Endangered Species

RFP Research Folio

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

 **Period: \_\_\_\_\_\_\_**

 **Species: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Vocabulary:
Population**: A group of organisms of the same species in the same location at the same time.
**Community**: All of the different species in one ecosystem
​**Ecosystem**: All of the biotic (living) and abiotic (chemical/physical) factors in one location.
**Biome**: An area with a similar temperature, rainfall, altitude, and latitude (ex: Savannah, Boreal Forest, Jungle)
**Abiotic**: Physical and Chemical Nonliving factors that affect organisms in ecosystems.  Ex: Water, sunlight, Soil, Salinity, pH
**Biotic**: Living Factors that affect organisms in ecosystems
Ex: All living things (competitors, predators, bacteria/disease, keystone species)
**Biodiversity**: The variety of species in an ecosystem. Measured by species richness and species abundance, genetic diversity and ecosystem complexity
**Species Richness**: The number of different species in an ecosystem.

Ex: Sparrows=20 Chickadees=15 Swallows=0 Juncos=20    Species Richness= 3 (3 different species)
**Species Abundance**: The number of individuals of each species in an ecosystem.   Ex: Sparrows=20 Chickadees=15  Swallows=0 Juncos=20    Species Abundance= 55 (add up all the individual birds)
**Ecosystem Services:**A way to give a "value" to what the ecosystem does for us...ex: clean water, preventing flooding, filtering water, pollination of crops, providing resources such as timber, and a place for enjoyment.
**Categories of Ecosystem Services:
Cultural:**Recreation, Heritage Values, Beauty, Spiritual Experience
**Provisioning (provides):**Food, Medicine, Timber, Energy resources, clothing materials
**Regulating (controls):**Air and water purification, pollination, temperature control, ​Erosion, Soil quality
**Supporting Services:**Water cycle, carbon cycle, photosynthesis (plant growth), Soil formation, biodiversity
**Population Vocabulary:**

**Population Density**: The number of individuals/unit area
**Population Distribution**: How the organisms are spread out
-**Clumped Distribution**(herds, flocks, schools of fish, colonies of ants, etc)
-**Uniform Distribution** (Pine trees in Boreal forest, Penguins, solitary species with large territories- polar bear)
-**Random Distribution**- Dandelions (plants whose seeds are distributed by the wind)
**Sex Ratio:** Number of males to females in a population. (Some populations the males are killed off at a higher rate and the population has more females. Some populations the numbers are more even)
**Ways to Measure/Estimate Populations:**
**Quadrat**: Method used for counting **small/medium sized plants or small animals w/ limited mobility**. Throw a square randomly in the area you are studying and count all of the organisms in the population in that square. Repeat at different random spots throughout the area and use those numbers to estimate the population.
**Mark and Recapture:**Method used for counting **animals**. Capture/Collect animals and tag them. Make a count of the original population that you tagged. Release the animals. Later on come back and recapture the animals again. Compare the number that are tagged to the number that are not tagged to get an estimate of the population.
**Transect**: Method used to see how a population changes along a line or to measure large plants such as trees or organisms that live in trees. Use a string to mark a line and count all of the organisms of the population within a certain distance of the string.

**Population Growth**
**Limiting Factors**: Biotic and Abiotic factors that keep a population from growing exponentially.
**Biotic Limiting Factors**: Competitors, # of Producers, # of Predators, Disease causing bacteria/parasites, # of decomposers
**Abiotic Limiting Factors:** Space, Sunlight, Rainfall, Water, Temperature, Natural Disasters, Soil Conditions,
**Exponential Growth:** Known as a J-curve because it is shaped like a J (or parabola) on a graph. This happens where there are no/few limiting factors acting on a population. All of the babies survive and reproduce. Unlimited food and few/no predators.
**Carrying Capacity:**The maximum sustained size of a population that the ecosystem can support. Shown as the flat portion of the graph at the top.
**Density Dependent Factors**: Factors that are determined by the number of organisms in the population (# of competitors, predation, disease)
**Density Independent Factors:** Factors that are NOT determined by the number of organisms in the population. (Temperature, Natural Disasters, Pollution, Fire)
**Cooperative Behavior:**  Individuals in a species working together for a specific purpose that benefit the individuals and the group. Ex: Hunting, Migration, Swarming
**Group Behavior**:  Individuals in a species gathering together without a specific purpose. Still has benefits for safety and reproduction.  Ex: Herding, Schooling, Flocking, Brooding
**FOOD WEB VOCABULARY**

