

## Lab: Ripple Effect

(modified from International Wolf Center)

### Background:

Wolves constitute a major ecological force in ecosystems where they are present. Research continues to be conducted on wolf behavior, prey selection, the influence of prey on ecosystems, and the correlations between and among all ecosystem components. While the primary impact of one species on another (wolves killing prey) is comparatively easy to measure, the domino effect of multiple species affecting each other over time in varying weather conditions makes identifying secondary and tertiary effects more difficult to measure and therefore less certain. Proponents of wolf recovery often argue that wolves benefit their ecosystems. Science can establish that wolves have an impact, but the extent of the impact is largely unproven. Various studies demonstrate the wolf's influence on prey, such as deer, moose and elk. Other studies measure the influence of deer, moose and elk on vegetation. Yet further studies identify the importance of vegetation for migratory songbird habitat. This is an example of a *trophic cascade*; an ecological phenomenon triggered by the addition or removal of top predators and the reciprocal changes in relative populations of predator and prey, which often results in dramatic changes in ecosystem structure and nutrient cycling. So, if more wolves mean fewer elk, and if fewer elk means more vegetation and more vegetation means more songbirds, then do more wolves mean more songbirds? What if the study on birds was conducted in a different ecosystem than the study on prey? Here, students must think like scientists and build a logical argument and identify flaws in logic.

### Procedure:

1. Arrange a minimum of ten evidence cards in a logical sequence. Look for sequences that establish the wolf's effect on prey, vegetation, scavengers and other large carnivores or mesocarnivores (medium-sized carnivores like foxes, coyotes, lynx and otters)
2. Record your sequence as a flow chart/concept map, and then answer the following questions.

### Analysis:

1. What limitations are there given that most studies are done in different ecosystems: Minnesota, Yellowstone National Park, Isle Royale and other places?
2. Even with these limitations, is there enough evidence to suggest that wolves have a significant effect on their ecosystems?
3. How did you define "significant" in question #2?
4. Which effects of wolves on their ecosystem can be considered "good"?
5. Which effects of wolves on their ecosystem can be considered "bad"?
6. Describe an example of trophic cascade using wolves.
7. Describe the effects that wolves and humans have on each other.
8. Where, if anywhere, are the roles of wolves in the ecosystem more important than human activities?
9. Where, if anywhere, are human activities more important than the roles of wolves in the ecosystem?
10. Do you think the U.S. government made the right decision when they reintroduced wolves into Yellowstone National Park? Why or why not?