- Environmental Protection Agency
  - Established 1970
- National Environmental Policy Act (NEPA)
  - Cornerstone of Environmental Law
  - Requires Environmental Impact Statements (EIS) for any proposed federal action
    - Ex: highway or dam construction
  - Revolutionized environmental protection in U.S.
- Table 2.1 in textbook provides a list

# Environmental Impact Statement



# U.S. Environmental Legislation

- Numerous laws passed since 1970
- They address:
  - ▣ Clean water
  - ▣ Clean air
  - ▣ Energy conservation
  - ▣ Hazardous waste
  - ▣ Pesticides
  - ▣ Federal regulation of pollution



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**Table 2.1** Some Important Federal Environmental Legislation

*General*

Freedom of Information Act of 1966  
National Environmental Policy Act of 1969  
National Environmental Education Act of 1990

*Conservation of Energy and Renewable Energy Resources*

Energy Policy and Conservation Act of 1975  
Northwest Power Act of 1980  
National Appliance Energy Conservation Act of 1987  
Energy Policy Act of 1992  
American Recovery and Reinvestment Act of 2008

*Conservation of Wildlife*

Fish and Wildlife Act of 1956  
Anadromous Fish Conservation Act of 1965  
Fur Seal Act of 1966  
National Wildlife Refuge System Act of 1966  
Species Conservation Act of 1966  
Marine Mammal Protection Act of 1972  
Marine Protection, Research, and Sanctuaries Act of 1972  
Endangered Species Act of 1973  
Federal Noxious Weed Act of 1974  
Magnuson Fishery Conservation and Management Act of 1976  
Whale Conservation and Protection Study Act of 1976  
Fish and Wildlife Improvement Act of 1978  
Fish and Wildlife Conservation Act of 1980  
Fur Seal Act Amendments of 1983  
Wild Bird Conservation Act of 1992  
National Invasive Species Act of 1996

Emergency Wetlands Resources Act of 1986  
North American Wetlands Conservation Act of 1989  
California Desert Protection Act of 1994  
Food, Conservation, and Energy Act of 2008 (the latest version of the “farm bill,” which has been amended and renamed every 5 years or so since the 1930s)

*Air Quality and Noise Control*

Noise Control Act of 1965  
Clean Air Act of 1970  
Quiet Communities Act of 1978  
Asbestos Hazard and Emergency Response Act of 1986  
Clean Air Act Amendments of 1990

*Water Quality and Management*

Refuse Act of 1899  
Water Resources Research Act of 1964  
Water Resources Planning Act of 1965  
Clean Water Act of 1972  
Ocean Dumping Act of 1972  
Safe Drinking Water Act of 1974  
National Ocean Pollution Planning Act of 1978  
Water Resources Development Act of 1986  
Great Lakes Toxic Substance Control Agreement of 1986  
Water Quality Act of 1987 (amendment of Clean Water Act)  
Ocean Dumping Ban Act of 1988  
Oceans Act of 2000



**Table 2.1** Some Important Federal Environmental Legislation

*Conservation of Land*

General Revision Act of 1891  
Taylor Grazing Act of 1934  
Soil Conservation Act of 1935  
Multiple Use Sustained Yield Act of 1960 (re: national forests)  
Wilderness Act of 1964  
Land and Water Conservation Fund Act of 1965  
Wild and Scenic Rivers Act of 1968  
National Trails System Act of 1968  
Coastal Zone Management Act of 1972  
National Reserves Management Act of 1974  
Forest and Rangeland Renewable Resources Act of 1974  
Federal Land Policy and Management Act of 1976  
National Forest Management Act of 1976  
Soil and Water Resources Conservation Act of 1977  
Surface Mining Control and Reclamation Act of 1977  
Public Rangelands Improvement Act of 1978  
Antarctic Conservation Act of 1978  
Endangered American Wilderness Act of 1978  
Alaska National Interest Lands Act of 1980  
Coastal Barrier Resources Act of 1982

Food, Drug, and Cosmetics Act of 1938  
Federal Insecticide, Fungicide, and Rodenticide Act of 1947  
Food Quality Protection Act of 1996

*Management of Solid and Hazardous Wastes*

Solid Waste Disposal Act of 1965  
Resource Recovery Act of 1970  
Hazardous Materials Transportation Act of 1975  
Toxic Substances Control Act of 1976  
Resource Conservation and Recovery Act of 1976  
Low-Level Radioactive Policy Act of 1980  
Comprehensive Environmental Response, Compensation, and Liability (“Superfund”) Act of 1980  
Nuclear Waste Policy Act of 1982  
Hazardous and Solid Waste Amendments of 1984  
Superfund Amendments and Reauthorization Act of 1986  
Medical Waste Tracking Act of 1988  
Marine Plastic Pollution Control Act of 1987  
Oil Pollution Act of 1990  
Pollution Prevention Act of 1990  
State or Regional Solid Waste Plans (RCRA Subtitle D) of 1991

