Can a Half-Earth Approach Save Endangered Great Apes?
Half-Earth Project Inspiration for Orangutan Conservation

By Tamara Jolly and Dennis Liu

Activity Overview:
Orangutans are primates that belong to the group called Great Apes, the same group of primates that we humans belong to. Our closest relatives in the group are the Chimpanzees, but we're also very closely genetically related to Gorillas and Orangutans. Orangutans are the focus of this conservation activity.

In this activity, you will explore different ideas about how best to protect Orangutans in Borneo (see this blogpost). You will analyze data from the Half-Earth Map and other sources related to protecting Orangutans.

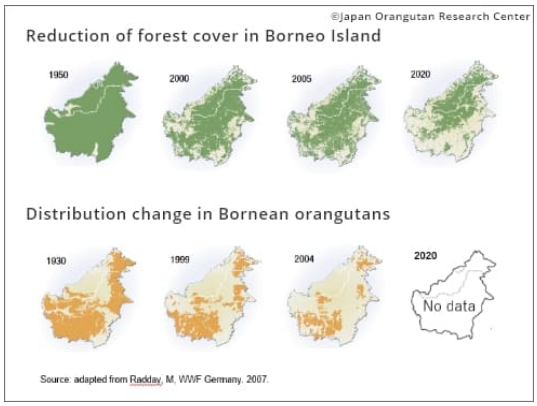
You Can Learn:

- How human activity is affecting the current population of orangutans in Borneo.
- To analyze and apply data gathered from the Half-EArth Map
- What possible options exist for protecting the orangutans of Borneo.

Materials: You will need online access and the graphics included in these activity pages.
You may also want to review this blogpost for more information about this activity: *Recovering Orangutans in Borneo with Half-Earth Principles*

The World of Orangutans

Today, the range of where orangutan species live is reduced from large areas of Asia to only the islands of Borneo and Sumatra. Although the numbers of these charismatic apes have fallen drastically, Borneo and Sumatra are very large islands that still have a lot of forest habitat. We'll focus on the island of Borneo which is divided among 3 nations: Indonesia, Malaysia, and Brunei.



Where and how Orangutans live

Compared to chimpanzees and gorillas, orangutans seem less social. They tend to hang out mostly on their own high up in the tree canopy, and it's less likely you would see them on the ground.

Orangutan numbers have dropped significantly on the island of Borneo. The main factor is habitat loss, caused by intensified agriculture. As a population gets smaller, the survival of each individual becomes more important and even genetic diversity becomes a conservation concern requiring specific strategies.

Part A. Video: Interview with an Orangutan Conservationist

Dr. Erik Meijaard, an Orangutan conservation expert, spoke with Dennis Liu, VP of Education at the E.O. Wilson Biodiversity Foundation, about protecting orangutans in Borneo, and the potential that a Half-Earth approach has for helping to protect Orangutan populations.

After watching the video, *Restoring Orangutans in Borneo: A Half-Earth Project Conversation (Part 1*), answer the following questions.
https://vimeo.com/771761897

1. Mark the box next to any of the following statements that are true.
   - ☐ We share a "recent" common ancestor with Orangutans.
   - ☐ There is only one species of Orangutan and it's endangered.
   - ☐ Orangutans are too heavy to live in nests.
   - ☐ Habitat destruction and direct killing by people are threats to Orangutan conservation.
   - ☐ Orangutans are harmful to people.

2. At minute 6:06, why does Dr. Meijaard say it is important to conserve organtangs?

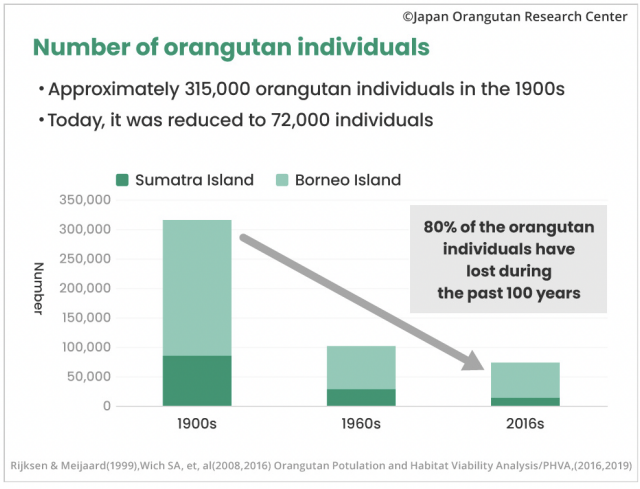
After watching the video, *Restoring Orangutans in Borneo: A Half-Earth Project Conversation (Part 2*), answer the following questions. https://vimeo.com/771811660

3. At 6:45 in the v, Dr. Meijaard talks about local community engagement when working to protect Orangutans. From what Dr. Meijaard says, do you think that local people living near Orangutans care about protecting them? Circle Yes/No.

