The VOTE Textbook
Student Notes
Chapter 14: The Environment

Opening Story: The mousetrap

The natural environment includes land, water, air, living organisms, and nonliving things such as minerals and soil. Natural resources are the materials we use from the natural environment to produce goods and services.

The Golden Moment

Shared Problem: Polluted air, water, and land can be dangerous

Shared Goal: Breathable air, drinkable water, and habitable land

ECONOMY	ENVIRONMENT
Consumption, Production, and Distribution of goods and services	Effects of production on air, land, and water
I. WHAT to Produce? Consumption of goods and services	Different product choices affect the environment differently • Example: car, train, bus, horse, stagecoach, bicycle, motorcycle
II. HOW to Produce? Production of goods and services	Use of renewable and non-renewable resources • Byproducts of production o hazardous and non-hazardous

Ecosystem: An interconnected community of diverse organisms and nonliving things that coexist in a specific environment.

Ecological Resilience: An ecosystem is able to adapt to disturbances and still be viable, which means support organisms that live in it.

Pollution: Contamination that harms ecosystems	
Local Pollution	Global Pollution
Examples: tainted drinking water, smog, and fumes from landfills	Example: climate change

Pollution Abatement (PA): Measures taken to prevent and/or clean up the byproducts of production (by filtering, scrubbing, incinerating, composting, etc.).

Shared Tools: Tragedy of the Commons

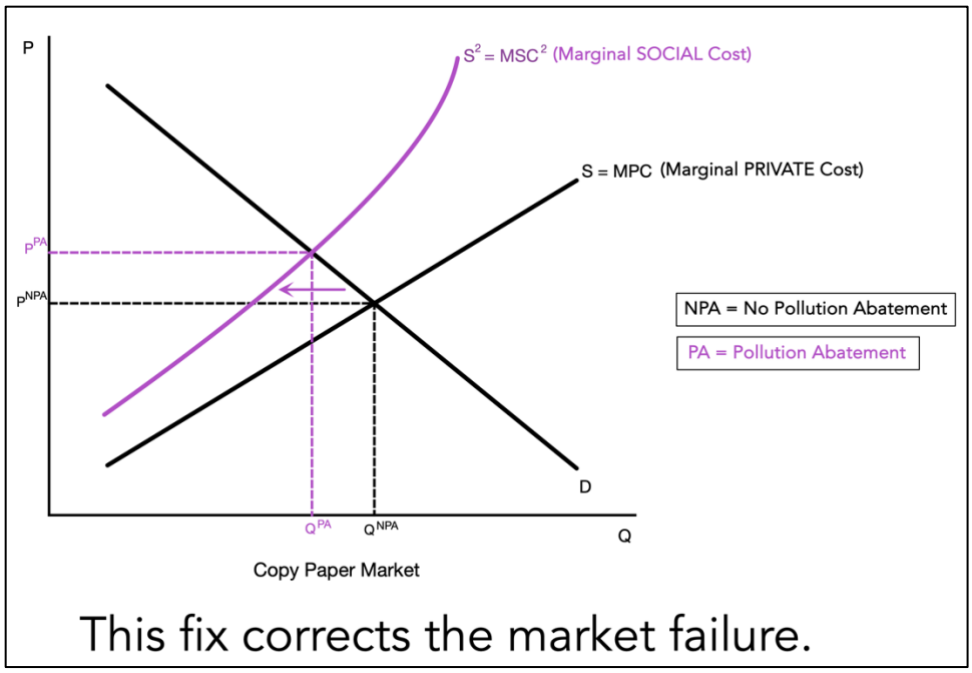
It is impossible to produce without having an environmental impact. Firms don't naturally produce in ways that create the lowest possible levels of pollution because of the *tragedy of the commons*. The commons are the natural resources that are accessible to all and affect the whole community. The tragedy of the commons occurs when firms are allowed to use the commons without restrictions ("open access"), resulting in those natural resources being overused and abused, and ultimately becoming unusable.

