Finding a Piece of Quiet

Comparing Ecotourism in Iceland and the Galápagos

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Target Audience: High School   Time Required: 45-50 minutes

Activity: What effect does geographic location have on tourism to a location? How can countries support economic growth through tourism and limit resulting environmental degradation?

Geography Education National Implementation Project Standards:
14.1: Human modifications of the physical environment can have significant global impacts.
14.3: People can either mitigate and/or adapt to the consequences of human modifications of the physical environment.
17.2: The causes and processes of change in the geographic characteristics and spatial organization of places, regions, and environments over time

Learning Outcomes: Be able to explain the effect of geographic proximity to the development of tourism and the potentially detrimental ecological effects on a fragile ecosystem.
Be able to explain how economic factors contribute to the development of ecotourism markets and connections between places.

Map URL: https://arcg.is/0PGqvn

Ask: *What are the physical and human characteristics of ecotourism?*
? What is ecotourism? [Tourism to endangered/exotic natural areas with the intent to experience the natural environment and support conservation efforts]
? What areas of the world would you expect to experience ecotourism [*Answers will vary - eg. Amazon, Africa*]

⬧ Open the webmap using the link above.

⬧ Click on the **Bookmarks** option in the top bar on the right-hand side and select the *Galápagos Islands* bookmark.

? What types of geographic characteristics do you notice? [*Equator runs through them, few cities, many islands*]

⬧ Zoom in and out using the **+** and **-** buttons in the top left of the map.

? What are features about the Galápagos that become apparent at different scales? [*Off coast of South America, in Pacific Ocean, not close to anything*]

⬧ Click on the **Bookmarks** option in the top bar on the right-hand side and select the *Iceland* bookmark.

? What types of geographic characteristics do you notice about Iceland? [*One big island but lots of smaller islands, many fjords, close to Arctic Circle, going to be much colder than the Galápagos, still few cities*]

⬧ Zoom in and out using the **+** and **-** buttons in the top left of the map.

? What are features about Iceland that become apparent at different scales? [*Between Europe and North America, in the North Atlantic, close to Greenland*]

Acquire: *What role does physical location have on the number of tourists?*
? What factors are going to contribute to the number of tourists who visit an area? [*proximity, cost to travel to, daily costs once you are there, easy to travel to, promotional marketing*]
ℹ The World Bank lists the countries of China/Hong Kong, Germany, the United States, the United Kingdom, and the Russian Federation as the source of the most international departures for tourism in 2018

⬧ Use the **Measure** tool located in the top right of the tool bar, to measure the distance from the major city or capital of each of the places in the World Bank's list to the Galápagos and then also to Iceland (to Reykjavik)
? Which tourism location (Iceland or the Galápagos) location is closest to all of the top tourism departure points? [*Iceland*]
ℹ The distance lines curve due to the "great circle" and the fact that our planet is spherical

? Based on this information which location would you expect to have more difficulty attracting tourists? [*Galápagos*]

⬧ Change the basemap to **Dark Gray Canvas** by selecting the **Basemap** option along the top bar

♦ Turn on the layers *Top 20 Tourists to the Galápagos (2017)*, *Top 20 Visitors through Keflavik Airport (2019)*, and *Popular Flight Routes* by clicking the check boxes next to each of the layers in the **Content** menu.
? Click on some of the different icons that come up to determine the top 3 countries who send visitors to Iceland [*USA, UK, Germany*] and the Galápagos [*USA, Ecuador, UK*]
? IcelandAir offers an option for passengers flying from Europe to North America to extend their layover in Iceland for up to seven days. Why would a similar program not be an option for the Galápagos? [*There are many flights going between Europe and North America so there is more likelihood that passengers will want to take advantage of that, the only flights to the Galápagos are through the Ecuador mainland*]

Explore: *What is the connection between economic development and ecotourism?*
? What are some trends you notice about the main groups of tourists going to Iceland vs. the groups going to the Galápagos? [*Galápagos is visited by more people from the Southern Hemisphere, Europe and North America. Iceland Receives visitors from Mostly Europe, North America, East Asia and Australia.*]
? What types of goods, services, and infrastructure does a country need to support tourism? [*Roads, paths in parks, park rangers, hotels, airports and transportation networks, food services*]

♦ Turn off all of the layers currently on in the **Content** menu.

♦ Sign in to ArcGIS by selecting the option in the top right corner of the map screen

♦ Add the layer *Gross National Income by country, 2014* from the Living Atlas. Instructions for adding layers from the living atlas are located in the How To box at the top of the next page

♦ Explore the Gross National Income (GNI) of different countries by clicking on them on the map. Use the search bar in the upper-right side of the map to search specific countries
? What was the GNI of Iceland in 2014? [*$42,530*]
? What was the GNI of Ecuador in 2014? [*$11,170*]
? Which country is going to better be able to build infrastructure to handle large amounts of tourists? [*Iceland*]
? Why is GNI a good indicator for Ecotourism? [*People with higher incomes are more likely going to be able to travel internationally to visit hard to reach places*]

Analyze: *What are the spatial relationships between Ecotourism sites and other locations?*
ℹ️ Instead of using the measurement tool ArcGIS has geospatial analysis tools to increase speed and accuracy of spatial analysis

♦ Add a filter to the GNI layer by hovering your mouse over the layer's name in the **Content** menu and selecting the **Filter** option.