4. Given your answer above, explain why you think local communities should be or not be included in conservation planning,

5. Propose one idea or strategy that you feel could help with community engagement in their protection.

6. At 8:30, Dr. Meijaard discusses forest coverage on Borneo, and proposes benefits for Half Earth. Who does he feel is responsible for engaging in Half Earth work?



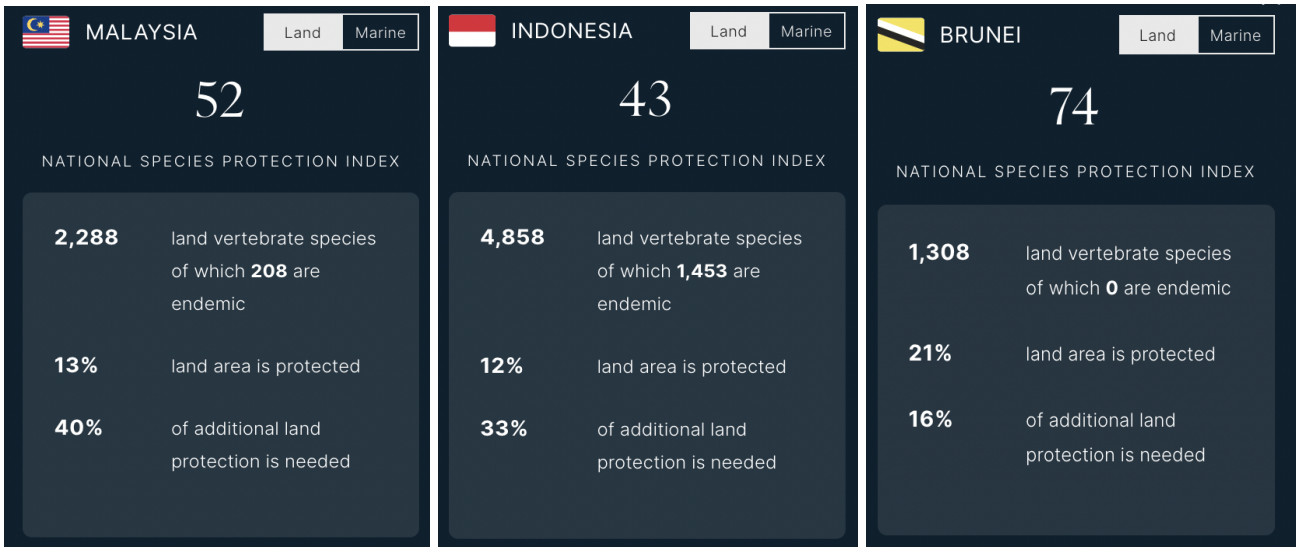
7. The Island of Borneo is losing forest every day to logging, agriculture, and development.
What would happen to the orangutan population on Borneo if no forest conservation action is taken?

8. What would happen if we apply the ideas of Half-Earth, which includes conservation measures and protection?

Part B. Half-Earth Map Exploration & Analysis

The Half-Earth Map can be useful for measuring biodiversity, conservation goals, and progress, to monitor a single place over time, or compare how well two different places are doing in caring for the species that live there. In this section you will be using the Half-Earth Map to focus on the countries that make up the island of Borneo, Malaysia, Indonesia, and Brunei.

B.1. Half-Earth Project National Report Cards for Protecting Biodiversity



Half-Earth Project National Report Cards for Malaysia & Indonesia as of January of 2023.

Nobody really likes being graded or getting a report card. But report cards can be useful for conservation. A report card can measure progress in a single place over time, and can also be used to compare how well two different places are doing in caring for the species that live there.

The Half-Earth Map team has generated report cards for every country in the world. These report cards change over time as countries improve, or backslide, on their biodiversity stewardship.

Look at the National Report Cards and answer the following questions.

