

Real-World Ecology Decision Challenges Bundle

How Should We Solve Real-World
Ecology Problems?



Analyze Data • Evaluate Evidence • Make Decisions

Students analyze
real-world ecology
data to make
evidence-based
decisions about
ecosystems.

SCROLL
to take a look inside!



HOW THIS ACTIVITY WILL HELP YOU



- **Prep-FREE and fully editable Decision Challenge**
Activity - just print/upload and assign with no materials.
- **Provides Built-In Assessment** - The included rubric makes it easy to check student understanding and evidence-based reasoning.
- **Builds Real-World Science Skills** - Students analyze data, compare possible causes, and use evidence to explain which of 3 options is the best option.

What Will Your Students Learn?



STUDENTS USE THE INFORMATION PRESENTED TO DECIDE IF RECOMMENDATION A, B, OR C SHOULD BE USED TO SOLVE THE CHALLENGE.

- ✓ Real-world ecology decision-making
- ✓ Ecosystem balance and biodiversity
- ✓ Population change over time
- ✓ Species protection and conservation
- ✓ Human impacts on ecosystems
- ✓ Habitat loss and habitat fragmentation
- ✓ Food webs and ecosystem relationships
- ✓ Environmental management trade-offs
- ✓ Comparing multiple solutions using evidence
- ✓ Using data to support science-based decisions

- A complete bundle of Real-World Science Decision Challenges where students analyze evidence and make science-based decisions about ecology and environmental issues
- Multiple activities focused on ecosystems, biodiversity, species protection, population change, food webs, habitat loss, human impacts, conservation, and environmental management
- Complete teacher supports for each activity including student questions, final decision responses, answer keys, early finisher extension options, and grading rubrics

What You Get

NO-PREP. JUST PRINT TO GO!

Species Protection Decision Challenge

Which Species Should Be Protected First?

Student Name: _____ Date: _____

The Situation
 Clearwater Reserve is a protected natural area with forests, wetlands, streams, meadows, and many different plant and animal species. For many years, the reserve has been home to a variety of species with pollinators, predators, herbivores, decomposers, fish, amphibians, and birds.

Recently, scientists have noticed that several important species in the reserve are declining. Habitat loss, pollution, changes in food supply, and human activity may all be contributing to the problem.

The reserve has received a conservation grant, but there is not enough money to protect every species at once. Wildlife managers must decide which species should receive protection funding first.

You are part of a conservation planning team. Your job is to analyze the evidence and decide which species should be protected first to help support the overall ecosystem.

Decision Question
 Which species should receive protection funding first?

Choose one recommendation:
Option A: Protect the wetland beaver population first.
Option B: Protect the native bee population first.
Option C: Protect the spotted salamander population first.
 You must support your decision with evidence from the activity.

Background Information
Biodiversity is the variety of living things in an ecosystem. Ecosystems with higher biodiversity are often more stable because many different species help support food webs, habitats, and ecosystem processes.

A **keystone species** is a species that has a large effect on an ecosystem compared with its population size. If a keystone species declines or disappears, many other species may be affected.

Habitat loss happens when an environment is damaged, reduced, or destroyed. Species may no longer meet their needs. Habitat loss can reduce food, shelter, and protection from predators.

Conservation decisions often involve trade-offs. Protecting one species may help other species, but limited funding means scientists and community leaders must decide which to act first.

Full
Situation
Overview

3 Options
Presented

Background
Information

What Will Your Students Learn?

EVIDENCE IS PRESENTED

Information/Data Set 1: Species Population Trends

Scientists estimated the populations of three species in Clearwater Reserve.

Year	Wetland Beavers	Native Bees	Spotted Salamanders
2020	46	12,000	820
2021	42	10,500	760
2022	36	8,700	640
2023	29	6,900	520
2024	22	5,200	390
2025	17	3,800	310

What This Evidence Shows

All three species have declined over time. The native bee population has declined by 68% over the 6-year period, but it has also decreased sharply. The beaver population is much smaller, but it has also decreased sharply. The beaver population is much smaller, but it has also decreased sharply. The beaver population is much smaller, but it has also decreased sharply.

Information/Data Set 2: Species Roles in the Ecosystem

Scientists summarized the role each species plays in Clearwater Reserve.

Species	Important Ecosystem Role
Wetland beavers	Build dams that create ponds and wetlands used by fish, frogs, insects, birds, and plants
Native bees	Pollinate many wildflowers, shrubs, and berry-producing plants
Spotted salamanders	Eat insects and other small invertebrates; serve as prey for snakes, birds, and mammals

What This Evidence Shows

Each species supports the ecosystem in a different way. Beavers change and create habitat for many other organisms. Native bees help plants reproduce. Salamanders are part of the food web as both predators and prey.