# Effects of Environmental Legislation

- Since 1970 - Six air pollutants have dropped by 25% (not CO<sub>2</sub>)
- Since 1990 - wet sulfate levels (part of acid rain) decreased by 33%
- As of 2008 - 92% of US had healthy drinking water (up from 75% in 1993)
- As of 2014 - 45% of municipal waste is burned as waste-to-energy or recovered for recycling
- As of 2007 - Human exposure to hazardous waste sites identified in 1969 is below 93%

# Economics and the Environment

- Economics- study of how people use limited resources to satisfy unlimited wants
- 3 main ideas
  1. Economics is utilitarian
    - ▣ Goods and services have value that can be converted to currency



Prakash Singh/Agence FrancePresse/NewsCom

# Economics and the Environment

2. Rational Actor Model
  - ▣ Assumes all individuals spend limited resources to maximize individual preferences (utilities)
3. Resources will be allocated efficiently
  - ▣ In an ideal economy

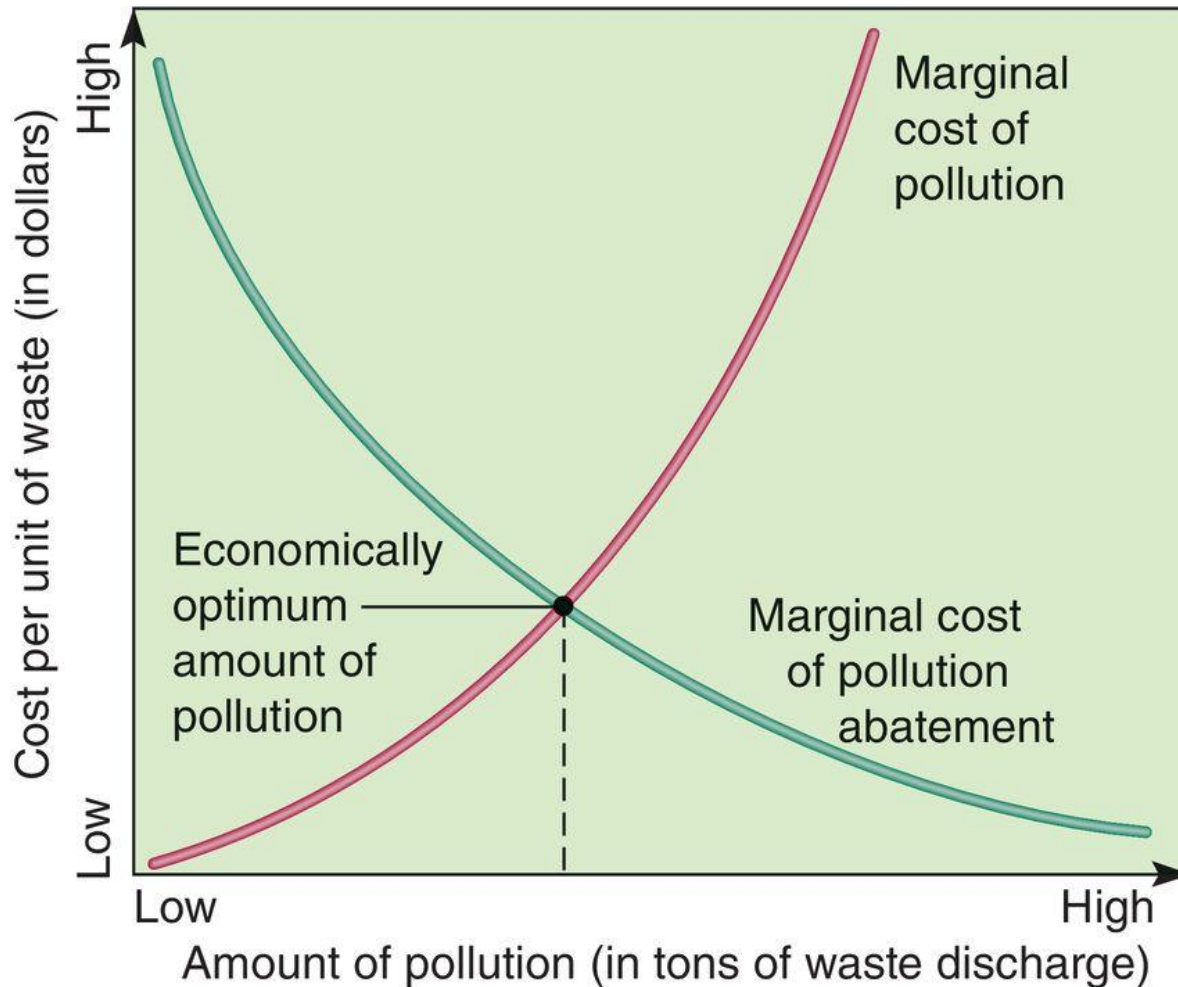
