Environment

THE SCIENCE BEHIND THE STORIES

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2

Environmental economics and environmental policy

PowerPoint® Lecture prepared by Jay Withgott

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This lecture will help you understand:

- Relationship between science and policy
- The policy process and U.S. environmental laws
- International environmental policy
- Classical economics
- Ecological economics
- Economic growth and sustainability

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Central Case: San Diego and Tijuana's Sewage Pollution Problems and Policy Solutions

- The Tijuana River crosses from Mexico into the U.S.; its pollution affects people on both sides of the border.
- Transboundary environmental issues are hard to resolve.
- Citizens have pressed policymakers to develop solutions, such as a bi-nationally managed sewage treatment plant.

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Economics

Economics is a discipline that deals with how we value and perceive our environment.

Economics influence our decisions and actions.

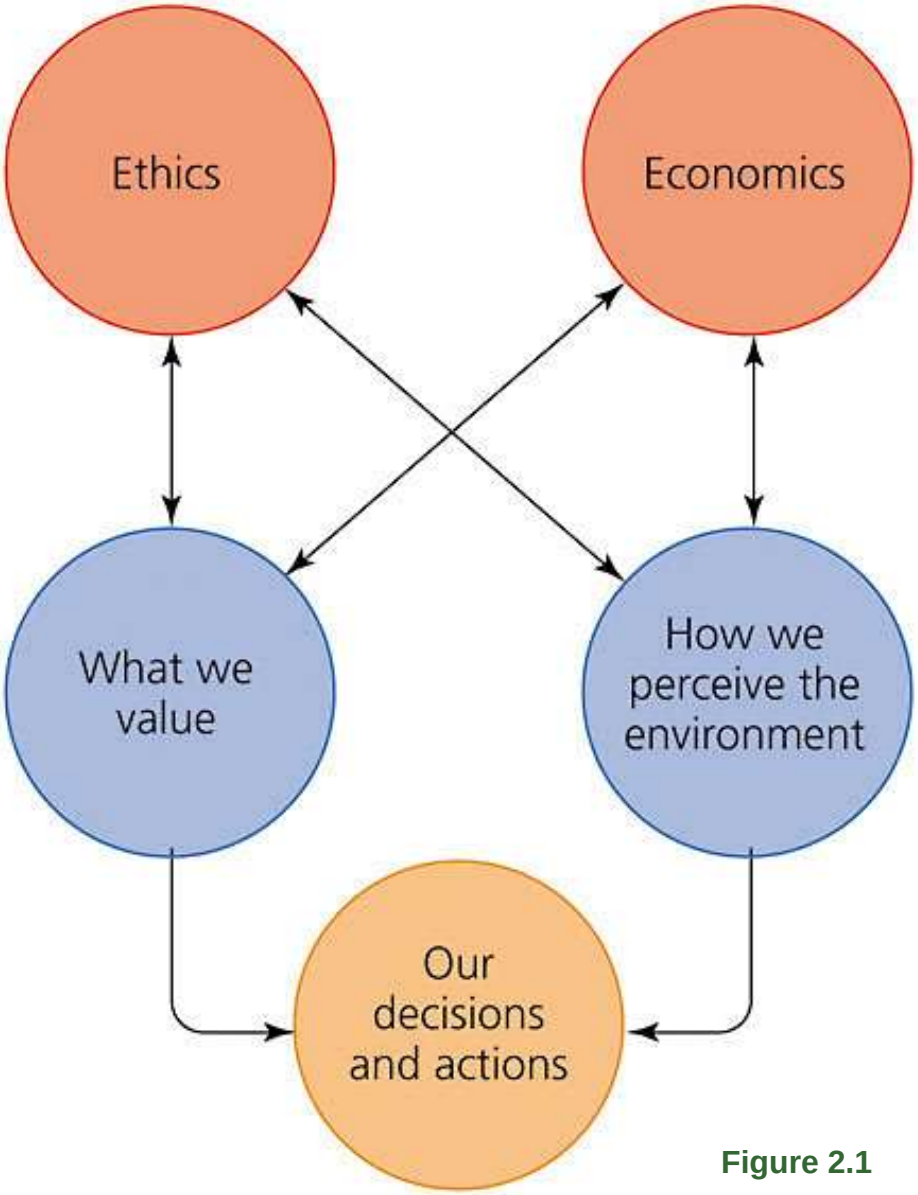

Figure 2.1

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Economics

Studies how people use resources to provide goods and services in the face of variable supply and demand.

Most environmental and economic problems are linked.

Root *"eco"* gave rise to both *ecology* and *economics*.

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Types of modern economies

Subsistence economy = People meet needs directly from nature and agriculture; do not buy most products.

Centrally planned economy = National government determines how to allocate resources.

Capitalist market economy = Buyers and sellers interact to determine prices and production of goods and services.

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Government roles in a market economy

Even in capitalist market economies, governments intervene to:

- Eliminate unfair advantages/monopolies
- Manage the commons
- Mitigate pollution
- Provide safety nets
- Provide social services