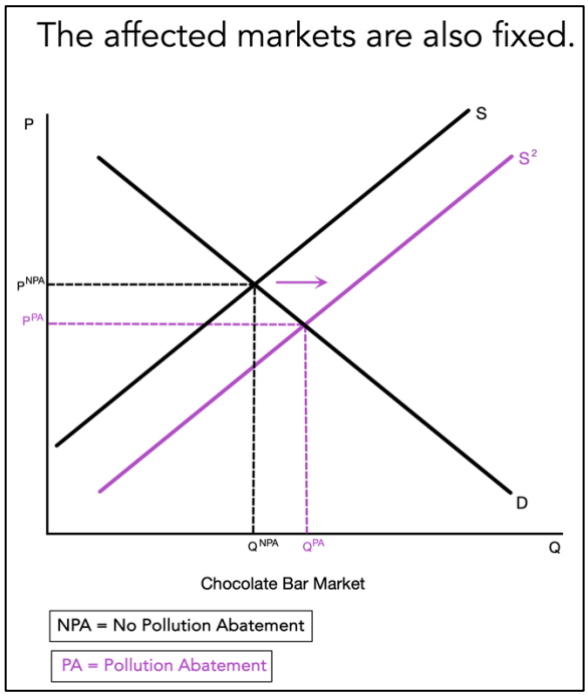
Each perspective claims it can solve the tragedy of the commons and ensure ecological resilience.

Conventional Tools: Negative Externalities and Cost-Benefit Analysis

In any market there are suppliers and demanders. But there are also people and firms that are neither suppliers nor demanders who may be directly or indirectly affected by the pollution resulting from production.

Negative Externalities are costs imposed on those third parties. Because negative externalities are not taken into account, society gets the wrong price signals. As a result, resources are misallocated and we end up with the wrong quantities of goods and services. This is called a *market failure*.





Cost-Benefit Analysis is the tool used to determine how much pollution abatement is best, given society's needs and scarce resources. Comparing the marginal cost to the marginal benefit, we continue to engage in pollution abatement until the Marginal Cost (MC) exceeds the Marginal Benefit (MB), which looks like MC > MB.

Pollution Abatement	Marginal Cost	Marginal Benefit	Comparison	
10%	0.10 B	2.00 B	MC < MB	
20%	0.12 B	1.60 B	MC < MB	
30%	0.15 B	1.20 B	MC < MB	
40%	0.18 B	0.80 B	MC < MB	← The optimal level of pollution abatement (a first step toward ecological resilience)
50%	0.20 B	0.15 B	MC > MB	
60%	0.22 B	0.13 B	MC > MB	
70%	0.25 B	0.12 B	MC > MB	
80%	0.28 B	0.10 B	MC > MB	
90%	0.30 B	0.08 B	MC > MB	
100%	0.32 B	0.04 B	MC > MB	

Liberals and conservatives agree that cost-benefit analysis is the best way to determine the appropriate level of pollution abatement. But they disagree about what should be included in the "benefits" column.

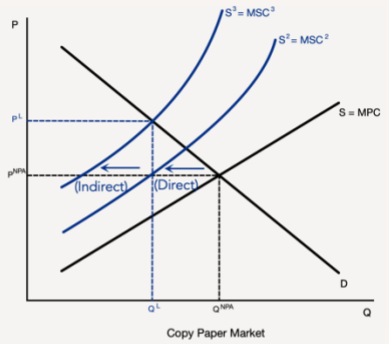
Conservatives say if we consider those who are indirectly affected by the pollution ("downstream effects"), there will be no logical end and it will be impossible to make anything other than pollution abatement with our resources.

Liberals say if we don't consider those who are indirectly affected by the pollution ("downstream effects"), the level of pollution abatement will be inadequate because third parties who are affected will be severely underrepresented.

Cost-Benefit Analysis: Liberal View

Pollution Abatement	Marginal Cost	Marginal Benefit	Comparison
10%	0.10 B	3.00 B	MC < MB
20%	0.12 B	2.20 B	MC < MB
30%	0.15 B	1.70 B	MC < MB
40%	0.18 B	1.20 B	MC < MB
50%	0.20 B	0.45 B	MC < MB
60%	0.22 B	0.33 B	MC < MB
70%	0.25 B	0.24 B	MC > MB
80%	0.28 B	0.15 B	MC > MB
90%	0.30 B	0.10 B	MC > MB
100%	0.32 B	.05 B	MC > MB

← The optimal level of pollution abatement (a first step toward ecological resilience)



L = Liberal

Liberal

Local Pollution	Global Pollution

Command and Control

Step 1

a. Government establishes standards. ("command")

b. Government enforces compliance. ("control")

c. Government imposes sanctions.
- Fines
- Shut-downs

Step 2

Government investment reduces the cost of pollution abatement in the long term. With lower marginal costs, the new cost-benefit calculation brings about higher levels of pollution abatement. This results in **ecological resilience** in the long term.

Supplemental Carbon Pricing

a. Carbon Taxes

Emissions are taxed, motivating the private sector to innovate; carbon tax revenue is invested in clean energy.