# Economics and the Environment

- To economists, environmental problems arise when the market fails due to
  - ▣ Externalities – when producer of good or service does not pay for full costs of production
    - Ex: air pollution by vehicles is not accounted for,
    - Cost is spread to another party or all of society
  - ▣ Inefficiencies – scarce resources are not used well

# Solutions for multiple polluters

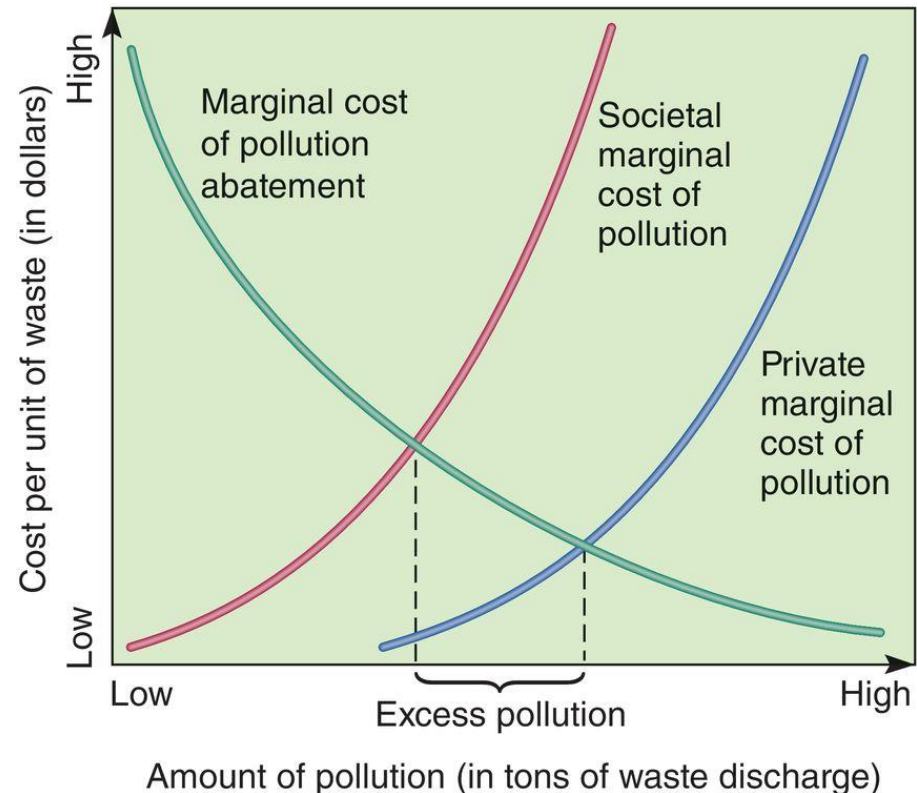
- Identify the optimum amount of pollution
  - Cost to society of having less pollution is offset by benefits to society of the activity that creates the pollution
- To find optimum, we must identify and balance
  - Marginal Cost of Pollution - Cost of small additional amount of pollution
  - Marginal Cost of Abatement - Cost of reducing small amount of pollution

# Economic Optimality and Pollution



# Inefficiencies Arising from Different Marginal Costs

- In unregulated market, polluter pays fraction of cost so pollutes excessively
  - ▣ Beyond level at which society sees damage