 **Food Web**: Made up of multiple food chains. Shows relationships among organisms
**Producer**: Makes its own food (in its cells) through photosynthesis or chemosynthesis. Ex: Plants and some bacteria
**Consumer**: Eats another organism Ex: Herbivore, Carnivore or Omnivore (heterotrophs)
​**Secondary Consumer**: Eats Primary Consumers Ex: Praying Mantis which eats a fly which eats nectar.
​**Tertiary Consumer**: Eats Secondary Consumer Ex: Hawk which eats a snake which eats a mouse which eats a seed​

**Decomposers**: Organisms that break down other organisms when they die and recycle the atoms (matter) to be used again. Ex: Fungus and Bacteria
**Detritus**: Bodies or fragments of dead organisms or waste from organisms
**Trophic Level**: Feeding Level of an Organism Ex: Producer, Primary Consumer, Secondary Consumer, Tertiary Consumer
​**Carnivore**: Organisms that eat animals
**Herbivore**: Organisms that eat plants
**Omnivore**: Organisms that eat both plants and animals
**Autotroph**: Producers (make their own food)
**Heterotroph**: Organisms that consume other organisms to survive
​**Primary Consumer**: Eats Producers Ex: Herbivore- Chicken which eats seeds
**Quaternary Consumer**: Eats a Tertiary Consumer Ex: Burmese Python which eats an alligator which eats a bird, which eats a fish which eats algae
**Scavenger**: An organism that eats dead/decaying matter that it didn't kill.
**Energy Pyramid**: Most energy is found in the producers (at the bottom). Only 10% of energy is transferred up to the next level. 90% of the energy is lost at each level as heat or indigestible materials.
**Food Chain**: Shows the flow of energy through different trophic levels
**Keystone species**: A species who plays an important role in an ecosystem. Without them many other species in the ecosystem are affected.



**Succession**: How the living parts of an ecosystem change after a disaster. Organisms come back (smallest to largest). Lichens, Mosses, Grasses, Shrubs, Trees. Animals come back as their niches become available.  Ex: How an ecosystem rebounds after a fire or a lava flow....or how an ecosystem changes when a lake dries up and becomes a terrestrial habitat instead of aquatic
**Primary Succession**- Starts on rock. Starts with lichens. Ex: After a lava flow
**Secondary Succession**- Starts on soil. Ex: After a fire
**Pioneer Species**: The first species to repopulate after a disaster. Lichens/mosses
**Climax Community**: An established ecosystem that is no longer undergoing succession.
​
**How humans disrupt ecosystems**: Combustion of fossil fuels, Pesticides and fertilizers, Over hunting and Over fishing, Deforestation, Urbanization, Habitat destruction, Pollution, Invasive Species
**Native Species**: Native species have been established in the food web for a long period of time.
**Invasive Species**: A species that is from another ecosystem and does not have an established niche in the new ecosystem. This species takes over the role of an organism in the native ecosystem. It is harmful to the ecosystem. Invasive species typically reproduce quickly, have few/no predators, eat a large variety of food and are "generalists".
**Nonnative species:** A species that is from a different ecosystem but is not harmful to the new ecosystem. It increases the biodiversity of the new ecosystem and has predators in the new ecosystem. (fills unoccupied niche)
**Niche**: The role of an organism in its environment (including what it eats, where it makes its home, where it lays eggs). Organisms with overlapping Niches compete with each other for resources.
**Niche Partitioning**: The idea that multiple species can live in similar areas and eat similar things if they eat at different times, live in different spots, eat in different ways, eat different parts of a plant.
**Competitive Exclusion Principle: No two species can occupy the same niche at the same time.**

**Step 1: Species Research**

1. Name of the Species you are researching for this project: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Current Threat Level: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Taxonomy of this species: Kingdom: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Phylum: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Order: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Family:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Genus:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Species: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Describe the habitat where this species lives: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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5. Where in the world does this species still live in the wild? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Why are the major threats to this species? (Why is it endangered?)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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7. In which biome is your species found? (Tropical Rainforest, Temperate Forest, Desert, Tundra, Taiga, Grassland, Savanna, Freshwater, Marine) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Citations: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Biodiversity of Earth’s Biomes**

1. Go to [Biome Viewer](https://www.hhmi.org/biointeractive/biomeviewer) (on weebly)
2. **Choose the biome that your species is found in and attempt to click on a location close to where your species is still found in the wild.**
	1. What biome did you select? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. What specific location did you select? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. What is the latitude and longitude of your location? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Use the flat map view and change to the anthrome layer. Select the year 2000.**