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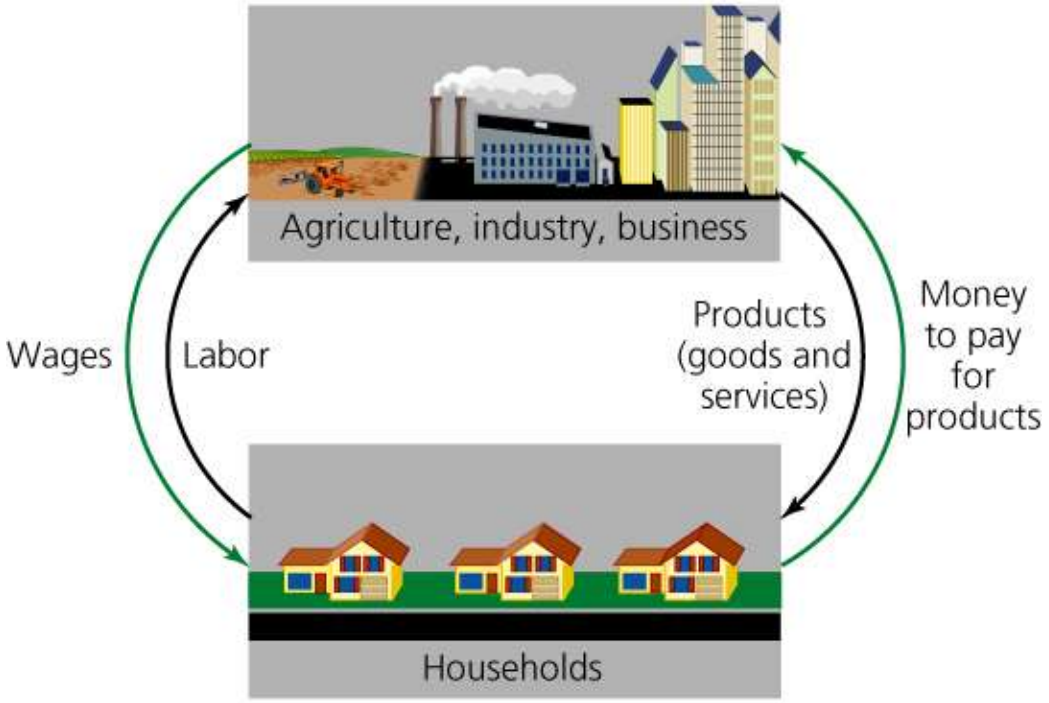
Conventional view of economic activity

Conventional economics focuses on interactions between households and businesses; views the environment only as an external "factor of production."



(a) Conventional view of economic activity

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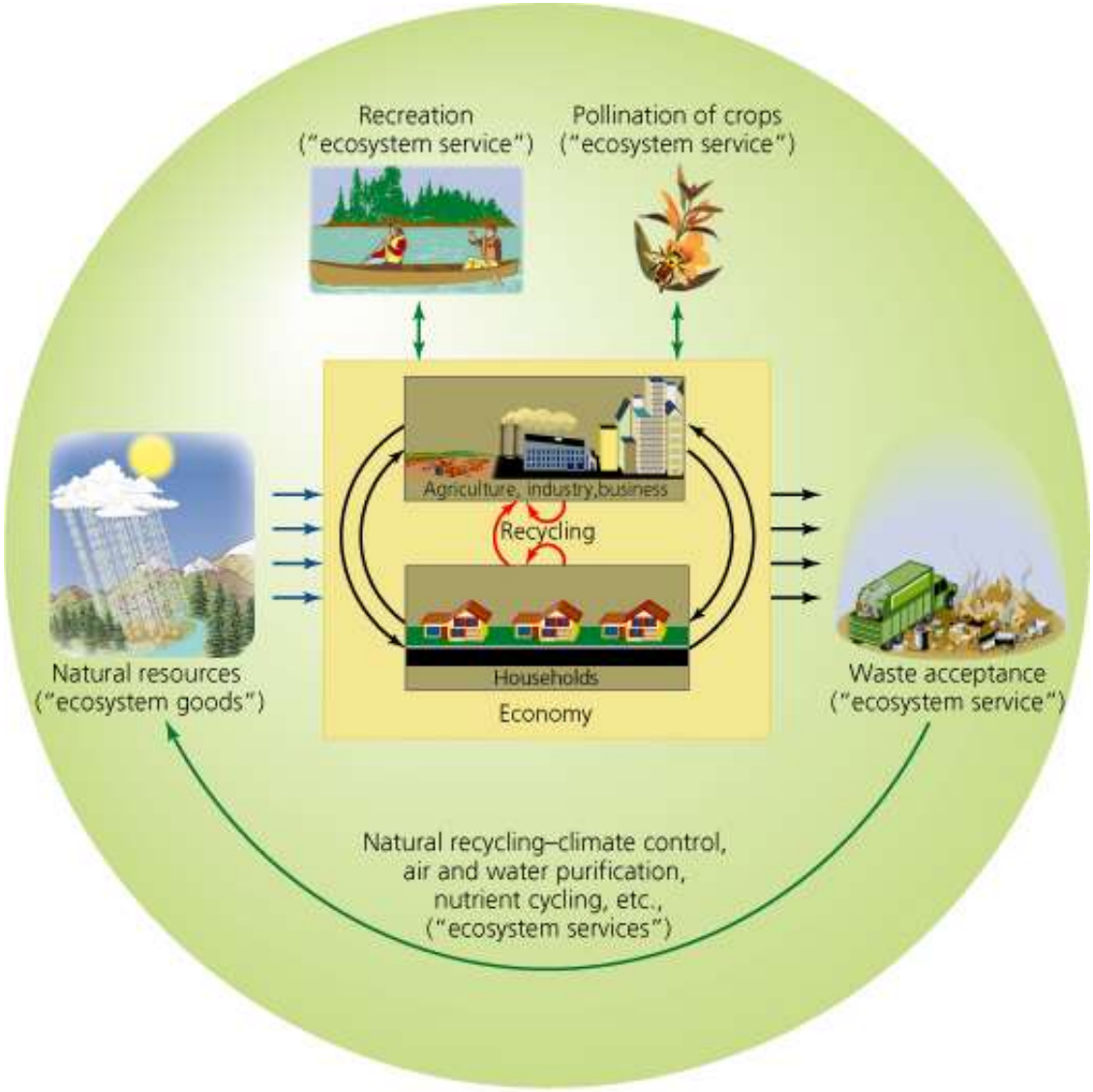
Figure 2.11a

Environmental view of economic activity

Environmental economists see the human economy as within the environment, receiving resources and services from it.



(b) Economic activity as viewed by environmental and ecological economists

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Figure 2.11b

Ecosystem goods and services

Natural resources are “goods” we get from our environment.

Natural capital

“Ecosystem services” that nature performs for free include:

- Soil formation
- Water purification
- Climate regulation
- Pollination
- Nutrient cycling
- Waste treatment
- etc.

