



# Ecological Biogeography

## Biogeographic Geoinquiry

Name: \_\_\_\_\_

Section: \_\_\_\_\_

Score: \_\_\_\_ / 30

Directions: Using ArcGIS you will be working through the inquiry learning framework to identify and analyze an issue related to a species or topic of your choice. Work through the geoinquiry process to identify and address a geographic question which you will work through the process of collecting data, visualizing your information in an easily readable format, and coming up with a course of action to address the issue.

### Geoinquiry Process

Ask – Develop a geographic question

Acquire – Collect data on question

Organize – Visualize data in easily readable format

Analyze – Compare spatial patterns in data

Answer and Act – Come to a conclusion and decide course of action

### Ask: Formulating a Geographic Question

Directions: Come up with a question regarding your topic that you can answer through the collection of geographic data and analyzing geographic features such as human-environment interactions, place (human and natural characteristics), region (specialized factors related to its physical location in relation to things around it)

Geographic Questions:

- At the root geographic questions are formulated around the ideas of “**where?**” and “**why there?**”
- A geographic question begins a series of inquiry which the student can use as a way to inform an investigation with a degree of analysis
  - o Often can have multiple answers and explanations
  - o Not a simplistic yes or no answer
  - o Needs to be something where data can be collected that will prove or disprove a hypothesis

### Suggestions for formulating a Geographic Question

Analyzes an issue and constructs geographic questions that inform a geographic investigation, as exemplified by

- Analyzing digital and paper maps of a place or thematic topic and constructing geographic questions to investigate the issue.
- Analyzing current trends in population and constructing geographic questions to investigate the sources and future projections of the trends.
- Analyzing a current news report and constructing geographic questions that would provide a geographic focus to the study or resolution of the topic or issue.

### Assignment Part 1: Ask

Topic Selection: \_\_\_\_\_

*(Reminder – Selections need to be related to Biogeography and the distribution of life on the planet)*

Draft Inquiry Question: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Justification: How does your research topic fall under the realm of biogeographic study? \_\_\_\_\_

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Hypothesis/Thesis Statement: What do you think you are going to learn/prove about the distribution of your particular species/groupings as a result of conducting this research?

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Data Methods: Where do you foresee being able to find data and information regarding your topic? Come up with 5 solid (reputable, accessible) sources (Internet sources include url)

Source 1: \_\_\_\_\_

Source 2: \_\_\_\_\_

Source 3: \_\_\_\_\_

Source 4: \_\_\_\_\_

Source 5: \_\_\_\_\_

Small Group Review: Share your draft with two different people in order to gain their feedback about your research question and justification. Record two pieces of positive (constructive) feedback in the + column, and two pieces of constructive suggestions on what to change in the  $\Delta$  column.

+	$\Delta$
1.	1.
2.	2.
3.	3.
4.	4.

Reflection: Does the research question meet the following criteria?

Potential for exploration and analysis beyond “yes” or “no”?	Y	N		
Relevant to the understanding of past, present, or future trends of distribution?			Y	N
Is the question supported by a scientifically valid hypothesis?			Y	N
Problem is stated clearly?	Y	N		

Final Geoinquiry Question: Write your revised inquiry question after edits \_\_\_\_\_

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## Acquire: Gather your Information

Directions: Use your data sources (and others) to find the following pieces of information that you will later organize as a story map presentation using ArcGIS.

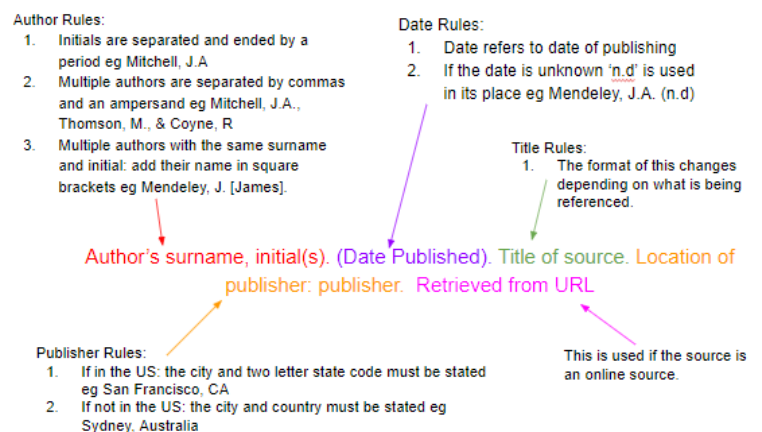
*Hint: In data phase you are not getting into phase of persuading reader of how to think yet, you are presenting data and allowing reader to begin making some of their own conclusions*