# Strategies for Pollution Control

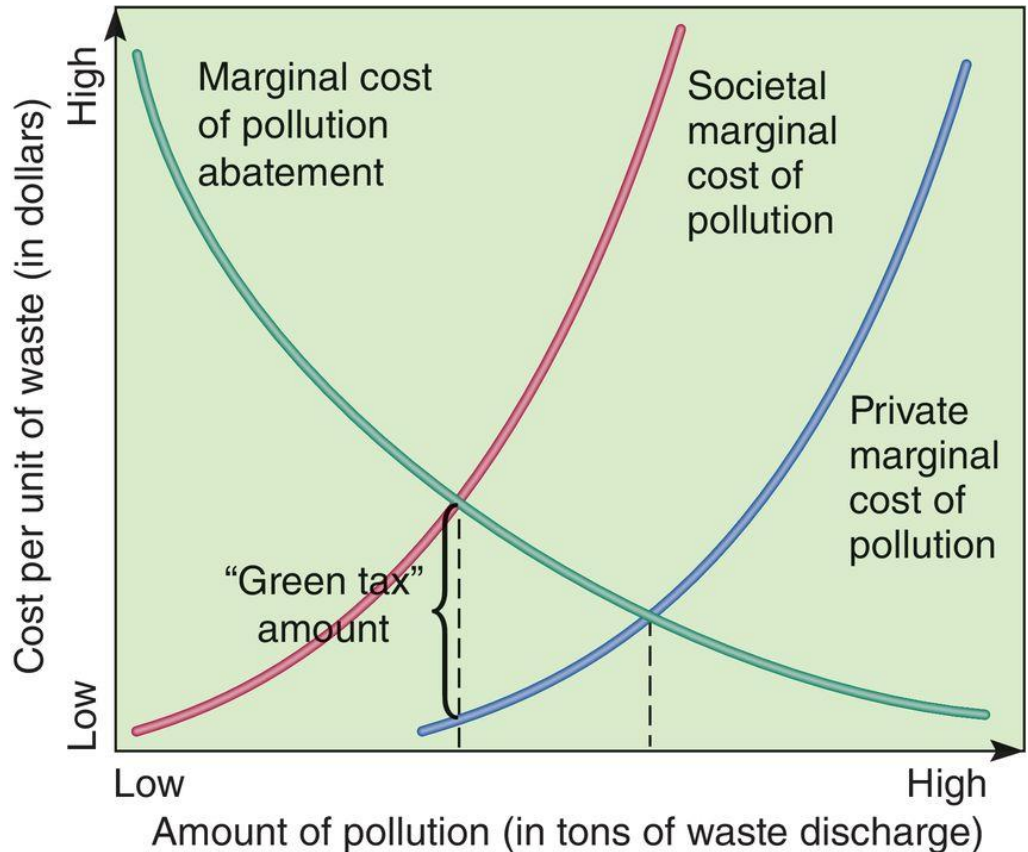
- Economists favor market based solutions, but other methods are often used
  - ▣ Command and Control Solutions
    - Government requires particular equipment installed to lower emissions or pollutants
    - Discourages of low-cost alternatives or creativity

# Strategies for Pollution Control

- Incentive based regulations (market based strategy to lower pollution)
  - Environmental Taxes (green taxes)
    - Identify and replicate societal cost of pollution with emission charge
    - If taxes are set at correct level, private marginal cost of pollution = social cost of pollution
    - Ex: Germany and Netherlands tax gas and oil
- Tradable Permits
  - Rely on identifying optimal level of pollution
  - Permit holder can generate pollution or sell permit

# The Corrective Effect of Green Taxes

- Adding a green tax encourages polluter to decrease pollution



# Critiques of Environmental Economics

- Difficult to assess true costs of environmental pollution and abatement
  - Impacts of pollution on people and nature is uncertain
  - Ecosystem services have no known value
- Utilitarian economics may not be appropriate
  - Dynamic changes and time are not considered



Juan Carlos Muñoz/AGE Fotostock

# National Income Accounts

- Our economy funded mainly by natural not human-made assets
  - ▣ Account for use and misuse of natural resources in national income accounts
    - Represent total annual income of a nation
      - Gross Domestic Product (GDP)
      - Net Domestic Product (NDP)

# National Income Accounts

- Environment may be overexploited to yield a higher GDP in developing countries
- Along with GDP, Environmental Performance Index (EPI) may account for natural capital
  - ▣ Assesses a country's commitment to environmental and resource management
    - U.S. ranked 61 out of 163, below most Western European countries
    - African countries in bottom half