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Neoclassical economics

Focuses on psychology of consumer choice.

The market favors equilibrium between supply and demand.

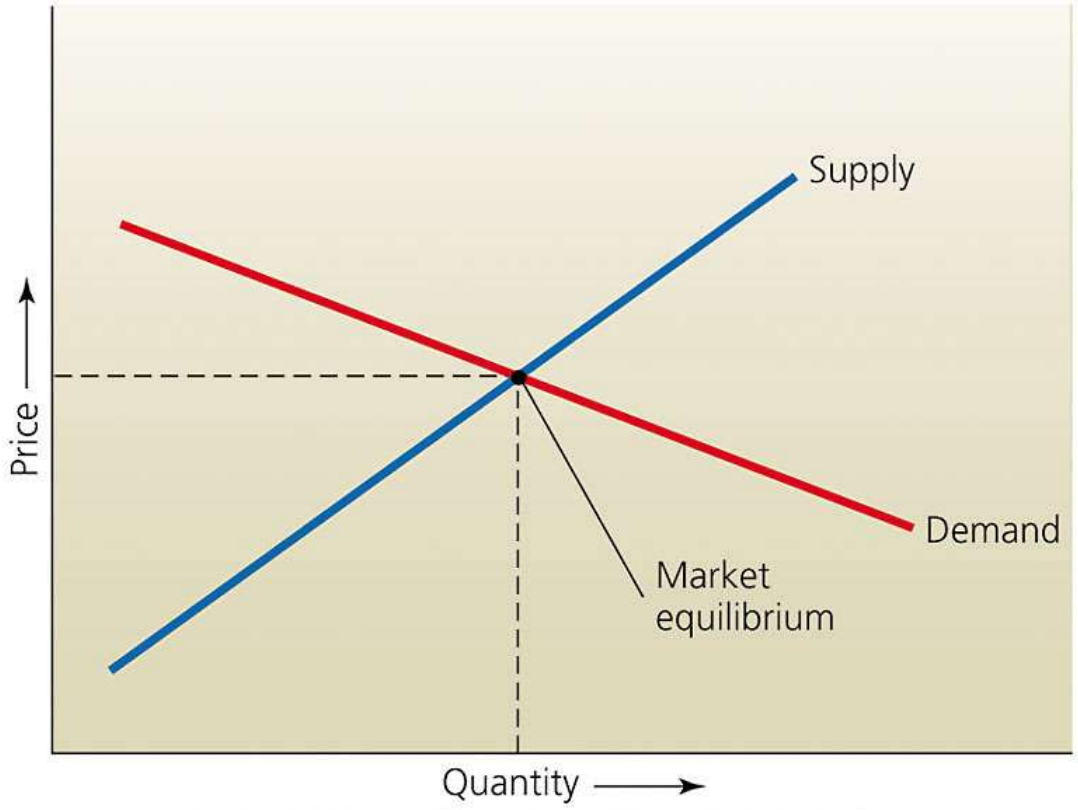

Figure 2.12

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Precepts of neoclassical economics

Resources are infinite or substitutable.

Long-term effects are discounted.

Costs and benefits are internal.

Growth is good.

Each of these can contribute to environmental problems.

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Why are economies still growing?

Some critics have long predicted that limited resources would doom growth-oriented economies.

But advances in technology have allowed ever-greater resource extraction and efficiency ... so far.

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Environmental and ecological economists

Environmental economists: Human economies can be made sustainable through improvements in technology and efficiency.

Ecological economists: Any economy dependent on growth is ultimately unsustainable; economies cannot overcome environmental limitations; economies should be circular, not linear.

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Nonmarket values

Use value: worth of the direct use of a resource

Option value: worth of things we conserve, possibly to use later

Figure 2.15b,c

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Nonmarket values

Aesthetic value: worth for beauty or emotional appeal

Scientific value: worth for scientific research

Figure 2.15d,e

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Nonmarket values

Educational value: worth for teaching and learning

Existence value: worth of existence, even if we never experience something directly

Figure 2.15a, f

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Nonmarket values

Cultural value: worth of things that define or sustain a culture

Figure 2.15g

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Viewpoints: Environment vs. economy?

Pete Geddes

Eban Goodstein

"Economic progress is a prerequisite for environmental quality. Hungry folks don't have the luxury of investing in the preservation of endangered songbirds. The real enemy of the environment is poverty, not affluence."

"One "cost" of environmental protection that is blown out of proportion is job loss. Contrary to popular belief, there is no net "jobs-environment tradeoff" in the economy, only a steady shift of jobs to cleanup work."