1. Malaysia has _____ land vertebrate species, Indonesia has _____, and Brunei has _____.

2. Which country has more land area protected? Malaysia, Indonesia, or Brunei?

3. Which country has the highest National Species Protection Index? Malaysia, Indonesia, or Brunei?

4. Which country has the most additional land protection needed ? Malaysia, Indonesia, or Brunei?

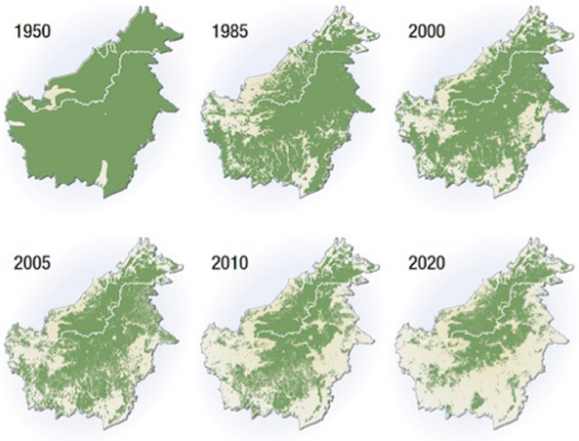
5. Look at the map of Borneo and the size of each country. How do you think their land size impacts their SPI?

6. Compare the protected land to species in each country to the amount of land vertebrates. How do you think these differences might affect each country's National Report Card SPI score?

Now you will use the **Explore Data** section of the Half-Earth Map. Click the link at the bottom of the homepage to find it. The Human Pressures Layer of the Half-Earth Map visually displays global human pressures that are causing habitat loss and accelerating species extinction. Human Pressures Layer

7. Click the tab and scroll down to the **Human Impact box**. Using the color scale bar, how would you assess the Human Impact Score for each country? Circle your answer.
    a. Malaysia: high/medium/low
    b. Indonesia: high/medium/low
    c. Brunei: high/medium/low

8. Explore the **Human Pressures Layer** on the Half-Earth Map on Borneo. Based on the map, what are the greatest land pressures that this region is facing?



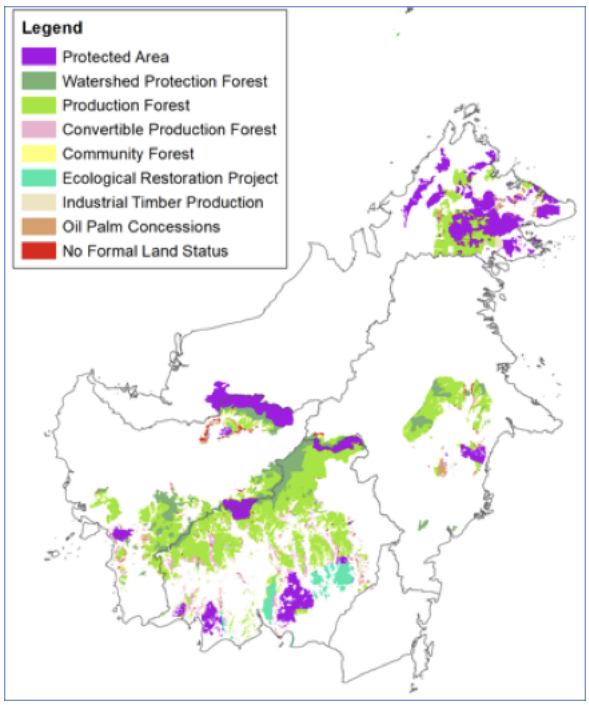
Indonesia has the highest rate of forest loss in the world, with the largest area located in Kalimantan on the island of Borneo. At current deforestation rates, little will be left by 2020. Map courtesy of WWF.

9. Using the image to the left and the data you collected from the Half-Earth Map, what can you conclude are the greatest threats to orangutans in Borneo?

