

Managing Environmental Resources: Part 1

LESSON OVERVIEW

This section invites students to explore how we manage our environment and natural resources. It introduces broader concepts that encourage critical thinking skills around environmental decision-making, responsibility, and the roles that different groups play in managing shared resources.

GOALS

- Show students the impacts that individuals, communities, government, and corporations can have on common resources.
 - Understand and identify ways that we can better protect our common resources.
 - Gain awareness of environmental issues through a discussion of laws and hypothetical scenarios.
 - Extend student learning by analyzing real-world case studies, allowing them to explore the challenges and complexities of managing resources in practice.
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MATERIALS

- Overview and Background Information Document
- Slide Deck: Managing Environmental Resources Part 1
- Goldfish crackers or other object representing fish (beads, popsicle sticks, etc.)
- Worksheet: Reflection Questions
- Optional Case Studies and Worksheets



PROGRAM OF STUDY CONNECTIONS

Environmental and Outdoor Education 9	Environmental Core: 3b Environmental Investigations: 2a, 2b, 2c
CTF Challenge	The Common Good (Managing Environmental Resources pg. 18-22) Let's Support Nature (Species Law pg. 27-32)
Social Studies 10-1/-2	POS 2.2-2.3, 3.2, 3.3, 3.6-3.9, 4.8-4.10
Social Studies 20-1/-2	POS 1.11, 2.1-2.3, 3.2, 3.6, 3.8, 4.9
Social Studies 30-1/-2	POS 1.6-1.9, 3.7-3.9, 4.3, 4.9, 4.10
Science 10	Unit B: sts&k 3.8 Unit D: sts&k 1.1, 3.4, 4.1, 4.6
Science 14	Unit D: sts&k 1.8, 2.8, 2.9
Science 20	Unit D: 1.4k, 1.5k, 1.2sts, 1.2s, 2.1sts, 2.2sts
Science 24	Unit A: sts&k 4 Unit B: sts&k 4
Science 30	Unit D: 1.4k, 1.5k, 1.6k
Biology 20	Unit A: 2.1sts, 3.1s, 3.2s, 3.4s Unit B: 1.1 sts
CTS: Natural Resources	ENS: 1110, 1115, 2030, 2050, 2120, 2140, 3050, 3110, 3120 WLD: 1070, 1075, 1080, 2040, 2070, 2080, 2090, 3020, 3050, 3060, 3090 FOR: 1110, 2010, 2100, 3010 PRS: 1020, 1050
CTS: Legal Studies	LGS: 2030, 2040, 3060



LESSON OUTLINE

Time (times are all approximate)	Description	Materials and Resources
10 minutes	A. Introduction to the Tragedy of the Commons <ul style="list-style-type: none"> • What is it? • Example 	Managing Environmental Resources Part 1 Slide Deck Slides 1-7
20-30 minutes	B. Fishing Activity	Slides 8-12 <ul style="list-style-type: none"> • Goldfish crackers or other objects representing fish (beads, popsicles sticks, etc.)
15 minutes	C. Managing Environmental Resources and the Law <ul style="list-style-type: none"> • Government regulation • Privatization • Community-based management 	Slides 13-20 <ul style="list-style-type: none"> • <u>Video: Elinor Ostrom's version</u>
15 minutes	D. Lesson Reflection	Slides 21-22
If you choose to include the optional components, more time will be required.	E. Optional Case Studies <ol style="list-style-type: none"> 1. Government Regulation: Chemical Valley 2. Privatization of Water: Nestle 3. Managing River Health in Indigenous Communities 	<ul style="list-style-type: none"> • Managing Natural Resources Case Studies



LESSON PLAN

This lesson is divided into two parts, each of which can be taught independently as a stand-alone lesson. Optional case studies can be added to deepen learning, though they may require an additional class to complete.

All background knowledge needed to facilitate this lesson can be found in the [“Environmental Laws 101” Document on pages 18-22](#). Along with the slide deck and activities provided, you have all the resources needed to facilitate this lesson. If you need further clarification or additional information, please don't hesitate to reach out to programs@abcee.org.