1. **Select the point in your biome with the highest level of human disturbance**. List the Anthromes at this location for each of these years:

1700: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1800: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1900: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2000: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Briefly summarize how humans have impacted the environment at this location over time.
2. At this location, record the following:

Anthrome (year 2000): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Species Richness: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Species NOT listed as “Least Concern”: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Now select the point in your biome with the lowest level of human disturbance.** Ideally, it should be a wilderness area, but as close as possible to the last location. Record the following:

Anthrome: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Species Richness: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Species NOT listed as “Least Concern”: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Summarize the differences in species richness and IUCN status of species between the two locations**. Make a claim for how human disturbance could have impacted biodiversity in your biome. Support your claim with evidence.

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1. Click “More” (indicated by an “i” in the lower left of the screen on the biome information)
	1. Describe the annual precipitation and temperature of this location.

		1. Precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		2. Temperature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Click on “Description” tab
	1. What grows in this location?

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1. Click on “Wild Life” tab
	1. Select EITHER Amphibian, Reptile OR Mammal
	2. Click on the “...” next to “Threat Level Filter”
		1. **Unselect “Least Concerned”**

Are there any other species that are endangered in the area where your species lives? \_\_\_\_\_\_

List the species (all types) that are endangered in this area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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****This image shows the various threat levels as determined by the International Union for Conservation of Nature and Natural Resources (IUCN).

**Step 2: Measuring and Analyzing Populations**

1. Name of Species: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the geographic range of your species? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What is the estimated world population of your species? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Based on the sampling techniques that we learned in class. How would you collect data to measure the population of your species? (Quadrat, Mark and Recapture, Transect, Trail Camera, Aerial Photography)
	1. Sampling Technique: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Why did you choose this technique? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Research and describe methods that ecologists are using to monitor the population of your species.

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1. How has your organisms population changed over time? Create a graph that includes at least 5 data points. If you don’t have exact numbers then at least draw the shape of the line that shows how the population has changed.
2. Explain why a population cannot grow indefinitely. Use the following terms in your response: *abiotic, biotic, population growth, limiting factor, carrying capacity*

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8. Citations: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 3: Behaviors that Increase Fitness**

1. Describe the size of the group in which your species is normally found. (Is it solitary, found in small groups, found in herds?) (give the size range of the group if possible) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If your species is found in groups, describe the ways in which they interact? (Hunt together, provide protection to each other, raise young together, find food together….) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Describe the mating behaviors of this species. How do males attract females or vice versa? \_\_\_\_\_\_\_\_\_

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1. Describe the child rearing habits of your species. Does it take care of its young or just lay eggs and abandon them? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What environment is needed for laying eggs or bringing up young? (Does it need a nest, a den, lay eggs in the sand, territory to roam)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What are the biggest threats to your species in its natural environment? (Predators, competition for food, having enough food?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Describe how your species gets food. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Describe adaptations your species has to its environment that allow it to avoid predators and to capture food. (Fast, sharp claws, wings, small size, eating fast…) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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9. How do the group behaviors of this species enhance the species ability to survive and reproduce (fitness)?

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**Step 4: Flow of Energy- Food Web**

**Create a food web including your species and at least 5 other species. You must include at least 2 producers, 2 primary consumers, and 2 secondary consumers. Give as specific names of organisms as possible in your food web. (Don’t just say tree…say Oak Tree Leaves or Bark). Draw arrows between the organisms showing the flow of energy (away from the producers).**

 Food Web of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (name of endangered species)

1. What is the trophic level of your endangered species? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Identify all of the producers on your food web. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Identify all of the primary consumers on your food web. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Identify all of the secondary consumers on your food web. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What would happen to the ecosystem if the population of your endangered species DECREASED? (Be specific as to the changes in the other organisms)

6. What would happen to the ecosystem if of your endangered species INCREASED? (Be specific as to the changes in the other organisms)

**Step 5: Disturbances**

1. Describe the disturbance(s) to the organisms’ ecosystem.

 Such as natural disaster, disease, human activity, or invasive species.

Fill in the following information:

|  |  |  |
| --- | --- | --- |
| Describe the disturbance |  |  |
| Does this lead to succession? |  |  |
| Which type of succession? |  |  |
| How do you know? |  |  |
| What impact will this disturbance have on abiotic factors of your ecosystem? |  |  |
| What impact will this disturbance have the biotic factors of the ecosystem? |  |  |
| What impact will this disturbance have on your species? |  |  |

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| Citations: |