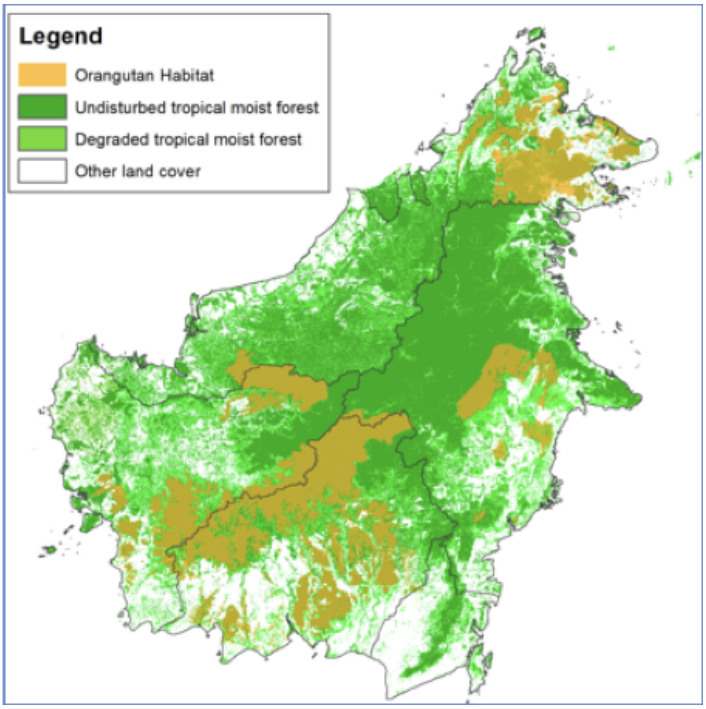
Part C. Orangutan Habitat Analysis

Now we will explore areas where orangutans are located. Look at the map below of Borneo, which displays the land use of the island as well as the orangutan habitats. You will use these maps to select your own location to analyze.

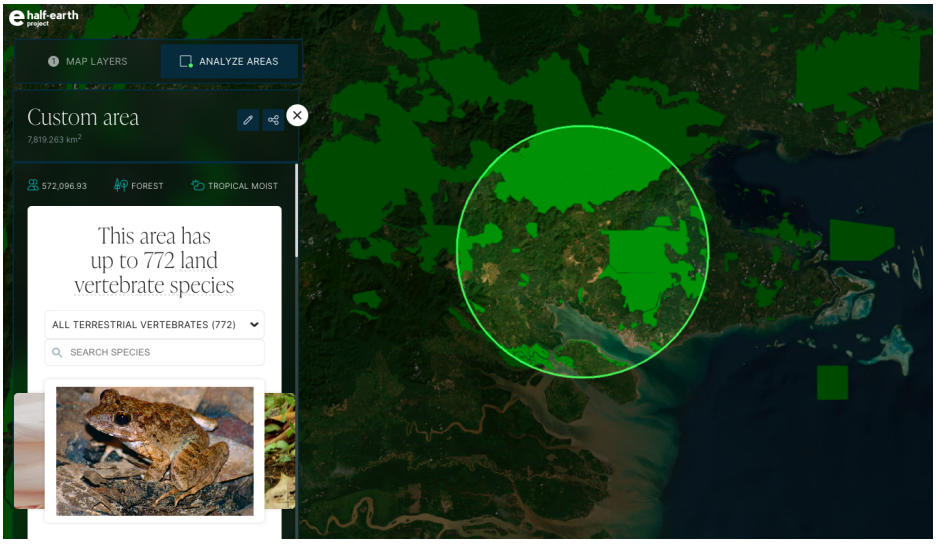
Land Use



Orangutan Habitats



The Half-Earth Map allows you to create your own area of interest to analyze. Below is an example of a custom area on Borneo. The area was selected by looking at the map above and creating a custom area that includes orangutan habitat.



Now, try to replicate this area or create your own custom area of your own interest within an orangutan habitat area. To create your own area of interest, follow the steps below.

Click this link to open the Half-Earth Map of Borneo: http://bit.ly/3IVuWOA

- Select the **Analyze Areas** Tab.
- Click The **Draw** box under selection type.
- Select the **Circle** shape from the toolbar at the top.
- Click and drag to select a specific area.
- Select the **Analyze Area** and see your results.

1. How would you describe the biodiversity in your selected area? Low/ Medium/ High

2. Approximately how much of the land is protected? Click the **All Protected Areas** button to see the list of protected areas. How many protected areas are listed?

3. Is there community based protection in this area?

4. Scroll down to **Human Impact** to explore different pressures on the land. What types of pressures exist in your selected area?