Information/Data Set 3: Habitat Loss

Scientists measured the amount of suitable habitat remaining for each species amount available 20 years ago.

Species	Suitable Habitat Remaining
Wetland beaver	...
Native bees	...
Spotted salamander	...

What This Evidence Shows

All three species have lost a significant amount of suitable habitat over the 20-year period. The beaver population has lost the most habitat, followed by the native bees and then the spotted salamanders.

Information/Data Set 4: Effects on Other Species

Scientists studied how protecting each species could affect the rest of the ecosystem.

Species Protected	Possible Benefits to Other Species
Wetland beavers	More wetland habitat for frogs, fish, insects, ducks, herons, turtles, and aquatic plants
Native bees	Better pollination for wildflowers, shrubs, berries, and seed-producing plants
Spotted salamanders	More balance in leaf-litter food webs and more prey for snakes, birds, and mammals

What This Evidence Shows

Protecting any of the three species could help other organisms. Beavers may help the widest range of wetland species by creating habitat. Native bees may help many plant species reproduce. Salamanders may help support forest food webs.

Information/Data Set 5: Conservation Funding Options

The conservation grant can only fully fund one protection plan.

Protection Plan	Main Actions
Beaver Protection Plan	Protect streamside areas, remove dams, remove, restore wetlands
Native Bee Protection Plan	Plant native flowers, reduce pesticide use, protect nesting areas
Salamander Protection Plan	Protect forest pools, reduce road crossings, restore leaf litter habitat

What This Evidence Shows

Each plan could help the ecosystem, but in different ways. The best decision depends on whether managers prioritize habitat creation, pollination, population decline, or food web support.

Students are presented with 5 Information Data Sets to inform their choices.

- ✓ Helps students build data analysis and evidence-based reasoning skills using real-world ecology scenarios
- ✓ Connects key life science concepts such as biodiversity, food webs, population change, habitat loss, conservation, ecosystem stability, and human impact
- ✓ Supports NGSS Science & Engineering Practices by having students analyze patterns, compare possible solutions, and make science-based decisions
- ✓ Encourages students to use evidence to explain and defend their recommendations in realistic environmental decision-making situations

Classroom Fit Guarantee

I want you to feel confident when you purchase from Teach With Fergy. If a resource is not the right fit for your students, simply contact me and I'll provide double your purchase amount in store credit toward another resource in my store.



Here is the page- by-page for my ‘Species Protection Ecology Decision Challenge’

Species Protection Decision Challenge

Which Species Should Be Protected First?



OPTION A	OPTION B	OPTION C
Protect beavers	Protect native bees	Protect salamanders
		
    	   	  
FROGS FISH DUCKS TURTLES HERONS	WILDFLOWERS BERRIES SEEDS PLANTS	SNAKES BIRDS MAMMALS
Creates wetlands and habitat for many species.	Improves pollination for plants and food sources.	Supports food webs as both predator and prey.

Analyze Data • Evaluate Evidence • Make Decisions

Page 1 & 2

Page 1 – Teacher Overview

- Estimated Time
- Learning Goals
- Materials Needed
- Teacher Notes

Page 2 – Student Task Overview and Background Information

- Situation Overview - Summary of the main issue at hand
- Decision Question with 3 Options
- Background Informational Text

Species Protection Decision Challenge

Which Species Should Be Protected First?

Teacher Overview

Activity Type: Real-World Science Decision Challenge

Topic: Ecology, keystone species, biodiversity, habitat loss, ecosystem stability

Estimated Time: 30–40 minutes

Main Skill: Students analyze evidence and make a science-based decision.

Learning Goals

By the end of this activity, students

- Explain how biodiversity
- Describe how habitat loss
- Identify why some species
- Analyze species population
- Compare multiple consequences
- Use evidence to support
- Consider the trade-offs in

Materials Needed

- Student activity pages
- Pencil or device
- Optional: highlighters for

Teacher Note

The main activity is designed to Extension is optional and can be who finish before others.

Species Protection Decision Challenge

Which Species Should Be Protected First?

Student Name: _____ Date: _____

The Situation

Clearwater Reserve is a protected natural area with forests, wetlands, streams, meadows, and many different plant and animal species. For many years, the reserve has supported a healthy ecosystem with pollinators, predators, herbivores, decomposers, fish, amphibians, birds, and mammals.

Recently, scientists have noticed that several important species in the reserve are declining. Habitat loss, pollution, changes in food supply, and human activity may all be contributing to the problem.