# National Income Accounts

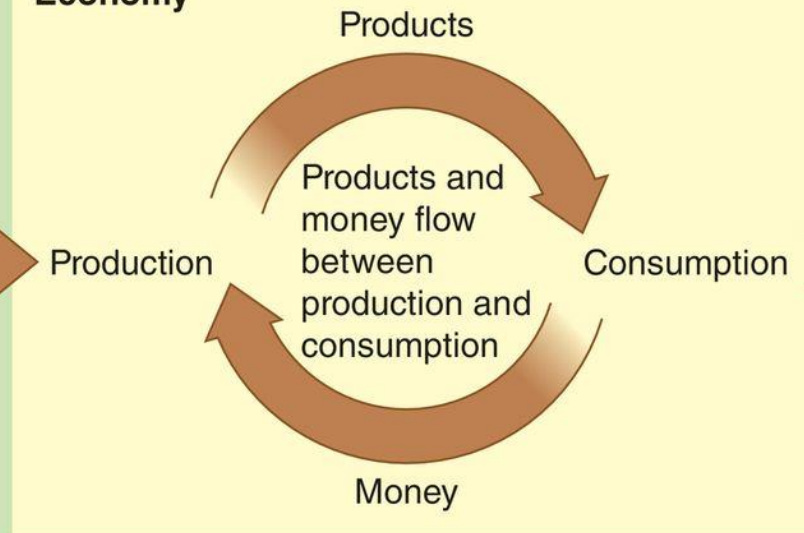
## Natural capital

**Sources** are that part of the environment from which materials move



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## Economy



**Sinks** are that part of the environment that receives input of materials



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Economies depend on natural capital for sources of raw materials and sinks for waste products

**Table 2.2** Environmental Performance Index Scores and Rankings for Select Countries

<i>Country</i>	<i>2010 EPI Score</i>	<i>2010 EPI Ranking*</i>
New Zealand	73.4	15
Sweden	86.0	4
Finland	74.7	12
United Kingdom	74.2	14
Canada	66.4	46
Japan	72.5	20
Iceland	93.5	1
Costa Rica	86.4	3
United States	63.5	61
Mexico	67.3	43
China	49.0	121
Sierra Leone	32.1	163
India	48.3	123
Niger	37.6	158

Canada ranks highest among North American countries. The lowest-ranked countries are in sub-Saharan Africa.

\*Out of 163 countries

Source: [www.yale.edu/epi](http://www.yale.edu/epi)



# Case Study: Central and Eastern Europe

- Pollution had been ignored for decades
- Fall of communism 1980s revealed neglect
- Water unusable to industry, let alone drinking
  - Fruits and vegetables grown in chemical laden soil
  - Air pollution and acid rain abundant
  - Citizens suffered from many respiratory diseases and miscarriages, cancers high



© Thomas Hoepker/Magnum Photos

# Case Study: Central and Eastern Europe

- Communism as a political system did not value environment
- Rising democracies slowly began protection
  - ▣ Costs estimated at \$300 billion for former East Germany
    - From lost of natural capital between 1960-1980

# Environmental Justice

- The right of every citizen regardless of age, race and gender, social class or other factor, to adequate protection from environmental hazards
- Generally, members of low income and minority communities:
  - ▣ Face more environmental threats and have fewer environmental amenities
  - ▣ Have less voice in planning

# Environmental Justice

- Cases are everywhere
- 1997 San Francisco Bay View-Hunters Point
  - Chronic illness 4x higher
  - 700 hazardous waste facilities
  - 2 Superfund sites



©Michael Macor/San Francisco Chronicle / Corbis

# Environmental Justice

- 1997 request to build uranium processing plant near two minority neighborhoods in Louisiana
- Nuclear Regulatory Commission rejected request
  - ▣ Applicant had ruled out all potential sites near predominantly white neighborhoods

# Environmental Justice

- Challenge of environmental justice
  - ▣ To find equitable solutions that respect all groups of people
- National level
  - ▣ 1994- Clinton required all federal agencies to ensure their policies do not discriminate against poor or minority communities when locating future hazardous facilities
- International level
  - ▣ 1989- Basal Convention (on exporting waste)



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# Environmental Ethics

- Field of ethics that considers the moral basis of environmental responsibility
- Western Worldview
  - ▣ Human superiority and dominance over nature
- Deep Ecology Worldview
  - ▣ All species have an equal worth to humans
- Most people's ethics fall somewhere in between

# ENVIRONNEWS

- Environmental stewardship increasingly viewed as religious requirement
  - 2001- U.N. Environment Programme and Islamic Republic of Iran considered ways to counter degradation at international seminar
  - 2006- global warming identified as important issue by Evangelical Climate Initiative (conservatives)
  - 2014 – Pope Francis I identified climate change as a ‘moral issue’



# Food for Thought

- Several generations ago, many people in cities raised edible plants and animals at their homes. Now, local zoning laws prohibit livestock and even vegetable gardens in many urban areas.
- What are your thoughts about this?
- What regulations exist where you live?