Final Analysis:

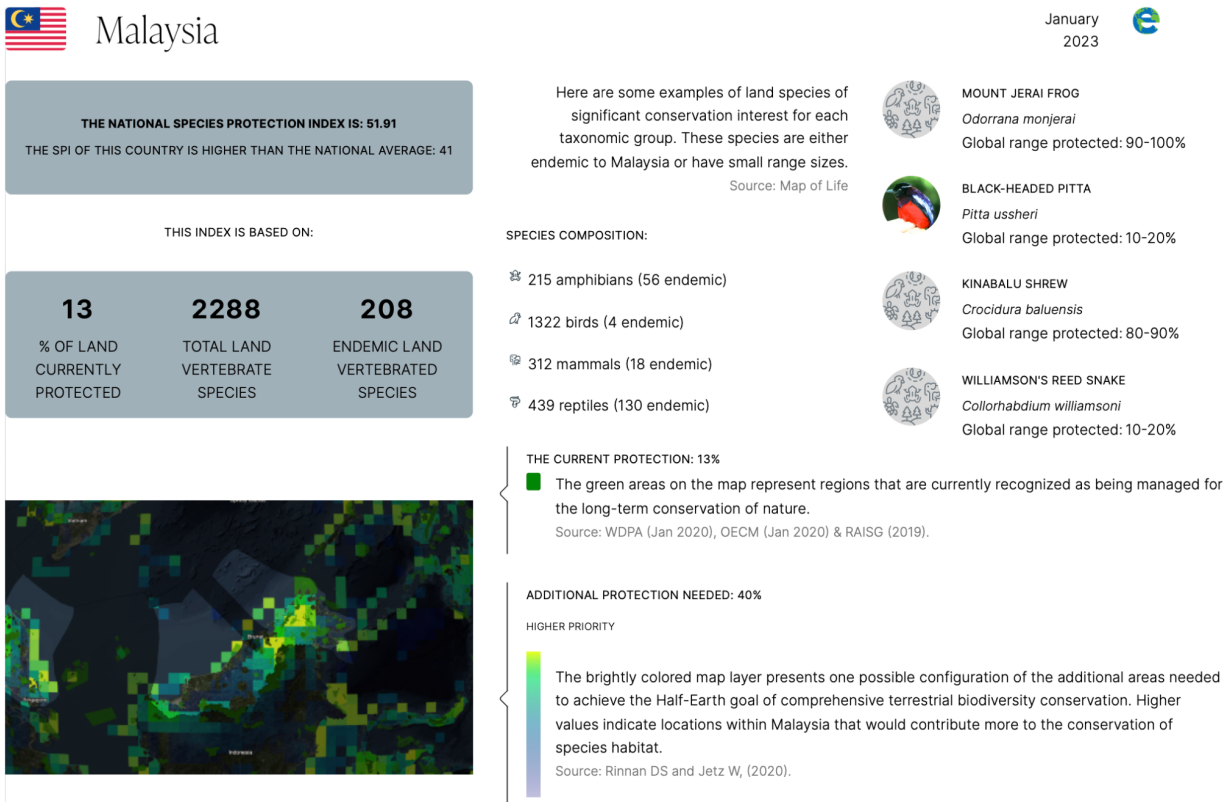
5. What are the main threats to orangutans?

6. What can a half-earth approach do for orangutan conservation?

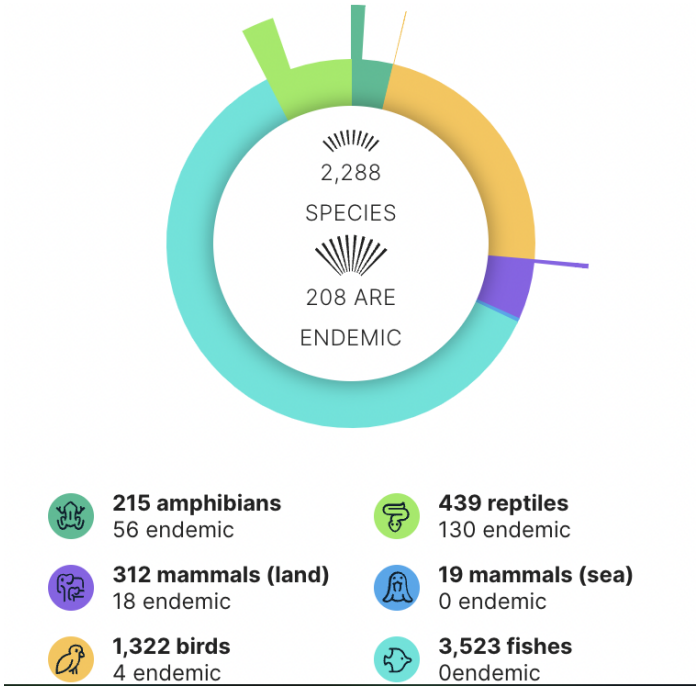
7. What are the major benefits of protecting orangutans?