The reserve has received a conservation grant, but there is not enough funding to protect every species at once. Wildlife managers must decide which species should receive funding first.

You are part of a conservation planning team. Your job is to analyze the evidence and decide which species should be protected first to help support the overall ecosystem.

Decision Question

Which species should receive protection funding first?

Choose one recommendation:

Option A: Protect the wetland beaver population first.

Option B: Protect the native bee population first.

Option C: Protect the spotted salamander population first.

You must support your decision with evidence from the activity.

Background Information

Biodiversity is the variety of living things in an ecosystem. Ecosystems with high biodiversity are often more stable because many different species help support food chains and ecosystem processes.

A **keystone species** is a species that has a large effect on an ecosystem compared with its population size. If a keystone species declines or disappears, many other species may be affected.

Habitat loss happens when an environment is damaged, reduced, or destroyed so that organisms can no longer meet their needs. Habitat loss can reduce food, shelter, nesting areas, and protection from predators.

Conservation decisions often involve trade-offs. Protecting one species may mean that other species, but limited funding means scientists and community leaders must decide where to focus resources.

Page 3 & 4

Page 3 and 4 – Information/Data Sets #1-5

- Data Sets and Tables
- Informational Text that clearly explains what the evidence shows
- Example:

Information/Data Set 1: Species Population Trends

Scientists estimated the populations of three species in Clearwater Reserve.

Year	Wetland Beavers	Native Bees	Spotted Salamanders
2020	46	12,000	820
2021	42	10,500	760
2022	36	8,700	640
2023	29	6,900	520
2024	22	5,200	390
2025	17	3,800	310

What This Evidence Shows

All three species have declined over time. The native bee population has the largest total number of individuals, but it has also decreased sharply. The beaver population is much smaller, and losing even a few beaver families could affect wetland habitat.

Information/Data Set 2: Species Roles in the Ecosystem

Scientists summarized the role each species plays in Clearwater Reserve.

Species	Important Ecosystem Role
Wetland beavers	Build dams that create ponds and wetlands used by fish, frogs, insects, birds, and plants
Native bees	Pollinate many wildflowers, shrubs, and berry-producing plants
Spotted salamanders	Eat insects and other small invertebrates; serve as prey for snakes, birds, and mammals

What This Evidence Shows

Each species supports the ecosystem in different ways. Native bees support other organisms. Native bees are also predators and prey.

Information/Data Set 3: Habitat Loss

Scientists measured the amount of habitat available 20 years ago and today.

Species	Habitat Loss (acres)
Wetland beavers	150
Native bees	200
Spotted salamanders	100

What This Evidence Shows

All three species have lost habitat. One reason their population is declining is the loss of habitat.

Information/Data Set 4: Effects on Other Species

Scientists studied how protecting each species could affect the rest of the ecosystem.

Species Protected	Possible Benefits to Other Species
Wetland beavers	More wetland habitat for frogs, fish, insects, ducks, herons, turtles, and aquatic plants
Native bees	Better pollination for wildflowers, shrubs, berries, and seed-producing plants
Spotted salamanders	More balance in leaf-litter food webs and more prey for snakes, birds, and mammals

What This Evidence Shows

Protecting any of the three species could help other organisms. Beavers may help the widest range of wetland species by creating habitat. Native bees may help many plant species reproduce. Salamanders may help support forest food webs.

Information/Data Set 5: Conservation Funding Options

The conservation grant can only fully fund one protection plan this year.

Protection Plan	Main Actions	Estimated Impact
Beaver Protection Plan	Protect streamside areas, reduce dam removal, restore wetland vegetation	Could improve wetland habitat for many species
Native Bee Protection Plan	Plant native flowers, reduce pesticide use, protect nesting areas	Could improve pollination and plant reproduction
Salamander Protection Plan	Protect forest pools, reduce road crossings, restore leaf litter habitat	Could improve breeding success and forest food web stability

What This Evidence Shows

Each plan could help the ecosystem, but in different ways. The best decision depends on whether managers prioritize habitat creation, pollination, population decline, or food web support.

Information/Data Set 5: Conservation Funding Options

The conservation grant can only fully fund one protection plan this year.

Protection Plan	Main Actions	Estimated Impact
Beaver Protection Plan	Protect streamside areas, reduce dam removal, restore wetland vegetation	Could improve wetland habitat for many species
Native Bee Protection Plan	Plant native flowers, reduce pesticide use, protect nesting areas	Could improve pollination and plant reproduction
Salamander Protection Plan	Protect forest pools, reduce road crossings, restore leaf litter habitat	Could improve breeding success and forest food web stability

What This Evidence Shows

Each plan could help the ecosystem, but in different ways. The best decision depends on whether managers prioritize habitat creation, pollination, population decline, or food web support.