From *Viewpoints*

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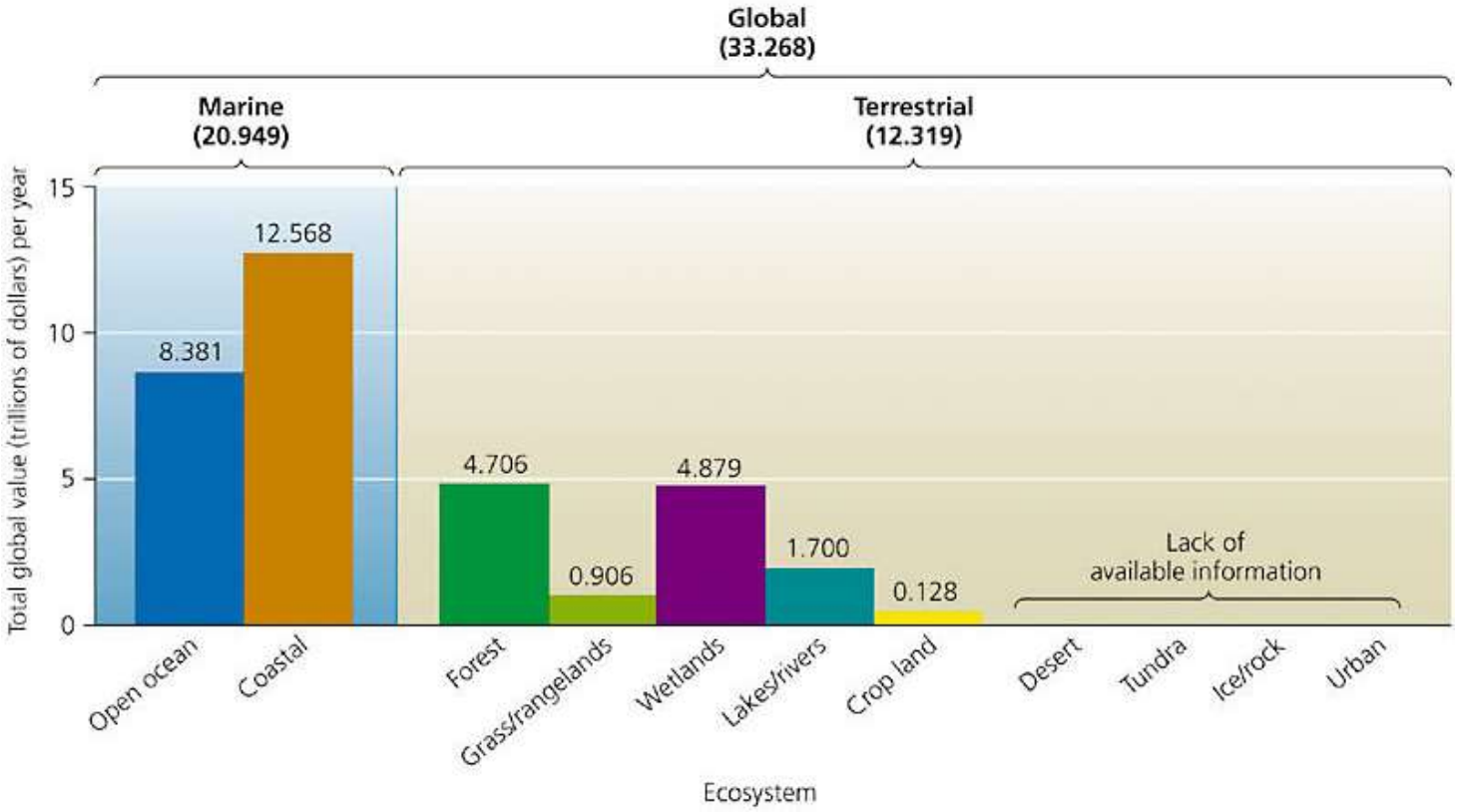
Valuation of ecosystem services

Environmental economists have assigned monetary values to ecosystem services.

Costanza et al., 1996: ***$33 trillion per year!***



From *The Science behind the Stories*

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Combating market failure

Governments can use various methods to guard against market failure relating to environmental concerns, e.g.:

Green taxes penalizing harmful activities

Subsidies to encourage beneficial activities

Ecolabeling to tell consumers how products were made or harvested

Permit trading to use market-based incentives for pollution control

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Policy

A rule or guideline that directs individual, organizational, or societal behavior

Environmental policies are developed by governments to regulate behavior of individuals, corporations, and government agencies.

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Environmental policy

Addresses issues of equity and resource use

- Prevents overexploitation of public resources (tragedy of the commons)
- Ensures that some people do not harm others while benefiting from common resources

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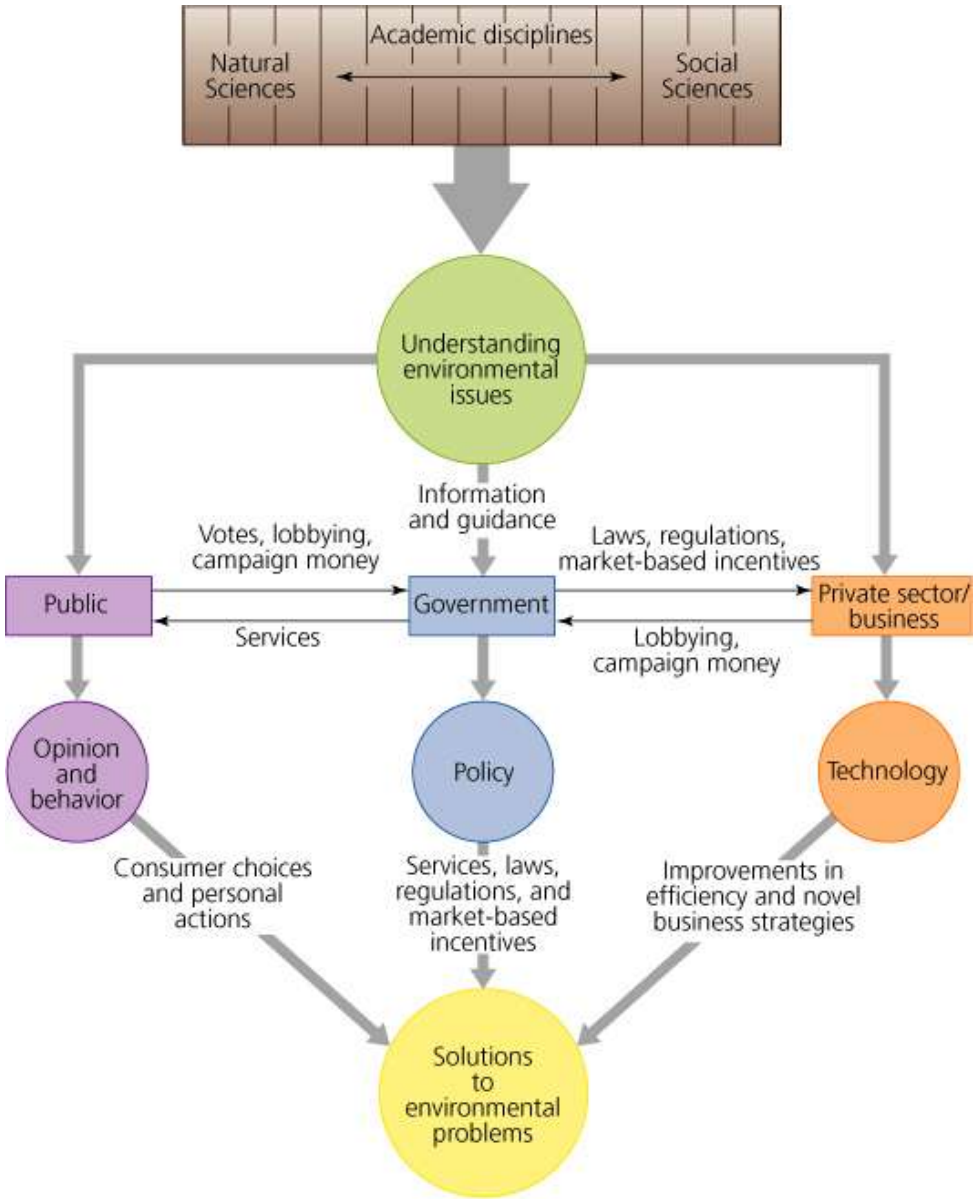
Science, policy, and solutions