Appendix I.

National Report Card for Malaysia, Indonesia, and Brunei



https://map.half-earthproject.org/nrc/MYS/overview



National Report Card for Indonesia

Indonesia

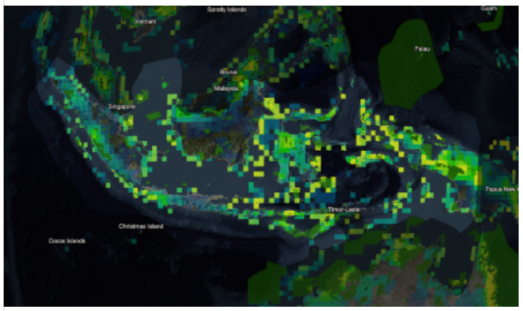
January 2023

THE NATIONAL SPECIES PROTECTION INDEX IS: 42.56

THE SPI OF THIS COUNTRY IS HIGHER THAN THE NATIONAL AVERAGE: 41

THIS INDEX IS BASED ON:

12	4858	1453
% OF LAND CURRENTLY PROTECTED	TOTAL LAND VERTEBRATE SPECIES	ENDEMIC LAND VERTEBRATED SPECIES



Here are some examples of land species of significant conservation interest for each taxonomic group. These species are either endemic to Indonesia or have small range sizes.

Source: Map of Life

Hylarana volkerjane

Global range protected: 90-100%

FLORES HAWK EAGLE

Nisaetus floris

Global range protected: 0-10%

Petinomys sagitta

Global range protected: 0-10%

SPECIES COMPOSITION:

- 367 amphibians (170 endemic)
- 3090 birds (726 endemic)
- 666 mammals (252 endemic)
- 735 reptiles (305 endemic)

THE CURRENT PROTECTION: 12%

The green areas on the map represent regions that are currently recognized as being managed for the long-term conservation of nature.

Source: WDPA (Jan 2020), OECM (Jan 2020) & RAISG (2019).

ADDITIONAL PROTECTION NEEDED: 33%

HIGHER PRIORITY

The brightly colored map layer presents one possible configuration of the additional areas needed to achieve the Half-Earth goal of comprehensive terrestrial biodiversity conservation. Higher values indicate locations within Indonesia that would contribute more to the conservation of species habitat.

Source: Rinnan DS and Jetz W, (2020).

LOWER PRIORITY

https://map.half-earthproject.org/nrc/IDN?globe=%7B%22center%22%3A%5B117.75526294281029%2C-3.0812420880713525%5D%2C%22zoom%22%3A5.021407446917974%7D

Still thinking how to incorporate this:

AOI analysis of portion (circle) of Orangutan habitat, note gap between protected areas (green)

Side issue, but big headache, genome mix-up, probably minor effect on conservation efforts, but did include a Tapanuli sequence (the rare Sumatran 3rd species).
nature.com/articles/d41586-022-03193-7?utm_source=Nature+Briefing&utm_campaign=ba930a9b48-briefing-dy-20221020&utm_medium=email&utm_term=0_c9dfd39373-ba930a9b48-46257622

Resources:

Miejaard paper,
https://www.cambridge.org/core/journals/oryx/article/restoring-the-orangutan-in-a-whole-or-halfearth-context/95C49E3F747CF09704C0E5E274D80B64

Blogpost, https://phys.org/news/2022-10-orangutan-whole-earth-half-earth-contexts.html

Notes:

- Killing and Palm Plantations main problem for them.
- Half-Earth Approach effective / This conservation inspired by Half Earth
- Not just protect but restore.
- If you save and protect this habitat what other benefits do you get from this protection?

Removed segments:

Part 1. Background Information: Half-Earth vs Whole Earth Approach to Conservation

Read the following excerpt from the article *Restoring the orangutan in Whole-Earth or Half-Earth contexts* by Wageningen University and answer the questions that follow.

"Current management
Under current management practices, orangutan populations may decline by around 27% by 2032. That decline would be in addition to the ca. 100,000 orangutans lost of Borneo between 1999 and 2015.

Half-Earth
They also estimated the likely impact from implementing two global proposals on conservation more generally: "Half-Earth" and "Whole-Earth." Half-Earth was an idea proposed by the late E.O. Wilson who envisaged that half of Earth's surface should be protected as wild nature if humanity wants to prevent further biodiversity losses. They tested this theoretical proposal by considering the ramifications of permanent protection of at least half of Borneo's forests in Indonesian Kalimantan and Malaysian Sabah.