A. INTRODUCTION TO THE TRAGEDY OF THE COMMONS

Slides 1-7

- **Ask students to brainstorm:**
 - What are public goods?
 - *Examples: goods or services that anyone can use*
 - What are some natural resources that are considered public goods?
 - *Examples: crown land, water, fish, air, parks, etc.*
 - How do people currently use these resources?
 - *Examples: crown land - public access for recreation and camping, water - we have access to clean drinking water (but does everyone? This will be addressed in Part 2), etc.*
 - What would happen to these resources if they were not regulated?
 - *Examples: overuse, unsafe or unsanitary, degradation of the resource, etc.*
- **Topic: The Tragedy of the Commons (Slide 3)**
 - The Tragedy of the Commons is an idea that was developed by the environmental scientist Garrett Hardin.
 - When multiple people share access to a common resource, each person may use it for their own benefit without feeling responsible for its care. Over time, this can lead to the resource becoming overused, damaged, or completely depleted.
 - This idea is not necessarily accurate for our current method of resource and land management but has been a leading principle in environmental law throughout the years.
 - *Note: This is just one way of understanding resource management.*
- **Example: South Saskatchewan River Basin Water Overuse (Slides 4-5)**
 - The South Saskatchewan River flows through southern Alberta and is used by many people for different things like farming, drinking water, industry, and recreation.
 - Over time, more and more people started taking water from the river, especially for irrigation (watering crops). Everyone wanted to use the water for their own needs, but no one was really making sure the river had enough left to stay healthy.
 - Eventually, so much water was being taken out that:
 - Water levels were too low to support healthy fish and wildlife populations
 - Critical wetland habitat started drying up
 - Some parts of the river became extremely low



- **Discussion: (Slides 6-7)**

- Why is this a Tragedy of the Commons?
 - *A shared resource is used too much because everyone is thinking about their own short-term benefit, and not about long-term sustainability or the cumulative impacts of many activities over time.*
 - How can we prevent this from occurring?
 - *Examples: government regulation, privatization - give the responsibility to someone, education, etc.*
 - What has been done to try and resolve the issue?
 - *Today, water allocations in some smaller parts of the larger river system (like the Bow and Oldman) are fully allocated, meaning no new licences can be issued.*
 - *There is also a need to protect the aquatic environment (habitat, fish, vegetation). As a result, conditions are often placed on new licences to protect the health of the environment.*
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B. FISHING ACTIVITY

Slides 8-11

- **Materials:** Goldfish (or other item that can represent fish)
- **Activity:** Divide students into groups of 4-5 and give each group 20 goldfish (save this for after the rules so students don't eat or touch the goldfish).
 - Each group of students represents a small fishing village and the students are anglers who are supporting their families. Each village surrounds a lake with fish in it that can be eaten or sold.
 - This game will be played in five rounds; each round represents a year. Each year the students go fishing. Each student must collect at least one fish each round in order to feed themselves. Inform students that the fish must be in one piece to avoid grabbing and crumbling them (if using goldfish).
 - *0 fish: you and your family starve and you are out of the game*
 - *1 fish: you survive but your family starves*
 - *2 fish: you and your family survive*
 - *More than 2 fish: you and your family survive and you can sell the excess for a profit*
 - At the end of the year the fish repopulate. This means that the teacher will double the amount of fish that are left in the lake at the end of each round.
 - *Example: If 5 fish are left in the lake, the teacher will add 5 more resulting in a total of 10 fish for the next round.*
 - There will be five years consisting of 'fishing' and 'repopulating'. Students who have the most fish at the end of the activity will have the most profit and therefore 'win'.
 - If anyone starves (i.e. they do not collect at least one fish), then they cannot fish anymore and are out for the rest of the game.
 - No talking (negotiating, strategizing, etc.) is allowed during the activity.



- **After an entire game of five rounds, ask students the following questions: (Slide 10)**
 - Did anyone survive? What helped you survive?
 - Students will survive if everyone in their group takes no more than their fair share. If even one group member takes more than three fish it can have detrimental consequences for the entire group.
 - What was challenging?
 - Students often get caught up in taking as many fish as possible to have as much profit as possible. This creates a challenge for other students, who can get frustrated as they try to take a sustainable amount of fish while their group members take more. This also highlights common conflicts between large corporations and smaller grass-roots consumers.
 - What could have been done to make sure everyone survived for the full five years?
 - Rules could be put in place. This could mean that students are only allowed to take two fish each round or one student is in charge of all the fish and decides how many fish each student in the group gets to take.
 - Ask students if they would be willing to abide by such rules.
 - If students can quickly agree on a rule that would be binding on everyone, write it down on the board and announce that it is in place from now on.
- **Play another game of five rounds, then ask the next round of questions. (Slide 11)**
 - Did more people survive the second game? Why or why not?
 - Hopefully, more people survive, but the survival of the group can hinge on a single group member taking more than their fair share.
 - Did anyone take more than two fish each round? Why or why not?
 - Even though students know how to make sure everyone survives for the full five years, often, the desire to make the most profit is stronger.
 - Did anyone sacrifice their fish for the common good? Why or why not?
 - Answers may vary.
 - Who does society reward in this type of scenario, the person who takes the most fish or the person who is aware of the common good?
 - Generally, the person who takes the most fish because they end up with the most profit.
 - This issue can be connected to our current reality of rising grocery prices. Even as the cost of food continues to climb, large corporations often remain in control of much of the food supply chain. Because of their size and efficiency, they can offer lower prices than small, local producers, and society tends to reward this affordability by continuing to support them with purchases, subsidies, and policy advantages.
 - However, when we look back through history, or even current discussions on sustainability and equity, these same corporations are often portrayed as the villains. They are frequently criticized for prioritizing profit over people, exploiting workers and farmers, harming the environment, and reducing biodiversity through industrial agriculture.
 - This contradiction reveals a deeper issue: while many people recognize the harm these corporations can cause, economic pressures and lack of accessible alternatives keep them in power. As a result, ethical and environmental concerns are often sidelined in favour of short-term affordability, creating a cycle where harmful systems are continually reinforced.
- **Note:** If you do not have time to do the activity or want to supplement it, these videos run a similar scenario as the activity.
 - [Video: Tragedy of the Commons Fishing Example & Explanation \(4:57 min\) \(Slide 12\)](#)
 - [Video: Tragedy of the Commons Pasture Example \(1:29\)](#)