*Hint: Some of the pieces below will not apply to all topics or species covered – these are dealt with on a case-by-case basis*

Species	Topic
<p><b>Demographic Information:</b></p> <ul style="list-style-type: none"> <li>- Map: Species Range</li> <li>- Cladogram or Panbiogeographic Analysis of Species Family</li> <li>- Endangered status – and trends</li> <li>- Description of physical landscape of habitat               <ul style="list-style-type: none"> <li>o Adaptations by animal to fit habitat                   <ul style="list-style-type: none"> <li>▪ Special emphasis if animal is island species</li> </ul> </li> <li>o Connection to Biome and climate</li> </ul> </li> <li>- Relationships to ancestral biota               <ul style="list-style-type: none"> <li>o Role within ecosystem</li> <li>o Place within food web</li> </ul> </li> </ul> <p><b>Discussion:</b></p> <ul style="list-style-type: none"> <li>- Means of Distribution               <ul style="list-style-type: none"> <li>o Dispersal or Vicariance? (Hint- Fossil Records)</li> </ul> </li> <li>- Impact of human presence on species</li> <li>- Impact of invasive species to habitat if any</li> <li>- Range Distribution – Endemism or Cosmopolitanism, reasoning (ex. What prevents species from extending range?)</li> <li>- Impact of outside physical forces on species (eg. Fire, glaciers, extinction of other species)</li> <li>- Any other data bits relevant to geoinquiry question (Make sure causes and effects addressed)</li> </ul>	<p><b>Topic Information:</b></p> <ul style="list-style-type: none"> <li>- Map of areas impacted</li> <li>- Key species impacted by issue               <ul style="list-style-type: none"> <li>o Find keystone species and Map Range</li> <li>o Identify key endangered species and trends</li> </ul> </li> <li>- Description of physical landscape impacted               <ul style="list-style-type: none"> <li>o Changes in physical landscapes already</li> <li>o Changes in relationships between biota to landscape</li> </ul> </li> <li>- Indicators or symptoms of the effects of issue</li> <li>- Human systems being affected</li> </ul> <p><b>Discussion:</b></p> <ul style="list-style-type: none"> <li>- Potential negative effects if issue unaddressed               <ul style="list-style-type: none"> <li>o Further changes to physical landscape</li> <li>o Further changes to biota</li> </ul> </li> <li>- Potential Tropic Effects of changes to landscape as a result</li> <li>- Physical causes of Issue</li> <li>- Anthropogenic causes</li> <li>- Any other data bits relevant to geoinquiry</li> </ul>

### Needs:

- At least two interactive maps to relate to topic
- A minimum of 5 visuals that relate to topic
- Bibliography in APA format (As many sources as you use)
- **As much information needed to build up informed support to geoinquiry question – Enough to show it is a real problem**
- Past, Present, Future



## Organize: Put the Pieces Together

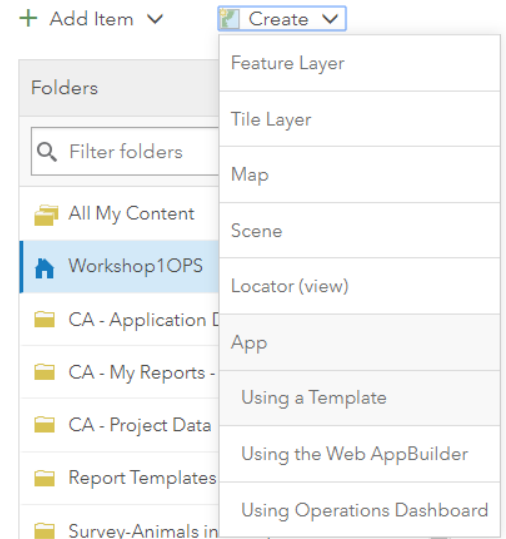
Directions: Build up an informative story map where you are able to organize

Create Your first map in ArcGIS and save it in a spot where you can easily find it with a title that signifies your ownership.