Half-Earth would be comparatively easy to achieve and is predicted to reduce the decline in the orangutan population by 2032 by at least half compared to current management. They found that with effective implementation, Half-Earth is predicted to be the best strategy for orangutan protection on Borneo, although it would still result in some orangutan losses.

Whole-Earth

They also tested Whole-Earth, a counterproposal against Half-Earth that called for a major overhaul of current political and economic systems, and more equitable conservation strategies based on community rights to manage forests.

They predict that rapid implementation of Whole-Earth on Borneo would lead to the highest orangutan losses: 56% population decline within the next 10 years. This was because the fundamental changes required under Whole-Earth would take much more than 10 years to implement and could leave a power vacuum in the meantime.

Half of land mass protected

Interestingly, the analysis showed that both the Indonesian and Malaysian governments had more or less reached the objective of legally designating half of the land mass as protected in Kalimantan and Sabah respectively. With 67.1% of Kalimantan's land mass designated as State Forest, Indonesia already exceeds the Half-Earth goal of locking in 50%, if indeed the Indonesian government would commit to retaining these areas as permanently forested and enforcing land protection policies. Malaysian Sabah has also exceeded the Half-Earth goal, with 65% of the State remaining forested.

This is all on paper though. A lot of effective conservation investment and management would be needed to ensure that indeed these orangutan habitats would remain permanently forested, and that the other key threat—unsustainable killing—is effectively addressed. To prevent killing, effective engagement with rural communities on Borneo is needed, and this is where elements of the Whole-Earth approach are helpful. The scientists found broad consensus that much more sensitive and equitable engagement with these communities is among the key requirements of facilitating peaceful co-existence between people and orangutans."

Answer the following questions:

B. The Species Protection Index and Half-Earth National Report Cards

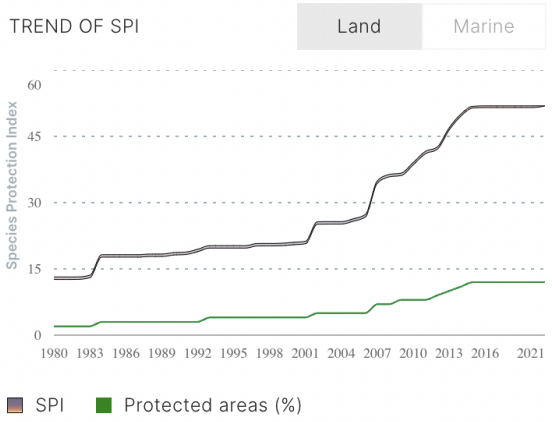
The Half-Earth Project National Report cards are based on a metric (a measure) called the Species Protection Index (SPI). The SPI measures how much habitat a nation is protecting for each species that lives there and then averages across all species to generate a score from 0 to 100. A score of 100 means that the country is protecting enough habitat to support the population of every vertebrate species that

lives there. A score of 0, means that no species in the country has enough habitat to support a functioning population. The best strategy to increase SPI is to protect habitat where species live. Protecting areas that don't have species habitat will not increase a country's SPI score. Learn more about the SPI from this StoryMap, **bit.ly/SPIstorymap**.

The overall average for the world's countries is an SPI score of 41.

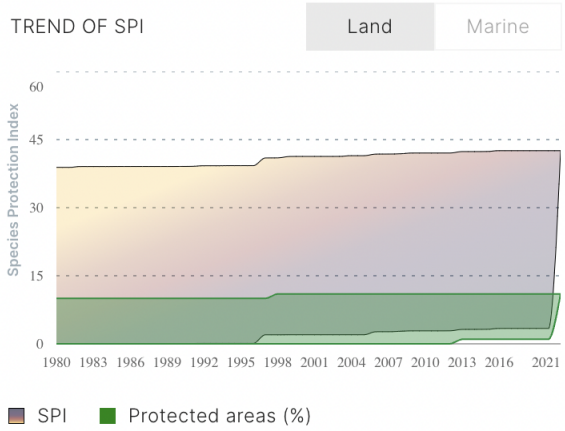
In your own words, state 2 reasons why you think Malaysia has a higher score than Indonesia, even though their protected areas.

Malaysia



Source: Map of Life, (Yale University).

Indonesia



Source: Map of Life, (Yale University).