Part 1: Evidence Analysis Questions

Answer each question using complete sentences when appropriate.

1. What decision does the conservation planning team need to make?
2. Which three species are being considered for protection funding?
3. How did the wetland beaver population change from 2020 to 2025?
4. How did the native bee population change from 2020 to 2025?
5. Which species has the least suitable habitat remaining?
6. What is a keystone species?
7. Why could wetland beavers be considered especially important for ecosystem stability?
8. Why could protecting native bees help more than just the bee population?
9. Which Information/Data Set best shows that protecting one species could help many other species? Explain your answer.
10. Which option do you think has the biggest trade-off or risk: Option A, Option B, or Option C? Explain why.

Part 2: Final Decision

Which species should receive protection funding first?

Choose one:

- ☐ **Option A:** Protect the wetland beaver population first.
- ☐ **Option B:** Protect the native bee population first.
- ☐ **Option C:** Protect the spotted salamander population first.

Final Response

Write a short paragraph explaining your decision. Your answer should include:

- Your recommendation
- At least two pieces of evidence
- An explanation of how the evidence supports your decision
- One possible trade-off or downside of your recommendation

My Decision:

1. Evidence Analysis Questions

2. Students Choose from Option A, B, or C based on their understanding

3. Final Response written as a short paragraph explaining their decision

Full Teacher Answer Key

Answer Key - Part 1: Evidence Analysis Questions

1. What decision does the conservation planning team need to make?

The conservation planning team needs to decide which species should receive

2. Which three species are being considered for protection funding?

The three species being considered are wetland beavers, native bees, and spotted salamanders.

3. How did the wetland beaver population change from 2020 to 2025?

The wetland beaver population decreased from 46 in 2020 to 17 in 2025.

4. How did the native bee population change from 2020 to 2025?

The native bee population decreased from 12,000 in 2020 to 3,800 in 2025.

5. Which species has the least suitable habitat remaining?

Native bees have the least suitable habitat remaining, with 38 percent of suitable habitat left.

6. What is a keystone species?

A keystone species is a species that has a disproportionately large effect on its environment relative to its

size. If a keystone species is removed, the ecosystem would change dramatically.

7. Why could protecting native bees be a better choice than protecting beavers?

Wetland beavers create ponds and wetlands. The ponds and wetlands provide habitat for fish, frogs, insects, ducks, herons, turtles, and aquatic plants.

8. Why could protecting native bees be a better choice than protecting beavers?

Protecting native bees could improve wetland habitat for many other species, which may support biodiversity and ecosystem stability. One downside is that native bees and spotted salamanders are also declining, so choosing beavers first means those species may not receive full protection right away.

9. Which information supports the decision to protect native bees first?

Answers may vary. For example, the native bee population has declined more rapidly than the wetland beaver population.

10. Which option would you recommend? Explain why.

Answers may vary. For example, protecting native bees first would support biodiversity and ecosystem stability.

Students may say that protecting native bees first would support biodiversity and ecosystem stability.

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Answer Key - Final Decision

Student answers will vary, but strong responses should include:

- A clear recommendation
- At least two pieces of evidence
- A connection between the evidence and the decision
- A trade-off or downside

Strong Sample Answer

Option A should be used because the wetland beaver population has declined and beavers can create habitat for many other species. Beavers build dams that create ponds and wetlands, which provide habitat for fish, frogs, insects, ducks, herons, turtles, and aquatic plants. The beaver population has also decreased from 46 in 2020 to 17 in 2025, so the population may need help soon. Protecting beavers could improve wetland habitat for many other species, which may support biodiversity and ecosystem stability. One downside is that native bees and spotted salamanders are also declining, so choosing beavers first means those species may not receive full protection right away.

Acceptable Alternative Answer

Option B could be used because native bees support pollination and plant reproduction throughout the ecosystem. Native bees pollinate many wildflowers, shrubs, berries, and seed-producing plants. Their population decreased from 12,000 in 2020 to 3,800 in 2025, and they have the least suitable habitat remaining at 38 percent. Protecting native bees could help many plant species reproduce, which could also support animals that depend on those plants for food and shelter. One downside is that protecting bees may not create new habitat as directly as protecting beavers.

Another Acceptable Alternative Answer

Option C could be used because spotted salamanders are part of the forest food web and their population has declined. Salamanders eat insects, which are eaten by snakes, birds, and mammals. Their population decline has also been reduced. Protecting forest habitat could help support the forest food web and breeding success and help support the forest food web. One downside is that protecting forest habitat may not create new habitat as directly as protecting beavers.