♦ Edit the Filter already in place and Add the expression **Gross National Income per Capita, PPP is greater than 30,000** and then choose the option to **Apply Filter**.

♦ Follow the directions in the How to box on the next page to perform a **Centroid Analysis** for the filtered Gross National Income by country, 2014 layer. Name your new Layer GNI_Centroid_YourName

♦ Once it is completed, turn off the *Gross National Income by country, 2014* layer in the **Content** menu.
? Just based on visual analysis, what percentage of centroids appear closer to Iceland than the Galápagos?
[*Answers will vary, but expect students to be somewhere between 75-90%*]

♦ Add pins to the Galápagos Islands and Iceland by selecting the **Add** option along the top bar and choosing the **Add Map Notes** option from the drop-down menu. Title the new layer *Ecotourism Sites*. Center on Iceland by typing it into the search bar in the top right. Place a pushpin as close to the center of the country as possible and title the pin Iceland. Follow the same steps to place a pin in the Galápagos Islands.

♦ To do a proximity analysis, open up the **Analysis** menu and expand the **Use Proximity** option in the top bar. Select the **Find Nearest** option from the drop-down menu. Make sure that your *GNI_Centroid_YourName* layer is selected for option on and your *Ecotourism Sites (Points)* layer is selected for **option 2**. Keep the limit to 1 nearest location for **option 4** but deselect the checkbox that limits the search range. Change the resulting layer name to Closest_Ecotourism_Site_YourName. Before running the analysis uncheck the **Use current map extent** box then select **Run Analysis**.
? What is the only country' centroid that is closer to the Galápagos than to Iceland? [*Australia's*]

Act: *How can geospatial data be used to make decisions?*

? Given the geographic data, what are some things that Ecuador can do to increase tourism to the Galápagos? [*answers will vary but should be along the lines of - subsidize flights, increase marketing to countries with high GNIs but low tourism counts, increase number of tour company licenses to increase competition and lower prices*]

? Why might the Galápagos not want to increase tourism? [*answers will vary but should be along the lines of - would require expansion of expensive infrastructure, increasing shipments of supplies to Galápagos to support, desire to protect pristine places by limiting access*]

? How can Iceland work to protect the environment while still supporting tourism? [Answers will vary but should be along the lines of - Increase entrance fees or imposing visitor quotas, increased investment into tourism infrastructure to support large numbers of tourists, allow periods of time for parks to restore themselves]

? How can individuals use Ecotourism to support conservation of the world's pristine locations? [Answers will vary but should be along the lines of - Tourism dollars support conservation efforts, raise awareness and fosters environmental empathy]

How To Boxes

Adding a Layer from the Living Atlas

- Open up the drop-down menu by selecting the **Add** option along the top bar
- Select the **Browse Living Atlas Layers** option to search layers in the Living Atlas
- Type in keywords of the type of information you are looking for into the search bar to bring up authoritative layers related to the topic

Create Centroids for Areas

- Open up the Analysis menu in the top bar
- Open the **Find Locations** drop down and then select the **Find Centroids** option
- Select the appropriate layer you want to perform the analysis on for option 1
- Change the resulting layer name to something you can easily identify
- Mind the Use current map extent box

Necessary Vocabulary:

Commercial Tourism: Visiting new places for the purpose of leisure. Encouraged by businesses for the influx of money from outside sources.

Ecotourism: Tourism to endangered/exotic natural areas with the intent to experience the natural environment and support conservation efforts.

Great Circle: Shortest distance to travel between two points on a spherical planet.

Gross National Income (GNI): The total amount of money earned by the population of an area. Calculated by combining Gross Domestic Product (GDP) and foreign income, and then dividing that by the population (known as *per capita*).

Next Steps:

- Build your final map into a Story Map App and make an informative presentation about Ecotourism using the Galápagos and Iceland as an example
- Do some research on another Ecotourism site and see how it compares to the Galápagos and Iceland

References:

- Ministry of the Environment (Ecuador)(2017), *Annual Report 2017: Visitors to the protected areas of the Galápagos*, accessed Mar. 28, 2020, http://www.Galápagos.gob.ec/wp-content/uploads/downloads/2018/02/informe_visitantes_anual_2017.pdf
- Statistics Iceland (2020), *Passangers through Keflavik airport by citizenship and month 2002-2020*, Data Table, accessed Mar. 28, 2020. http://px.hagstofa.is/pxen/pxweb/en/Atvinnuvegir/Atvinnuvegir__ferdathjonusta__farthegar/SAM02001.px/?rxid=9317761e-0146-470a-afbf-f0bd5f408a76
- World Bank (2018), *"International Tourism, Number of departures,"* World Bank Open Data, Accessed Apr 1, 2020, from https://data.worldbank.org/indicator/ST.INT.DPRt

Finished Map Example URL: https://arcg.is/04uOLz