

Climate Change & Ecosystems Handout*Students research interrelationships in ecosystems and predict the effects of climate change.**Water Atlas Curriculum Lesson 32***Student Activity Sheet: Climate Change and Ecosystems**

The state Department of Natural Resources has asked your class to evaluate how climate change due to an enhanced greenhouse effect might impact an ecosystem in your state. In a previous activity your class identified the major components of the ecosystem you have chosen to study. Because the organisms in the ecosystem function in a complex web of interdependencies, your class will need more information to evaluate how climate change would affect the system as a whole.

Your task as a member of the climate impacts evaluation team is to describe in detail how the projected climate changes could impact one species in the ecosystem. You will present your findings to the class, and use this information and that of your teammates to construct “before” and “after” pictures of the ecosystem, using both text and illustrations.

In your research, try to consider all of the ways in which climate could impact your species, both directly and indirectly. The questions below will help you get started, but you may be able to identify other important relationships between your species and climate. Be creative!

My species is _____

Its place in the food web is (circle one):

Producer

Herbivore

Carnivore

Omnivore

Decomposer

Illustrate the function of this species in the ecosystem by sketching interrelationships with other organisms:

Climate can affect a species directly, for example by constraining organisms to areas within their temperature tolerances, or indirectly by affecting food supply, availability of shelter, or other factors necessary for survival. In order to determine how climate change might affect a particular species, scientists must first try to understand all of the ways in which present climate influences that species. Research the life cycle, habits, and physiological needs of your species in order to identify the ways in

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which climate affects it today. Use the following questions as a guide to get you started. List other questions that you think are important in the space provided below.

Life Cycle: What are the life stages of the species? When do changes from one stage to another take place? How is the species affected by the seasons? How does the species reproduce? When and how often does it breed?

Food: What are the nutritional needs of the species? What are its preferred foods? What are other food sources? What do the young eat? Is the food supply influenced by the seasons?

Shelter: Where does the species live in the ecosystem? Does it share this space with other species? What kind of shelter does it need for breeding/raising its young?

Predators/Disease: What species, if any, depend on this species for food (or parasitic/symbiotic relationships)? What diseases or pests affect this species? What conditions make the species susceptible to disease?

Competitors: What species compete with this species for food, shelter, or other needs? What if anything, maintains a balance among these competitors?

Other Important Factors:

Evaluating Climate Change Impacts:

Now that you have learned more about your species' life habits and needs, it's time to consider how global climate change might play a role in its future. Some scientific studies have suggested that climate change could change the distribution of species in an area because warmer temperatures would cause some species to shift their geographic ranges to cooler areas, either to higher latitudes or to higher elevations on mountain slopes. Other studies indicate that in areas where species are unable to move to accommodate changing climate conditions, for example, in places where their movement is blocked by large cities, population numbers could decline or local populations could become extinct. In fact, the impact of climate change on a species is likely to be complex because its survival is linked to many factors. You have identified some of the factors that are important to the survival of your species. Now look at the list of projected climate changes and evaluate how each of these changes might impact the species you studied. Use a table to characterize the impact as "little or no impact," "moderate impact," or "significant impact."

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Climate Change	Impact: (Little or None; Moderate; or Significant)	Nature of Impact: (e.g., range shift north, earlier egg-laying, fewer breeding sites)
Higher temperatures / More heat waves		
More heavy downpours		
Change in drought frequency/severity		
Heavier snowfalls		
Change in flooding frequency/severity		
Change in fire frequency/severity		
Sea level rise		
Polar Warming		

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