



Designing Solutions to Preserve Biodiversity

INTRODUCTION

Biodiversity is the variety of life on Earth at all levels. It can include the numbers and types of plants, animals, and other organisms found in one area or across different ecosystems. Although biodiversity is important for both ecological processes and human communities, it is threatened by various types of human activities. Five of the biggest threats to biodiversity are represented by the acronym **HIPPO**:

- **H:** Habitat loss
- **I:** Invasive species
- **P:** Pollution
- **P:** Population growth
- **O:** Overharvesting

Understanding these threats can help us develop ways to decrease negative human impacts. In this activity, you'll explore the five HIPPO threats and apply what you learn to design solutions to preserve biodiversity.

- In **Part 1**, you join an "Expert Team" to learn about a specific HIPPO threat and how the threat impacts the Hawaiian monk seal. You will then use the case of the monk seal to design and present solutions that help address this biodiversity threat.
- In **Part 2**, you will watch an episode from the film series *Wild Hope*. Each episode highlights a species or ecosystem threatened by biodiversity loss, as well as people working to protect them.
- In **Part 3**, you will join a "Biodiversity Response Team" to transfer your knowledge about biodiversity threats to the *Wild Hope* episode. You will then design, present, and refine a new solution that addresses the biodiversity loss shown in the episode.

MATERIALS

- copies of the "Hawaiian Monk Seal Comic"
- copies of the "Expert Team Information Sheets"
- a *Wild Hope* episode selected by your instructor

PART 1: EXPLORING THREATS TO AND SOLUTIONS FOR THE HAWAIIAN MONK SEAL

Your instructor will assign you to one of five Expert Teams. Each team should become experts on one of the HIPPO biodiversity threats and how it impacts an endangered species called the Hawaiian monk seal.

With your Expert Team, read the "**Hawaiian Monk Seal Comic**" and your assigned "**Expert Team Information Sheet.**" Then, answer the following questions.

1. Which HIPPO biodiversity threat is your Expert Team focusing on?

2. Summarize your threat and the types of human activities that contribute to it.

3. How does your threat impact the Hawaiian monk seal?

Scientists estimate that 30% of Hawaiian monk seals are alive today thanks to human actions that protect and support their survival. For these actions to be effective, they must address key problems faced by the monk seals.

4. With your Expert Team, pick a problem that affects the Hawaiian monk seal, *based on your HIPPO threat*, that your team plans to address. Describe the problem that your team chose, being as specific as possible.

Work with your team to design a solution for this problem, *based on one of the general solutions in your “Expert Team Information Sheet”* and the biology of the Hawaiian monk seal.

5. Describe your team’s solution, including *how* your solution would specifically address the problem.

6. List **five** main steps needed for your solution. For example, what types of information, resources, actions, or activities might be required to successfully develop or carry out your solution?

The success of a solution also depends on engaging **partners**: people or groups that you can work with based on shared interests or goals. Potential partners include local and Indigenous community members, schools, governments and organizations, scientists, businesses, educators, etc.

Partners can provide important resources, knowledge, or guidance. Considering how different partners value, benefit from, and can help preserve biodiversity may also impact your solution.

7. Describe **three** specific partners that you could work with to develop or implement your team’s solution.

Partners	Connection to the problem or solution	Potential role in your solution

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When designing a solution, you will also encounter **constraints**: factors that may limit or pose challenges to the solution’s implementation, scope, or success. One potential constraint is financial costs.

8. List **two** potential constraints on your team’s solution. Describe how these constraints might limit the implementation of the solution.

Each Expert Team should now present:

- their assigned HIPPO biodiversity threat (Questions 1–2)
 - how that threat impacts the Hawaiian monk seal (Question 3)
 - their team’s solution (Question 5) and its main steps for implementation (Question 6)
 - potential partners (Question 7) for and constraints (Question 8) on their solution
9. Take notes on each Expert Team’s presentation in the following sections. (You can skip the section for your own team.) Evaluate their proposed solution and provide constructive feedback, which could include suggestions or additional considerations that they could use to improve their solution. Be prepared to ask clarifying questions and to share your feedback with the other teams.

a. **Habitat loss**

- Describe this threat:
 - How does this threat impact the Hawaiian monk seal?
- Proposed solution:
- Partners:
- Constraints:
- Constructive feedback on their solution:

b. **Invasive species**

- Describe this threat:

- How does this threat impact the Hawaiian monk seal?

