



Palácio da Alvorada
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Dear students:

As you know, the Amazon is a large and diverse region. Scientists estimate that one quarter of the world's plants and animals live in our rainforests. However, this great diversity of life is threatened. Logging destroys some of our rainforests. Other forests are cleared to make room for agriculture. Soybean fields and cattle ranches are common here. Other kinds of agriculture include banana and coffee plantations. The good news is that we have 40 national parks in Brazil. These parks protect rainforests. However, we can't preserve all of our forests because our people need to make a living.

To protect our people and our rainforests, we are planning to design a new Biodiversity Preserve. This preserve will balance two needs. It will protect the economic interests of people living in the Amazon. It also will preserve our ecological interests.

Economic Interests:

- Maintain good jobs
- Improve quality of life
- Create farming and logging opportunities
- Attract eco-tourism

Ecological Interests:

- Support high levels of biodiversity
- Maintain ecosystem goods and services by supporting the natural mechanisms of the rainforest that make our planet habitable

We have spoken with a team of scientists, and they recommended that we create two types of areas in our Biodiversity Preserve. The first is a **wilderness area**. This area will be designed to protect biodiversity and attract eco-tourists. The second is a **multi-use area**. Here, people will be able to do some farming and logging. However, these uses will have to be done in a sustainable manner. Instead of clearing the forest to make room for farming, people will grow crops that will be complementary to our forests. For example, coffee bushes do not need to be grown in big sunny fields. In fact, they grow well in the shade under rainforest trees.

Together, the two types of land in our new Biodiversity Preserve will balance our economic and ecological interests and needs.

Wilderness Area	Multi-Use Area
<ul style="list-style-type: none">a. Between 5,000 and 10,000 km²b. Within 30 km of a riverc. At least 50 km from any roadsd. At least 30 km degraded arease. At least 30 km agriculture areasf. At least 30 km away from citiesg. Excludes indigenous lands	<ul style="list-style-type: none">a. Between 5,000 and 10,000 km²b. Within 30 km of riverc. Within 20 km from a townd. Contains a combination of forest and agriculturee. Excludes indigenous lands

Thank you for your time and effort in helping the country of Brazil to select the best location for our new Biodiversity Preserve. We know that many factors will need to be considered, and we appreciate your help.

Sincerely,

Dilma Rousseff

Dilma Rousseff
President of Brazil



People and Wildlife in the Amazon

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Student Worksheet #1

1. Check which type of area you are creating.

- ☐ Wilderness Area
- ☐ Multi-Use Area

2. Open the ArcGIS.com map.

You can find it at: <http://bit.ly/1jS199r>

The screenshot shows the 'Amazon Unit Map' interface in ArcGIS.com. The map displays the Amazon basin region with various colored overlays representing different units. Annotations with blue arrows point to specific features:

- Add Features:** Points to the 'Add' button in the top toolbar.
- Table of Contents:** Points to the 'Contents' panel on the left side of the map.
- Legend:** Points to the 'Legend' button in the top toolbar.
- Measure Tool:** Points to the 'Measure' button in the top toolbar.

The 'Contents' panel on the left lists various layers with checkboxes:

- ☒ Brazil Outline
- ☒ Cities
- ☐ Roads
- ☐ Airports
- ☒ Rivers
- ☐ Ecoregions
- ☒ Biodiversity Threat Level
- ☐ Amphibian Species Richness
- ☐ Reptile Species Richness
- ☐ Bird Species Richness
- ☐ Mammal Species Richness
- ☐ Mines
- ☐ Oil and Gas Wells
- ☐ Topographic

The map shows the Amazon basin with labels for countries like Colombia, Guyana, Suriname, Peru, and Brazil, and major rivers like the Amazon and Rio Negro. A scale bar at the bottom indicates 0, 200, and 400 km.



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- 3. Review the various GIS data layers.** Some data layers may be more helpful to you than others. Explore each layer and explain whether or not it will be useful in helping you to choose a site. Be sure to examine the data thoroughly.

Data Layer	Explore the Data	Will this data layer help you locate a good site? Why or why not?	
Cities	Turn on and off (check and uncheck) the Cities layer in the Table of Contents . You can click on the city to see its population size.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Major Roads	Use the Measure tool to measure the length of the longest road.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Major Rivers	Click on a river to see its name and its length.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Airports	Turn on both the cities and the airport layers to see how many airports are outside of the major cities.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Ecoregions	Click on each colored region to identify the type of habitat in various ecoregions. You can also click on the Legend icon on the left to reveal which color corresponds to which ecoregion.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Biodiversity Threat Level	Click on the Legend icon on the left to reveal which color corresponds to which threat level. You can also click on each region to identify the name, area and threat level of each individual region.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	
Species Richness	Turn on each of the species richness layers to see whether species richness varies across the Amazon.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe	



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Student Worksheet #2

1) Prioritize your criteria.

- a. Which data layers are going to be most important in your analysis? Remember to look back at the minimum criteria for your area (on the letter), and also consider what additional types of data might be important to your site selection.
 - In each row of the table below, **check one column** to note how that data layer relates to your preserve site.
 - Decide which 4 data layers will be most important in your site selection. **Rank these layers 1 through 4**, with 1 indicating the most important layer in siting your preserve. Be sure to consider both people and wildlife.
 - Use the **measure tool** at the top of the page to determine distances.