Science informs policy directly.

Science also informs the public and the private sector, which influence policy.

Policy is one path to solving environmental problems.

Figure 3.1

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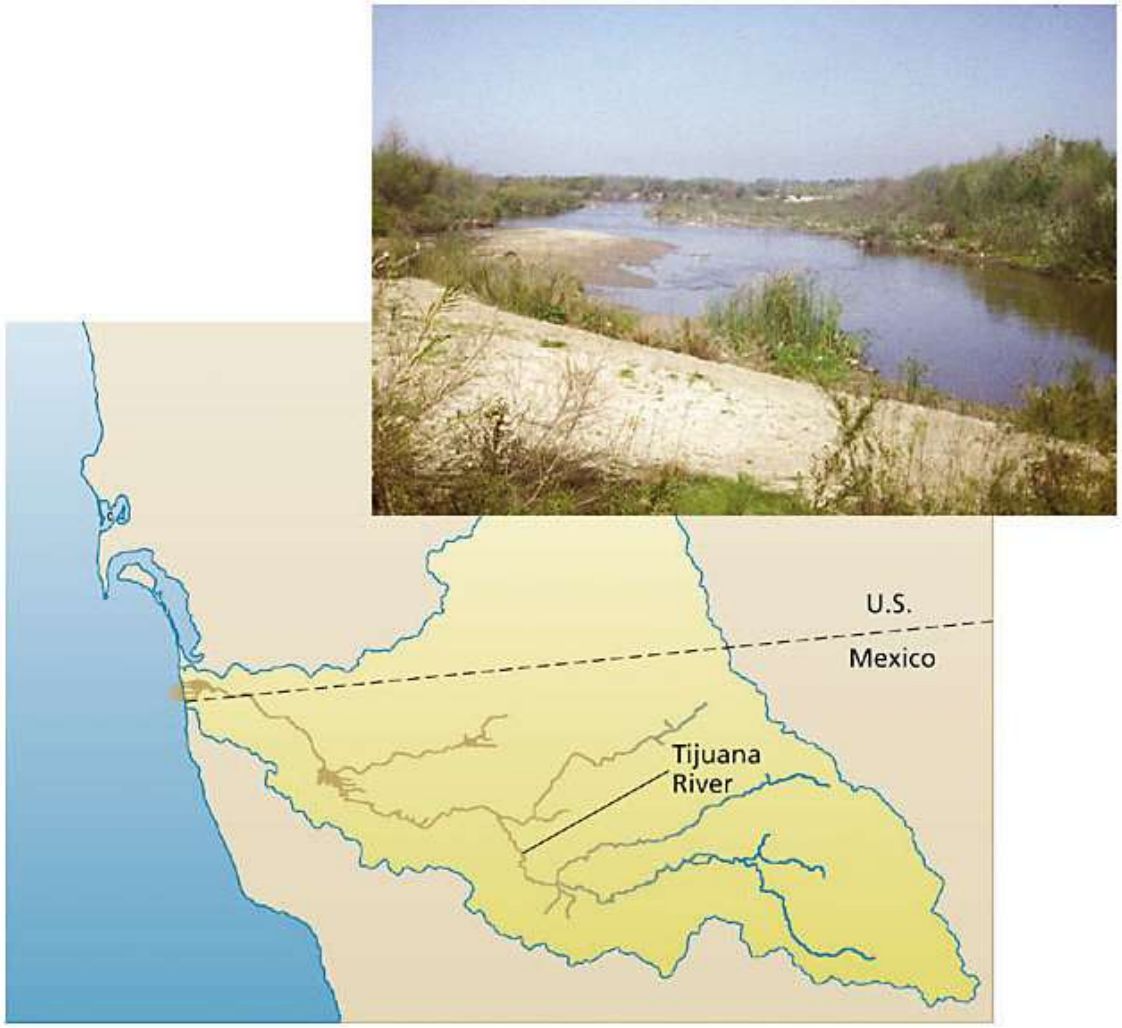
External costs

Pollution from Mexico flows in the Tijuana River into the U.S.

But some of this pollution is from U.S.-owned factories in Mexico.



Users of river water can create external costs for other users downstream.

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What can hinder environmental policy?

Opposition from landowners fearing loss of control over land

Opposition from businesses, developers, and industry groups fearing government regulation

Human tendency (especially businesses, media, politicians) to focus on short-term problems and ignore long-term problems

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First wave of environmental policy in the U.S.

Laws to promote land settlement and resource extraction; for example:

- General Land Ordinances, 1785, 1787
- Homestead Act, 1862
- Mineral Lands Act, 1866
- Timber Culture Act, 1873

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Land settlement

U.S. policy encouraged settlers like these in Nebraska, circa. 1860, to move west.

Figure 3.7a

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Resource extraction

Mining in Alaska

Logging in Washington

Figure 3.7b,c

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Second wave of environmental policy in the U.S.