C. MANAGING ENVIRONMENTAL RESOURCES AND THE LAW

Slides 13-20

- **Topic: What does the law have to do with it?**

- In Alberta, we strive to prevent the negative outcomes of the Tragedy of the Commons in three main ways: government regulation, privatization, and community-based management.
 - *The optional case studies will take a closer look at some examples.*

Slides 14-15

- **Topic: Government Regulation**

- In Alberta, the law plays a key role in managing natural resources, as the provincial government owns and regulates most of them, including land, water, and minerals. A range of statutes and regulations, overseen by ministries and agencies, guide how these resources are developed, conserved, and allocated. In general, two types of regulation are used.
- **Command and control regulation:** These are bans or semi-bans, of a particular action or regulations that otherwise attempt to control individual behaviour.
 - *Example: Alberta regulates fishing extraction through daily catch and possession limits. This varies by species and water body.*
 - One critique of command and control type regulations is how difficult it can be to enforce these laws. In cases of large-scale environmental regulations, such as control of large water bodies, enforcement is extremely difficult.
 - Referring to the example of Alberta's fishing limits, is it possible to ensure compliance with the catch and possession limits established by the Government of Alberta?
- **Incentive based regulation:** This is a regulation which seeks to encourage certain forms of behaviour over others.
 - *Example: The Marine Stewardship Council (MSC) certification is an example of an incentive-based regulation because it encourages sustainable fishing practices through rewards, rather than punishment.*
 - One critique of incentive-based regulations is that they disproportionately affect those individuals who cannot afford to cover the increased costs, while those who are unconcerned about money can afford to keep doing the original unwanted behaviour.
 - Referring to the example of the MSC certification, this can be a costly process and not everyone can afford to get and maintain the certification.

Slides 16-17

- **Topic: Privatization of Land or Resources**

- This is based on the idea that privatizing land or resources and allowing an individual or company to be the owner of the land or resource, instead of the government, removes the incentive to exhaust the resource as quickly as possible. The owner now has a stake in what happens to that piece of land or resource because the owner is the one who will have to regrow the grass if it gets over-grazed or clean the water if it becomes too polluted to use.



◦ Discussion Questions:

- Are there certain types of natural resources that should not be privatized?
 - *For example, should we be able to privatize water? Understandably, water is a critical resource for the survival of animals, plants, and humans. So what would happen if we created a private market in water?*
 - Imagine if prices went up so much that poorer communities ended up being priced out and unable to afford adequate water supplies. Or, what about monitoring water quality? Or, what if the majority of our water sources were controlled and owned by a small number of companies? These companies would become very powerful because we, the people, need water, and we would do everything we could to stay on the good side of those who control the water supply.
 - *In Mad Max: Fury Road, water privatization is depicted through the character Immortan Joe, who controls the limited water supply in a post-apocalyptic world, hoarding it for his own benefit and using it as a tool of power and oppression. This portrayal serves as a commentary on the potential dangers of privatizing essential resources and highlights the social inequalities that can arise when access to necessities like water is controlled by a select few.*
- How should we respond to individuals who don't view conservation as a legitimate goal for the use of their private property or land?
 - Another problem is that privatization does not guarantee that an owner will protect or safeguard their land or resource. If a private company owns a water supply and believes that the fast exploitation of this supply, to the point that there is no longer water available in that area, is likely to make them more money, what is stopping them from simply exploiting their property to the fullest?
 - Often, markets are focused on short-term profits rather than long-term protection goals, which do not fit well with environmental goals.
 - If people don't understand how important biodiversity is for supporting natural resources, they might use the land in a way that seems okay at first but actually harms the environment because they don't see why it's important to keep nature healthy.
 - The concept of ecosystem services helps communicate the benefits of conservation to those who may not intrinsically value the environment.
 - Ecosystem services or nature's benefits highlight the essential ways humans rely on a healthy environment for survival and well-being.
- How do we control free-flowing natural resources?
 - One of the overarching challenges we face when trying to privatize a resource like water is that regardless of how hard people try, water (and resources like it) are not readily privatized. Free-flowing water such as streams and rivers, without dams, have no regard for borders or economic divisions and it is impossible to tell if "your water" has moved into "my water." This also means that attempting to control the same is futile.