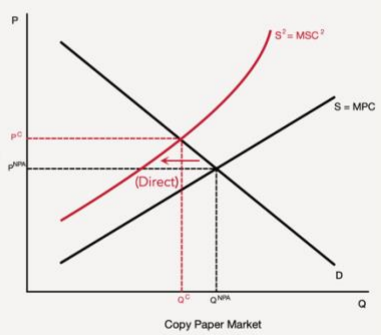
b. Cap and Trade

- The government auctions carbon permits.
- A market in pollution permits emerges.
- The private sector innovates.
- Revenue from permits is invested in clean energy.

Cost-Benefit Analysis: Conservative View

Pollution Abatement	Marginal Cost	Marginal Benefit	Comparison
10%	0.10 B	2.00 B	MC < MB
20%	0.12 B	1.60 B	MC < MB
30%	0.15 B	1.20 B	MC < MB
40%	0.18 B	0.80 B	MC < MB
50%	0.20 B	0.15 B	MC > MB
60%	0.22 B	0.13 B	MC > MB
70%	0.25 B	0.12 B	MC > MB
80%	0.28 B	0.10 B	MC > MB
90%	0.30 B	0.08 B	MC > MB
100%	0.32 B	0.04 B	MC > MB

← The optimal level of pollution abatement (a first step toward ecological resilience)



C = Conservative

Conservative

Local Pollution	Global Pollution
Expanded Private Property Rights	**Carbon Pricing**

Step 1 (uses the profit motive)

a. Extend private ownership of natural resources.

b. Owners hire private companies to do cost-benefit analyses.

c. Owner can sue violators, and courts can award damages to compensate the owners.

d. The threat of lawsuits motivates firms to comply.

Step 2

Over the long term, other parties who want to use the resource (for instance, a resort or a beverage company) may pay the owner to increase pollution abatement to **ecological resilience**.

1. Revenue-Neutral Carbon Tax

Emissions are taxed, motivating the private sector to innovate, while other taxes are cut. No government revenue is generated, so price signals are not distorted.

2. Free-Market Cap and Trade

- The government issues carbon permits.
- A market in pollution permits emerges.
- The private sector innovates.
- No distorting government revenue is generated.

The Environment Policies	
Liberal	**Conservative**
Liberals want ***command and control regulation and supplemental carbon pricing.***	Conservatives want ***expanded private property rights, revenue-neutral carbon taxes, and free-market cap and trade.***

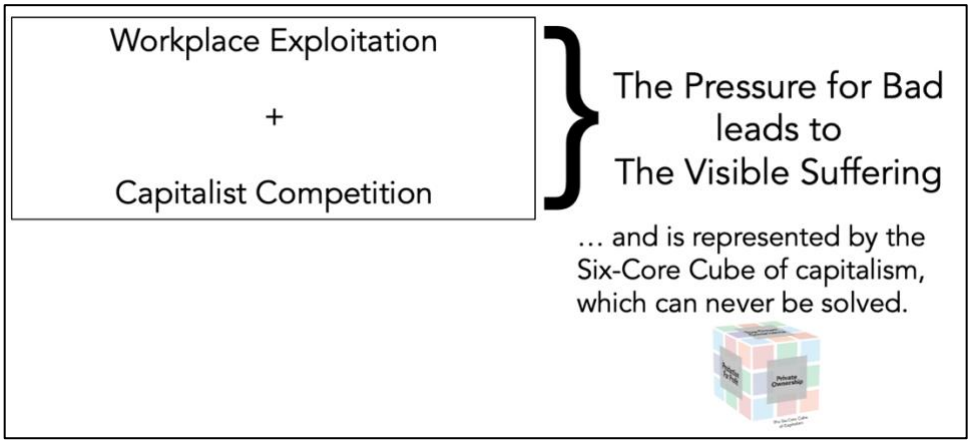
Radical Tools: Unsustainable Growth and Sustainable Development

Radicals use the six core points as tools to analyze economic issues.

- Ownership
- Governance
- Meeting people's basic material needs
- Production
- Sustainability
- Communities

Radicals select the core point that makes the most sense for a particular issue. For the environment, it is sustainability.

Drill down into sustainability in capitalism:



The Unsolvable Six-Core Cube of Capitalism

1. Private Ownership
2. Top-Down Governance
3. Individuals at Risk
4. Production for Profit
5. Unsustainable Growth
6. Unhealthy Communities

The Six-Core Cube of Capitalism

Why unsolvable?
It is built around six core points that are rotten to the core!