To address impacts of the first wave; for example:

- Creation of national parks
- Creation of national forests
- Soil conservation policy
- Wilderness Act, 1964

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Third wave of environmental policy in the U.S.

Modern environmental activism and policy arose in response to pollution and other problems.

- *Silent Spring*
- Earth Day
- EPA and National Environmental Policy Act
- Clean Air Act, Clean Water Act

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Rachel Carson and *Silent Spring*

Carson's 1962 book brought attention to pesticide dangers and catalyzed environmental awareness.

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Rivers on fire

The petroleum-polluted Cuyahoga River in Ohio caught fire, showing the need for action against water pollution.

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Earth Day

Earth Day began in 1970…

…and is bigger than ever today.

Figure 3.10a,b

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EPA and NEPA

In 1970, President Richard Nixon:

- Signed the **National Environmental Policy Act (NEPA)** into law
- Created the **Environmental Protection Agency (EPA)** by executive order

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EPA

Was directed to:

- Conduct and evaluate research
- Monitor environmental quality
- Set and enforce standards (e.g., for pollutants)
- Assist states in meeting standards
- Educate the public

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NEPA

Created the Council on Environmental Quality

Mandated **environmental impact statements** for public projects and has:

- Prioritized understanding our impacts on the environment
- Slowed down or prevented environmentally destructive development
- Given citizens a say in the policy process

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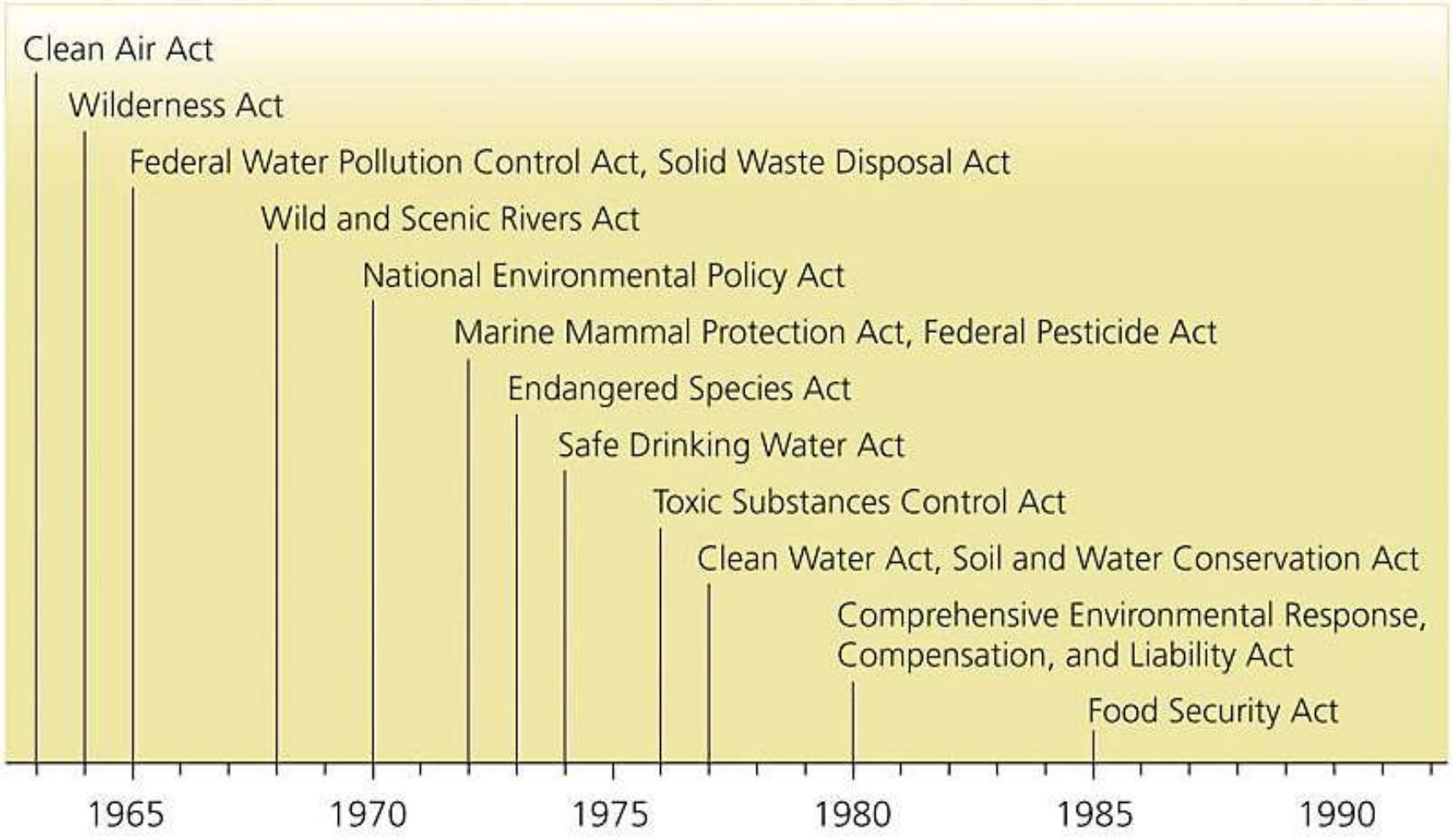
Key environmental protection laws, 1963-1985



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Legislation

Major laws such as the Clean Water Act (1977) were passed throughout the 1960s, ‘70s, and ‘80s.

The Clean Water Act capped efforts to clean up waters badly polluted since the 1800s.

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International law

Conventional law arises from conventions or treaties agreed to among nations.

(e.g., Montreal Protocol to protect ozone layer)

Customary law arises from practices or customs held in common by most cultures.

(e.g., resource use should be equitable and one nation should not cheat another.)

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U.S. - Mexican cooperation

In 1990 the U.S. and Mexico agreed by treaty to build and operate the International Wastewater Treatment Plant to handle excess sewage from Tijuana that otherwise would pollute the river.