Slides 18-20

• Topic: Community-based Management introduced by Elinor Ostrom

- Political scientist and economist Elinor Ostrom challenged the traditional idea of how this tragedy should be managed. Instead, Ostrom found that communities can successfully manage shared resources, like forests, fisheries, and water, without government regulation or privatization—if certain conditions are met.
- Video: Elinor Ostrom's version of this principle (5:25 min) **(Slide 19)**



- Think back to the fishing activity...If the students in a community worked together for the common good to preserve the fishery, this is an example of Elinor Ostrom's theory in practice.
 - The students, a small group, made decisions on which rules would work best for them and then put them into action.
- **Community-based Management in Alberta**
 - Alberta does have examples of community-based management, especially in watersheds, rangelands, and Indigenous-led programs. However, these are often collaborative with the government or other groups.
 - *Example: Crown rangelands are managed by the Government of Alberta in partnership with farmers and ranchers (community) who lease the land and steward it through sustainable range management practices.*
 - *Example: Yellowstone to Yukon Conservation Initiative uses a partnership-based approach to collaborate with hundreds of community partners, including conservation groups, local landowners, businesses, government agencies, Indigenous governments, people and organizations, scientists, and others to protect habitat along the spine of the Rocky Mountains.*

D. LESSON REFLECTION

Slides 21-23

- What factors make it easier or more difficult for people to manage a commons, such as shared land or water resources?
 - *Hint: Think about rules, communication, trust, and whether people are working together or just thinking about themselves. Also consider if there are consequences for overusing the resource.*
- How does the Tragedy of the Commons apply to climate change?
 - *Hint: The atmosphere is a global common good, it belongs to all of us, and no single person or country owns it. Here's how it connects to climate change:*
 - Burning fossil fuels (like coal, oil, and gas) releases greenhouse gases into the air.
 - Countries, companies, and individuals benefit in the short term by using fossil fuels for energy, transportation, and industry.
 - But the long-term result is that we all suffer from climate change, more extreme weather, rising sea levels, and ecosystem damage.
 - No one wants to stop first because it might hurt their economy or cost more money.
 - **Optional Video: How Climate Change is a Collective Action Problem (3:18 min) (Slide 23)**
- Research British Columbia's Community Forest Agreement Program and compare it to Alberta's Crown Rangeland Program as two approaches to community-based natural resource management.
 - Who is involved in managing the resource?
 - What are the main goals of each program?
 - In what ways do these programs reflect the principles of community-based management?



E. CASE STUDIES

Review one or more of the following case studies and complete the provided discussion questions and/or assignments. Case studies can be used for in-class discussions or as an assignment.

CASE STUDY 1: GOVERNMENT REGULATION IN CHEMICAL VALLEY, ON

- Case Study and Discussion Questions
- Optional:
 - Review the section on Environmental Justice on page 23-26 in the Background Document
 - Video: [Canada's Toxic Chemical Valley](#) (Full Length: 31:12)
 - Note: the video shows clips from protests that include swear words (2:26, 4:03)
 - Research: Students can look up the air quality policy that was agreed upon before moving on to the discussion questions.
 - Environmental Registry of Ontario, "[Cumulative effects assessment in air approvals](#)" (26 April 2018) Government of Ontario.

CASE STUDY 2: PRIVATIZATION OF WATER, NESTLE

- Case Study and Discussion Questions
- Optional:
 - Video: [Water for Life, Not for Profit! The Fight Against Nestlé in Ontario](#) (3:00)
 - Article: [Nestlé Waters leaving Canada is a community success](#) (2020)
 - Article: [Nestlé faces renewed criticism as B.C. drought continues](#) (2015)

CASE STUDY 3: MANAGING RIVER HEALTH IN INDIGENOUS COMMUNITIES

- Case Study and Discussion Questions
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RESOURCES

- [Government of Alberta: Grazing and Range Management](#)
- [Government of British Columbia: Community Forest Agreements](#)
- [Marine Stewardship Council: Why get your fishery MSC certified?](#)