Unsustainable Growth: Society uses up resources without considering how those decisions will affect people in the future.

Unsustainable Growth

- The focus is solely on short-term gains.
- Production continually expands, regardless of the costs to people and the planet.
- Future generations are burdened with the consequences of today's actions.

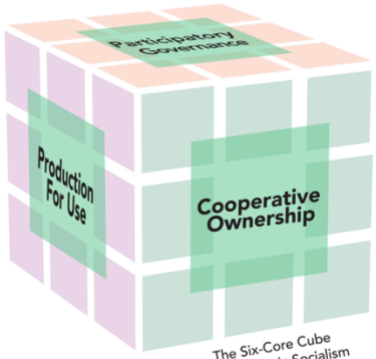
The Visible Suffering of Capitalism

- Hunger and malnourishment
- Harmful products
- Mass poverty
- Homelessness
- Extreme income inequality
- **Pollution and climate crisis**
- Inaccessible, low-quality health care
- Destructive market domination
- Impoverished elders
- Exploding public and private debt
- Damaging trade relationships
- High prices and no jobs

Drill down into sustainability in democratic socialism:

The Solvable
Six-Core Cube of Democratic Socialism

1. Cooperative Ownership
2. Participatory Governance
3. Social Safeguards
4. Production for Use
5. Sustainable Development
6. Healthy Communities



The Six-Core Cube of Democratic Socialism

Why solvable?

It is built around six core points that are beneficial to the core!

Sustainable Development: Society uses resources wisely today and protects them for future generations.

Sustainable Development

- There is equal focus on short-term and long-term gains.
- Economic growth is in service to the well-being of people and the planet.
- Prosperity is assured for generations to come.

Radicals reject cost-benefit analysis.

The true value of a clean environment cannot be measured in monetary terms. People don't have price tags on their foreheads.

Radicals use Commons Viability Analyses.

- Commissioned by stewardship councils.
- Scientifically rigorous assessments.
- Determine the specific level of pollutants ecosystems can handle without becoming compromised.

In both the short and long term, the result is **ecological resilience**.

The Six-Core Cube of Democratic Socialism

The Environment Policy: Radical

Local Pollution	Global Pollution
Green New Deal	
a. People have a right to clean water, land, and air. b. The community protects the commons. c. The government convenes stakeholder groups to set and enforce policies. d. Cooperative ownership gives workers a voice to protect local environments.	a. Net-zero greenhouse gas emissions. • Capture emissions • Sustainable agriculture • Clean industry b. All projects, including infrastructure, take into account environmental factors. c. Invest in transportation. • Zero car emissions • Public transportation • High-speed rail

The Invisible Synergy of Democratic Socialism
■ Abundant, healthy food
■ Safe and helpful products
■ Prosperity
■ Housing for all
■ Equitable income distribution
■ **Clean environment**
■ Universal, first-rate health care
■ Fair and positive competition
■ Secure and dignified retirement
■ A thriving, debt-free society
■ Mutually beneficial trade relationships
■ Jobs and stable prices

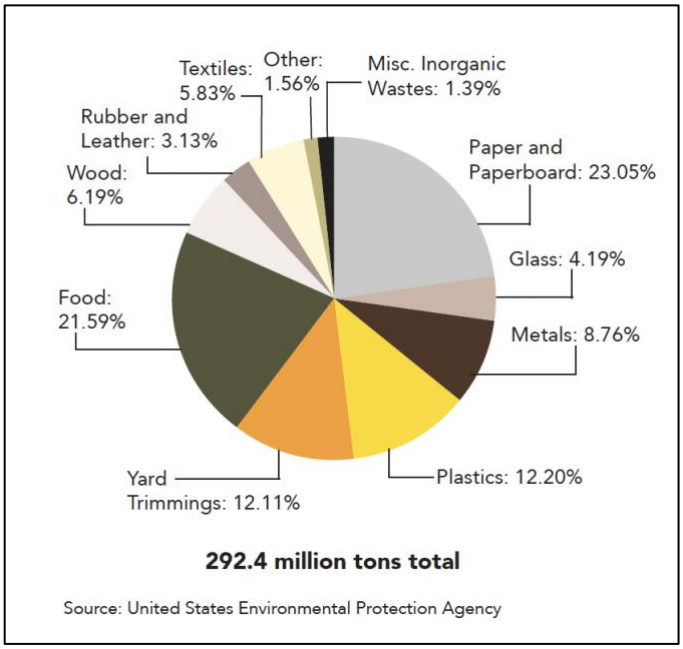
THE BLAME GAME What causes polluted air, land, and water?		
Conservative	**Liberal**	**Radical**
Too much government interference in capitalism	Not enough government intervention in capitalism	The drive for profit in capitalism
We need free-market capitalism.	We need fair-market capitalism.	We need democratic socialism.