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Important international bodies

United Nations (UN): main body of international accord; UNEP handles environmental issues

World Bank: funds major development projects worldwide

European Union (EU): government body with representatives from most European nations

World Trade Organization (WTO): promotes free trade worldwide

Non governmental organizations (NGOs): nonprofit advocacy organizations

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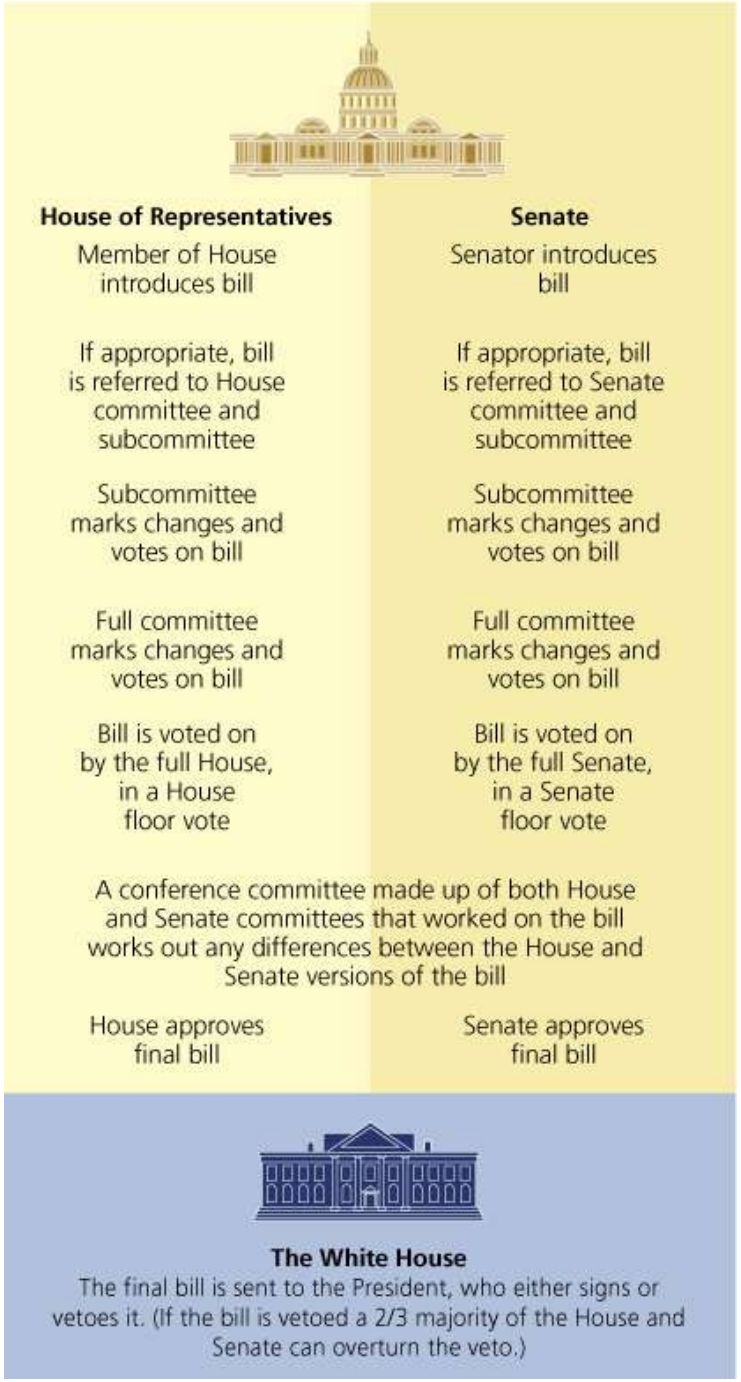
Legislative process

Bills go through a long process before becoming law, involving:

- Committees, subcommittees, and floor votes in both houses
- A joint conference committee
- Final approval
- Signature or veto by the president



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Many subsidies are environmentally harmful

Some examples from the 2002 Green Scissors report:

- **Mining**: billions of dollars of minerals extracted from public lands leased cheaply
- **Coal**: billions of dollars to coal industry while money also goes to find cleaner energy sources
- **Timber**: hundreds of millions of dollars spent by Forest Service building roads for private logging on public land

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QUESTION: Review

According to NEPA, before the government can embark on a major development project, it must conduct a(n):

a. Pollution prevention and assessment study.

b. Public opinion poll.

c. Business feasibility study.

d. Environmental impact statement.

e. None of the above.

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QUESTION: Review

Which is NOT a responsibility of the EPA?

a. Monitor environmental quality

b. Set and enforce pollutant standards

c. Conduct and evaluate research

d. Educate the public

e. All of the above are responsibilities of the EPA.

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QUESTION: Weighing the Issues

Should executives from industry be allowed through the "revolving door" to take government jobs regulating their industry?

a. No, regulating one's former industry is a conflict of interest that undermines the regulatory process.

b. Yes, government will receive people who are experienced and have inside knowledge.