Weak Answer

The native bees should be protected first because their population has declined.

This answer is weak because it is based mostly on the Information/Data Sets and does not explain biodiversity or trade-offs.

Early Finisher Extension

If you finish early, choose one of the following extension tasks.

Extension Option 1: Create a Public Message

Create a quick visual, poster, warning sign, social media post, or public announcement that explains your decision to the community.

Your message should include:

- The problem
- Your recommendation
- One piece of evidence
- One action people can take

Extension Option 2: What Other Evidence Would Help?

Identify one additional piece of evidence that would help conservation managers make a stronger decision.

Explain:

- What evidence you would collect
- How you would collect it
- Why it would help

Extension Option 3: What If the Evidence Changes?

Imagine that a new study shows the native bee population is starting to recover naturally, but the beaver population is still decreasing. Would this change your recommendation? Explain why or why not.

3 Extension Activities for Early Finishers

Activity Rubric

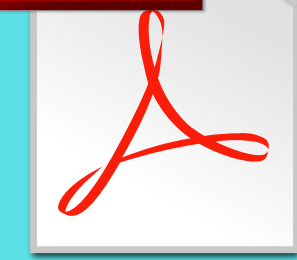
Category	1 - Needs Improvement	2 - Developing	3 - Good	4 - Strong
Evidence Analysis	Uses little or no evidence from the Information/Data Sets. Responses may be mostly guesses or opinions.	Uses limited evidence, but some evidence may be unclear, incomplete, or not fully connected to the question.	Uses relevant evidence from the Information/Data Sets with mostly accurate explanations. Minor details may be missing.	Accurately uses multiple pieces of relevant evidence from the Information/Data Sets and explains them clearly.
Science Understanding	Shows major misunderstandings about the science concept or does not explain the concept accurately.	Shows partial understanding of the science concept, but explanations may be basic, unclear, or contain errors.	Shows a general understanding of the science concept and explains most ideas accurately.	Clearly explains the science concept and shows strong understanding of how it connects to the real-world problem.
Final Decision	Decision is missing, unclear, or not supported with evidence.	Makes a decision, but the support is weak, incomplete, or mostly opinion-based.	Makes a clear decision and supports it with some relevant evidence and reasoning.	Makes a clear, well-supported decision using strong evidence and logical reasoning.
Reasoning and Explanation	Does not explain how the evidence supports the decision, or the explanation is inaccurate.	Gives a basic explanation, but the connection between evidence and decision is incomplete or unclear.	Explains how the evidence supports the decision with only minor gaps in reasoning.	Clearly explains how the evidence supports the decision and shows thoughtful cause-and-effect reasoning.
Trade-Offs and Real-World Thinking	Does not identify a trade-off, downside, or real-world concern.	Identifies a trade-off or concern, but the explanation is vague or not well connected to the decision.	Identifies a relevant trade-off or real-world concern and explains it with some detail.	Clearly explains a realistic trade-off or downside and shows an understanding that real-world science decisions can be complex.
Completeness and Effort	Many questions are incomplete, missing, or rushed.	Some questions are incomplete, missing, or rushed.	Most parts are complete and show appropriate effort.	All required parts are complete, detailed, and show careful effort.

Marking Rubric



Your Activities

PDF



- Include background information and evidence cards for student understanding
- Are DIGITAL and PRINT ready
- Are FULLY EDITABLE
- Include Extension activities for early finishers
- Include a Complete Answer Key

NO-PREP. JUST PRINT TO GO!

Species Protection Decision Challenge

Which Species Should Be Protected First?

Student Name: _____ Date: _____

The Situation

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Recently, scientists have noticed that several important species in the reserve are declining. Loss, pollution, changes in food supply, and human activity may all be contributing to the problem.

The reserve has received a conservation grant, but there is not enough money to protect every species at once. Wildlife managers must decide which species should receive protection funding first.

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You must support your decision with evidence from the activity.

Background Information

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Habitat loss happens when an environment is damaged, reduced, or destroyed. Species may no longer meet their needs. Habitat loss can reduce food, shelter, and protection from predators.

Conservation decisions often involve trade-offs. Protecting one species may help other species, but limited funding means scientists and community leaders must decide when to act first.

Full
Situation
Overview

3 Options
Presented

Background
Information

Thanks
**for your interest
in this resource!**

I am a real person and if
you have any questions,
suggestions, or concerns,
please reach out.



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TWF

Teach With Fergy

*Let's
Connect!*