In the Content section of ArcGIS select that you want to **Create an App Using a Template.**

You can select a style of story map, look through the options but I would suggest a **Story Map Journal** or **Story Map Series.**

Use the template to add your information in an organized manner that will make it so that you can easily present your topic in front of the group, or allow people to learn about your topic just from interacting with your story map.



## Analyze: What are Areas of Concern

Directions: Work through both of the Primary Analysis questions below that are spatially based and one of the Secondary Analysis questions of your choice. Each one should be addressed in about 250 words (2 Primary Analysis and 1 Secondary Analysis for total of about 7500 words or 1 ½ pages)

**Primary Analysis** (Suggestions – look at organizations involved, where they are involved, identify countries/states that may be areas of concern) *Address both questions*

- What is being done where? What more needs to be done?
- Which areas are the areas of most concern and why?

**Secondary Analysis** (Suggestions – for this you will be examining the research specifically that is being done with your topic and looking for quality or deficiencies) *Choose one question or a different one of your choosing*

- Analyze the counter-arguments to your topic that try to explain why it is not an issue.
- Reliability of information and further research needed
- Gaps in understanding about topic

## Act: Action Plan

Directions: Work through and formulate an action plan how you can use the information from your research to address the issue and create positive change.

Potential Action Plans: The following are suggestions which you can work with depending on the format of your research

- Social Media Awareness Campaign
- Public Official Letter Writing
- Holding a public presentation/forum
- Meeting with business officials
- Organize a citizen science project

Goal: What do you hope to achieve with your action plan? – Goal should be attainable, measurable, and related to purpose of research

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Plan: Highlight your strategy for how you are going to build up your research through developing your action plan. Your plan should include the How? What? When? Where? Why? And Who? Of how you are going to share/extend your research and use it to address the problem at hand.

Reflection: Does your action plan meet the following criteria

Is your action plan based on the information collected in your research?	Y	N
Does your action plan inform or involve others beside yourself?	Y	N
Does your action plan have a clearly defined goal?	Y	N

Biogeographic Geoinquiry						
Score (Level Achieved)	Visuals	Information	Embedded Map	General Design	Questions	Productivity
0 (Not Shown)	No additional visuals added to Story Map	No informative text added to Story Map	No evidence of attempt to complete map	No attempt to make an Story Map about the topic	Less than 25% of questions attempted, or completed correctly.	Project not completed
1 (Attempted)	Some visuals added, but less than the required number or some visuals do not connect to the objective	Some informative text added to expedition, but more needed to properly address objectives	Map construction is attempted, but is missing data layers, or is unreadable	Story Map started, but missing large amounts of information. Lack of organization makes Story Map confusing	Most questions attempted, but more than half are incomplete or incorrect	Project attempted, but far from complete before given deadline.
2 (Basic)	Required number of visuals added, but some do not connect to the ideas of the Story Map or lack captions	All questions answered, but some answered more completely than others. Some answers lack clarity or depth	All of the elements of the map are present, but have not been refined making data difficult to read.	Most Story Map elements present, but organizational or design errors make Story Map goals hard to understand	More than half of questions are completed and correct, but lack depth of understanding and analysis	Project not completed by the required deadline. Worktime not well utilized resulting in needing extra time
3 (Acceptable)	Proper amount and use of visuals, but some small errors in captions or explanations	Informative text is clear and helpful in understanding objective. Sources cited where necessary. Some errors in grammar or missing information	Evidence in effort to display data. All data sets are clear and understandable. Still some small errors, such as layer order, transparency, pop-ups, or symbology.	Story Map contains all of the necessary elements, but edits needed in content, visuals, explanations, or organization	All questions completed and most questions answered correctly. Only a few questions lack full analysis.	Project mostly completed, with some errors present requiring resubmission. Work time well utilized.
4 (Advanced)	All visuals added with clear understanding of how they connect to objective without errors	All objectives clearly and professionally met by thorough informative text	Map contains all data in clean, easy to read format. Clear attention to details of making a professional map.	Story Map is well done and professional. All elements are present and well organized.	All questions are completed correctly and show clear comprehension of concepts	Project fully completed on, or before, given timeframe. Worktime well utilized with clear regards to deadline.