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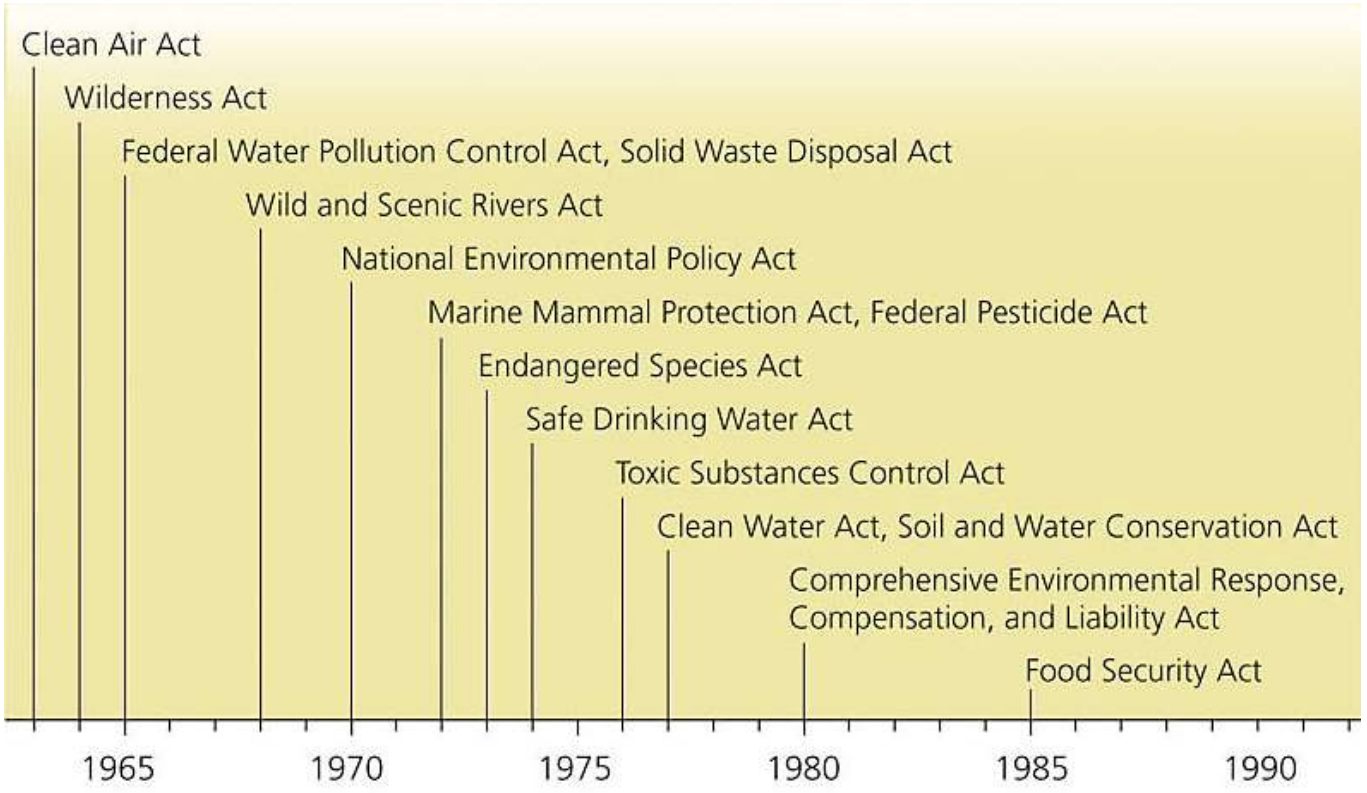
QUESTION: Interpreting Graphs and Data

What law was passed in 1973?



a. Wilderness Act

b. Clean Water Act

c. Food Security Act

d. Endangered Species Act

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QUESTION: Review

Which is NOT an assumption of neoclassical economics that can lead to environmental degradation?

a. Resources are unlimited.

b. Resources are limited.

c. Long-term effects are downplayed.

d. All costs and benefits are experienced by the buyer and seller alone.

e. Growth is *good*.

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QUESTION: Review

Which is an ecosystem service?

a. Water purification in the atmosphere

b. Crop pollination by insects

c. Nutrient cycling in ecosystems

d. Waste treatment by bacteria

e. All of the above

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QUESTION: Weighing the Issues

Should economists try to assign monetary amounts, such as aesthetic, cultural, and existence values, to "nonmarket values"?

a. Yes, because this draws attention to the importance of these values.

b. No, because the amounts can never be made objective and exact.

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QUESTION: Interpreting Graphs and Data

In conventional economic theory, the price of a good is set…?

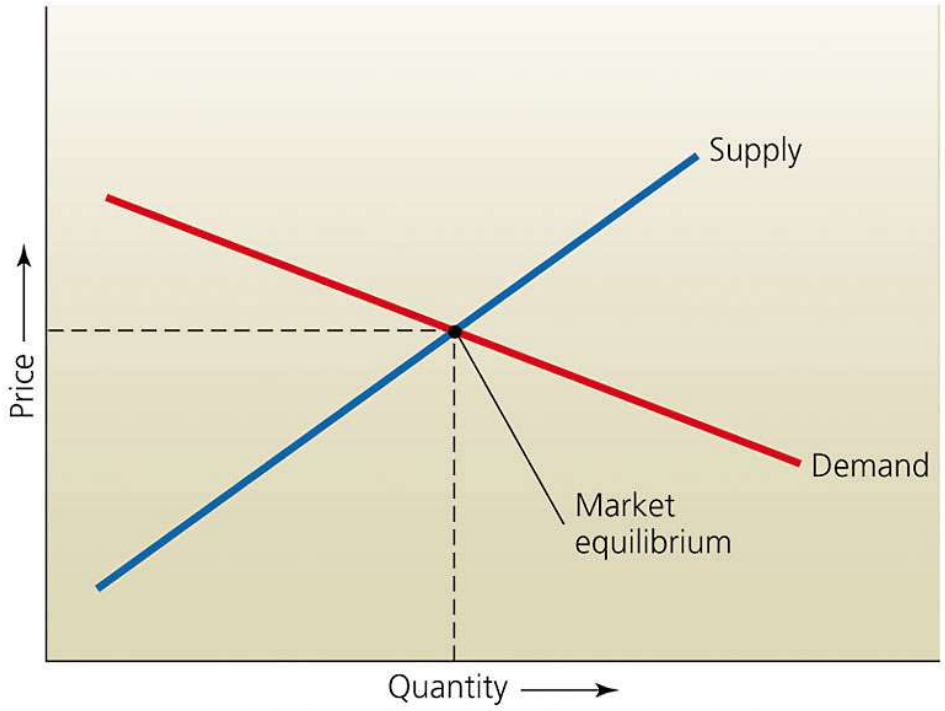

Figure 2.12

a. Primarily by supply

b. Primarily by demand

c. By demand when quantity is low and supply when quantity is high

d. By the point at which demand equals supply

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