Data Layer		Relationship to Preserve Site				Rank
		Should be close to the preserve	Should be far from the preserve	Preserve should exclude	Preserve should include	
Cities						
Major Rivers						
Major Roads						
Airports						
Biodiversity Threat Level	High					
	Medium					
	Low					
Species Richness	Amphibians					
	Animals					
	Mammals					
	Reptiles					

- b. Explain your data layer rankings in terms of decisions you made about opportunities for people and protection for wildlife.



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Student Worksheet #3

1. Explore your map

- Identify two specific locations for your preserve. Each of them should be from 5000-10,000 km² in size.
- Think carefully about finding locations that meet all of the criteria.

2. Draw your possible preserves.

- You can show the proposed location for each site by drawing a polygon within the map for each of your proposed areas:
 - Click on the **Add** button.
 - Click on "Add Map Note". Wait for the **Add Feature** options to appear.
 - Click on the feature you want to add.
 - Click on the map to draw your feature. Double click to complete.
 - You can measure the size of your line or polygon with the **Measure** tool.

3. Characterize your sites:

First Possible Site (Site #1)

- Ecoregion: _____
- Area in square kilometers: _____
- Area in football fields: _____
(A football field about 5 km).
- Perimeter in kilometers: _____
- Species Richness: _____
- In the table below, check off each of the criteria met by this area. Remember that in order for your area to be selected by the Brazilian Government, it would be good to consider other factors as well.

Put a check next to the type of preserve you are focusing on.

<input type="checkbox"/> Wilderness Area	<input type="checkbox"/> Multi-Use Area
a. Between 5,000 and 10,000 km ² b. Within 30 km of a river c. At least 50 km from any roads d. At least 30 km degraded areas e. At least 30 km agriculture areas f. At least 30 km away from cities g. Excludes indigenous lands	a. Between 5,000 and 10,000 km ² b. Within 30 km of river c. Within 20 km from a town d. Contains a combination of forest and agriculture e. Excludes indigenous lands



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Second Possible Site (Site #2)

1. Ecoregion(s): _____
2. Area in square kilometers: _____
3. Area in football fields: _____
(A football field is ~110 meters long and ~49 meters wide).
4. Perimeter in kilometers: _____
5. Species Richness: _____
6. In the table below, check off each of the criteria met by this area. Remember that in order for your area to be selected by the Brazilian Government it would be good to consider other factors as well.

Put a check next to the type of preserve you are focusing on.

<input type="checkbox"/> Wilderness Area	<input type="checkbox"/> Multi-Use Area
a. Between 5,000 and 10,000 km ²	a. Between 5,000 and 10,000 km ²
b. Within 30 km of a river	b. Within 30 km of river
c. At least 50 km from any roads	c. Within 20 km from a town
d. At least 30 km degraded areas	d. Contains a combination of forest and agriculture
e. At least 30 km agriculture areas	e. Excludes indigenous lands
f. At least 30 km away from cities	
g. Excludes indigenous lands	



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4. Compare your possible two sites using the table below. Identify at least two advantages and disadvantages for each site.

	Advantages	Disadvantages
Site #1	<div>1.</div> <div>2.</div>	<div>1.</div> <div>2.</div>

	Advantages	Disadvantages
Site #2	<div>3.</div> <div>4.</div>	<div>3.</div> <div>4.</div>



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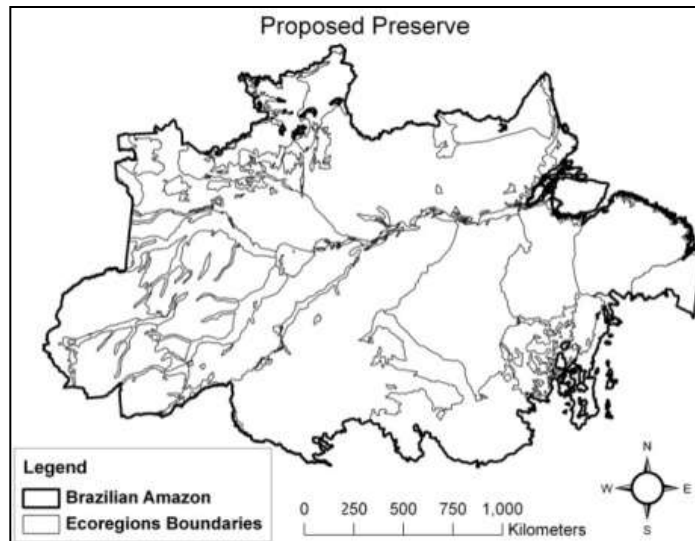
Date: _____

Student Worksheet #4

Instructions: Work with your group members to complete the entire worksheet.

1. Make a recommendation to the Brazilian Government.

- a. Which of your two sites do you recommend that the Brazilian Government select?
- b. Draw a polygon to show the location of your proposed site on the map below.



- c. What is your strongest argument for why your site should be accepted by the Brazilian Government? Be sure to consider the data you used.

2. Make your presentation.

- a. Create one map that shows where your preserve is within the Brazilian Amazon and at least one map that illustrates the most important data layers that helped you make your decision.
- b. Create your wiki. Your wiki must include:
 - At least 2 or 3 maps
 - Description of your preserve
 - Your answer to 1b