<u>Discussion Story: Cleveland's Cuyahoga River</u>

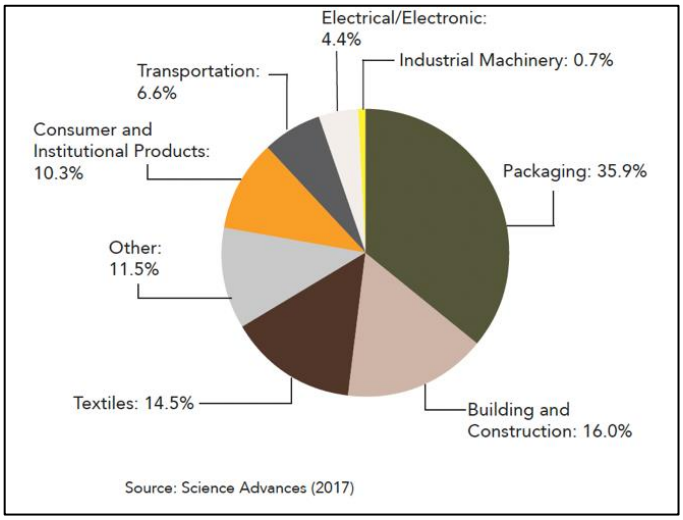
<u>Understanding the Environment</u>

The *human footprint* is the impact that our activities have on nature. We experiment and make new discoveries, but we can't anticipate all the consequences of our inventions.

Total Municipal Solid Waste



Plastic and the Environment



Water Pollution

In 2016, the EPA estimated that the drinking water of 63 million Americans was tainted with lead and other pollutants.

My *carbon footprint* is the total amount of greenhouse gases generated by my actions.

International Climate Agreements	U.S. Environmental Agencies
• 1992: Rio Earth Summit • 1997: Kyoto Protocol • 2009: Copenhagen Accord • 2010: Cancun Agreement • 2015: Paris Agreement	• Environmental Protection Agency (EPA) • Department of the Interior (DOI) • Department of Agriculture (USDA) • Agency for Toxic Substances and Disease Registry (ATSDR) • Geological Survey (USGS) • National Oceanic and Atmospheric Administration (NOAA)

Three-in-One Activity: "Tragedy of the Commons"

The goal is to achieve ecological resilience from each perspective.

Percentage of Pollution Abatement in the Lake

Tons Abated Per Week (out of 5 tons generated)	Marginal Cost for Pollution Abatement	Percentage of Pollution Abatement	Condition of the Lake
0	$0	0% (5 tons left in lake)	Water unusable
1	$500	20% (4 tons left in lake)	Water unusable
2	$1,000	40% (3 tons left in lake)	Usable for production
3	$2,000	60% (2 tons left in lake)	Usable for recreation
4	$3,500	80% (1 ton left in lake)	Potable water **Ecologically resilient**
5	$6,000	100% (0 tons left in lake)	Pristine—not possible with production

***The Tragedy of the Commons* Activity, Round I: Neutral**

- The profit from 1 crate of paper is $2,000.
- Producing 1 crate of paper creates 1 ton of pollution.
- The marginal cost to clean up or prevent pollution goes up as more tons are abated (marginal means *additional*). Therefore, the total cost for abatement of Ton 1 ($500) and Ton 2 ($1,000) is $1,500.
- Ecological resilience is achieved when each firm only emits 1 ton of pollution per week.

Notes for the neutral round:

- Each firm produces 5 crates per week.
- The lake is open access.
- Firms ***must*** maximize their profits.

Questions:

a. How many tons should your firm abate?

b. How much profit will your firm make?

c. What will be the long-term condition of the lake?

Tons Abated Per Week (out of 5 tons generated)	Marginal Cost for Pollution Abatement
0	$0
1	$500
2	$1,000
3	$2,000
4	$3,500
5	$6,000

Round I: Neutral, Results

a. 0 tons abated

b. $10,000

c. lake water unusable

The Tragedy of the Commons killed the lake.

Conclusion: When firms are allowed to use resources without restrictions, the natural resources get overused and abused, and they become unusable.