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

c. **Pollution**

- Describe this threat:

- How does this threat impact the Hawaiian monk seal?

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

d. Population growth

- Describe this threat:

- How does this threat impact the Hawaiian monk seal?

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

e. Overharvesting

- Describe this threat:

- How does this threat impact the Hawaiian monk seal?

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

10. After the presentations, work with your own Expert Team to list **three** ideas for improving your team's solution. This could include addressing feedback or additional considerations.

PART 2: EXPLORING A BIODIVERSITY CASE STUDY FROM *WILD HOPE*

Your instructor will select a *Wild Hope* episode for the class to watch. Each episode highlights a species or ecosystem threatened by biodiversity loss, as well as ways in which people are addressing these threats.

11. While watching the episode, take notes on the following topics. These notes will be helpful for the next part of the activity.
 - a. What **biodiversity threats** (e.g., human activities that lead to biodiversity loss) were shown in this episode? Identify specific HIPPO threats (habitat loss, invasive species, pollution, population growth, or overharvesting) and provide evidence to support your claims.

 - b. What **solutions** were used to address the threats, and how can they help preserve biodiversity?

 - c. What **partners** helped implement or develop the solutions?

 - d. What were the **constraints** on developing or implementing the solutions?

PART 3: DESIGNING SOLUTIONS FOR THE *WILD HOPE* CASE STUDY

Your instructor will assign you to a Biodiversity Response Team, which should have members from each Expert Team. Be prepared to share more about the work you did in Part 1, including which HIPPO threat you explored, with your new team members.

12. With your Biodiversity Response Team, complete the following table to describe how each HIPPO threat could apply to the *Wild Hope* episode that you watched. It will be helpful to reference your notes from Part 2. For each threat:
 - Describe **examples** that provide evidence of that threat in the episode. If the threat was not directly discussed in the episode, suggest a potential reasonable example of how it might apply in this situation.
 - Describe specific **solutions** that people in the episode used to address the threat. If a solution for that threat was not presented in the episode, leave this part blank.

HIPPO threat	Shown in episode? (Yes/No)	Example(s) Describe examples of the threat from the episode. If no examples were discussed, suggest how the threat might apply.	Solution(s) Leave blank if the episode did not show any solutions for the threat.
Habitat loss			
Invasive species			
Pollution			
Population growth			
Overharvesting			

You'll now work with your Biodiversity Response Team to design a new or expanded solution for a biodiversity threat of your choosing.

13. With your Biodiversity Response Team, pick a problem, *based on a HIPPO threat you described in Question 12*, to develop a solution for. Describe the problem that you chose, being as specific as possible.

Work together with your team to design a solution for this problem. It may be helpful to revisit the general solutions in the "Expert Team Information Sheets" from Part 1. Avoid repeating a solution that was already shown in the *Wild Hope* episode. You must develop a new solution *or* a significant expansion of a solution from the episode.

14. Describe your solution, including *how* your solution would specifically address the problem.

15. List **five** main steps needed for your solution. For example, what types of information, resources, actions, or activities might be required to successfully develop or carry out your solution?

16. Describe **three** specific partners that you could work with to develop or implement your team’s solution. You may want to review your answers to Question 7 for ideas.

Partner	Connection to the problem or solution	Potential role in your solution

17. List **three** potential constraints on your team’s solution. Describe how these constraints might limit the implementation of the solution. You may want to review your answers to Question 8 for ideas.

Each Biodiversity Response Team should now present:

- the specific HIPPO threat/problem that they plan to address (Question 13)
- their team’s solution (Question 14) and its main steps for implementation (Question 15)
- potential partners (Question 16) for and constraints (Question 17) on their solution

18. Take notes on each Biodiversity Response Team’s presentation in the following sections. Similar to what you did in Part 1, evaluate their proposed solution and provide constructive feedback. Be prepared to ask clarifying questions and to share your feedback with the other teams.

a. **Team 1**

- The problem they plan to address:

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

b. **Team 2**

- The problem they plan to address:

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

c. **Team 3**

- The problem they plan to address:

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

d. **Team 4**

- The problem they plan to address:

- Proposed solution:

- Partners:

- Constraints:

- Constructive feedback on their solution:

19. After the presentations, work with your own Biodiversity Response Team to list **three** ideas for improving your team's solution. This could include addressing feedback or additional considerations.