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Biology Article Assignment #4 – Fourth National Climate Assessment

Read Chapter 7 of the Fourth National Climate Assessment on Ecosystems, Ecosystem Services and Biodiversity at <https://nca2018.globalchange.gov/chapter/7/>

**Species and Populations**

1. Although some species can alter their behavior to adapt to changes in climate, why are scientists concerned about future generations of many species impacted by climate change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. Using Figure 7.2, describe the correlation between the genetic diversity of bullhead trout and the areas of the Columbia River watershed exposed to the greatest impacts of climate change. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. What is phenology and how are changes in phenology expected to alter food webs and migratory species? \_\_\_\_\_

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4. How are the ranges of certain species expected to change as a result of climate change? How does habitat fragmentation effect different species abilities to respond to climate change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Ecosystems**

 5. What affect is climate change expected to have on the spread of invasive species? How is the range of the invasive lionfish expected to change as a result of climate change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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6. How are species in higher trophic levels expected to be impacted by climate changes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Ecosystem Services**

7. How is climate change expected to impact fish stocks and corals reefs, which many humans depend on as an important food source? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Regional Summary** (use the interactive map of Figure 7.5 to answer questions 8 and 9)

8. Click on the southwest portion of the map. How has climate change affected the amount of area burned by wildfires between 1984 and 2015? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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9. Click on the Midwest portion of the map. How has climate change affected wolf and moose populations in the Isle Royale ecosystem? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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10. How have snowshoe hairs been affected by climate change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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11. How has the range expansion of many tropical herbivorous fishes impacted kelp forest ecosystems? \_\_\_\_\_\_\_\_\_

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12. How can the range expansion of many marine species impact their protections? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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13. What are assisted migration and genetic rescue and how are they used to help species buffer the changes brought about by climate change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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