Voices on The Environment

Radical

Response to discussion story: In capitalism, rivers become fire hazards because the drive for profit forces firms to choose between staying in business or destroying natural resources.

Voice: Pages 522-526
Summary: Page 527
Talking Points: Page 527

***The Tragedy of the Commons* Activity, Round II: Radical**

Notes for this radical round:

- For sustainability, each firm agrees to limit paper production to 3 crates per week. (Initial profit: $6,000 per week.)
- The stewardship fee to use the lake is $2,000 per week.
- With ecological resilience as the goal, the stewardship council uses a commons viability analysis and limits each firm to emitting only 1 ton of pollutant per week.

Tons Abated Per Week (out of 5 tons generated)	Marginal Cost for Pollution Abatement
0	$0
1	$500
2	$1,000
3	$2,000
4	$3,500
5	$6,000

Questions:

a. How many tons of pollution should your firm abate?

b. How much total profit will your firm make?

c. What will be the long-term condition of the lake?

Round II: Radical, Results

a. Pollution Abatement = 2 tons. (An additional 2 tons were prevented in the first place by limiting production to 3 crates per week.)

b. Total Profit = $6,000-$2,000-$1,500 = $2,500

c. Democratic socialism guarantees that the lake will be **ecologically resilient**—clean enough to drink, safe for water recreation, and usable for production for generations to come.

Radical short-term and long-term results:

80% pollution abatement = **Ecological Resilience**!

Liberal

Response to discussion story: The government didn't set limits on how the river was used. Only with a strong public-private partnership can natural resources be protected.

Voice: Pages 529-533

Summary: Page 534
Talking Points: Page 535

The Tragedy of the Commons Activity, Round III: Liberal

Notes for this liberal round:

- Each firm maximizes profit by producing 5 crates per week. (Initial profit: $10,000 per week.)
- The government access tax to use the lake is $2,000 per week.
- The government uses a cost-benefit analysis including direct and indirect benefits and concludes that firms may only pollute up to 2 tons per week.
- Firms will be fined $8,000 for each additional ton of pollution above the allowed 2 tons per week.

Tons Abated Per Week (out of 5 tons generated)	Marginal Cost for Pollution Abatement
0	$0
1	$500
2	$1,000
3	$2,000
4	$3,500
5	$6,000

Questions:

a. How many tons of pollution should your firm abate?
b. How much total profit will your firm make?
c. What will be the long-term condition of the lake?

Round IV: Liberal, Results

a. Pollution Abatement = 3 tons
b. Total Profit = $10,000-$2,000-$3,500 = $4,500
c. Government investment in innovations leads to lower costs for pollution abatement in the long term. With lower marginal costs, the new cost-benefit calculation brings about higher levels of pollution abatement—at the 4th ton. This results in **ecological resilience**.

Liberal short-term result:
60% pollution abatement = Usable for recreation

Liberal long-term result:
80% pollution abatement = **Ecological Resilience**!

Conservative

Response to discussion story: No one owned the river, so firms took advantage and trashed it. Natural resources are best protected when they are owned privately.

Voice: Pages 536-540
Summary: Page 541
Talking Points: Page 542

***The Tragedy of the Commons* Activity, Round IV: Conservative**

Notes for this conservative round:

- Each firm maximizes profit by producing 5 crates per week. (Initial profit: $10,000 per week.)
- The access fee charged by the owner to use the lake is $2,000 per week.
- The owner uses a cost-benefit analysis including direct benefits only and tells firms they may only pollute up to 3 tons per week.
- Owners will sue firms for $8,000 for each additional ton of pollution above the allowed 3 tons per week.

Questions:

a. How many tons of pollution should your firm abate?

b. How much total profit will your firm make?

c. What will be the long-term condition of the lake?

Tons Abated Per Week (out of 5 tons generated)	Marginal Cost for Pollution Abatement
0	$0
1	$500
2	$1,000
3	$2,000
4	$3,500
5	$6,000

Round IV: Conservative, Results

a. Pollution Abatement = 2 tons

b. Total Profit = $10,000-$2,000-$1,500 = $6,500

c. Firms innovate to maximize profits, which lowers the cost of pollution abatement. Then, over the long term, other parties who want to use the resource (for instance, a resort or a beverage company) may pay the owner to increase pollution abatement to 4 tons—**ecological resilience**.

Conservative short-term result:
40% pollution abatement = Usable for production

Conservative long-term result:
80% pollution abatement = **Ecological Resilience**!

Shared Outcome: Breathable air, drinkable water, and habitable land.