# ECOSYSTEMS – Wolf Biodiversity in Yellowstone

**STANDARD/HS-LS2-2:** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.]

**RUBRIC:** demonstrates knowledge of factors affecting biodiversity ...

| | 4 – Exceeding | 3 – Meeting | 2 – Approaching | 1 – Beginning |
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| **STANDARD**/BIODIVERSITY | Complete all requirements for MEETING (3)<br>**AND…includes some combination of the following:**<br>○ Demonstrates understanding of *density independent factors*<br>○ Demonstrates deep understanding of connection between limiting factors and species diversity<br>○ Use of outside examples to support explanation | **Demonstrates understanding of the following:**<br>○ Distinguishes between ecosystem diversity, species diversity, and genetic diversity (*do NOT just use the word "diversity"*)<br>○ Identify limiting factors within an ecosystem<br>○ Identify short term and long term effects on population size<br>○ explains the cause and effect relationship between the changes in the biotic and abiotic factors | **Understanding shows inconsistencies:**<br>○ understanding of biodiversity but does not specify between ecosystem, species, and genetic diversity<br>○ identifies possible limiting factors within the ecosystem<br>○ inconsistently distinguishes between short term and long term effects on biodiversity or population growth<br>○ describes but doesn't explain the cause and effect between biotic and abiotic factors | **Understanding shows a lack of clarity:**<br>○ inconsistent or incorrect use or explanation of biodiversity<br>○ identifies unrelated limiting factors within the ecosystem<br>○ does not distinguish between short term and long term effects on biodiversity or population growth<br>○ does not make clear connections between biotic and abiotic factors |
| | • Use data to calculate a mathematical representation of trends within or between the groups | • Use data on the numbers & types of organisms represented<br>• Compare multiple data sets OR find mathematical trends in the data to support your answer | • State data on the numbers & types of organisms represented<br>• Compare 2 to 3 data sets OR find nonmathematical trends in the data to support your answer | • Use of data is implied but not stated directly (words like more, increased, etc.)<br>• States data points from one or more population without comparing |

Use evidence from the Wolf Case Study background and data to the following questions.

## *Assessment Questions*

1. List 5 biotic factors and 3 abiotic factors AND explains how each has an effect on the others. Using mathematical evidence (i.e. trends averages, etc), explain how the presence of wolves has affected the biodiversity in Yellowstone.

2. (a) Provide an *explanation* for the cause for the short-term slight drop in the wolf population from 2003–04 (Table 1) versus the cause of the significant long-term drop from 2007–11 (Table 1). Different situations would cause these wolf population numbers. (b) Provide an *alternate explanation.*

| **(a)** ***explanation*** | **(b)** ***alternate explanation*** |
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