

## 5.2 The Impact of an Individual Species

[Start Assignment](#)

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**Due** Monday by 5pm      **Points** 8      **Submitting** a text entry box or a file upload

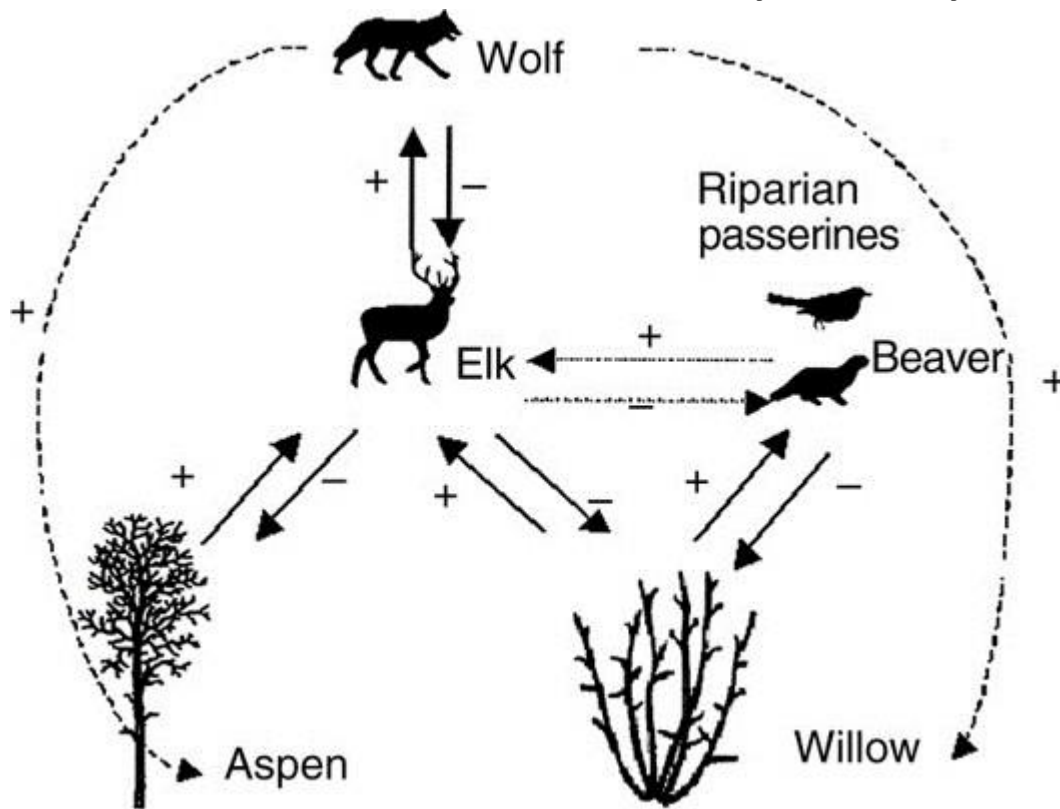
**Available** Apr 25 at 12am - May 14 at 11:59pm 20 days

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Watch the video below.

How Wolves Change Rivers





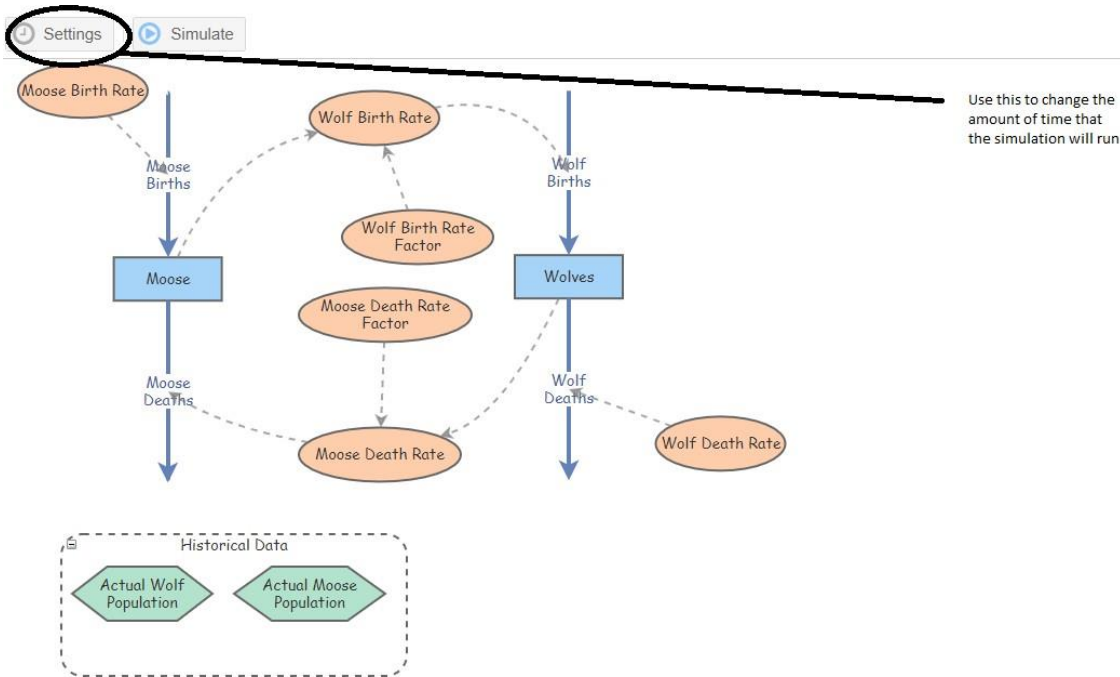
Question 1) What is a trophic cascade? Use the information from the video and figure above ([Source](https://extension.colostate.edu/topic-areas/people-predators/ecological-effects-of-wolves-8-005/) [\(https://extension.colostate.edu/topic-areas/people-predators/ecological-effects-of-wolves-8-005/\)](#) )

A trophic cascade is ecological effect that ripples through an ecosystem brought about by apex predators simply because they are at the top of the food chain.

Question 2) The Predator-Prey Simulation:

Follow this link to an interactive simulation of wolf and moose populations [Activity](https://insightmaker.com/insight/2068/Isle-Royale-Predator-Prey-Interactions) [\(https://insightmaker.com/insight/2068/Isle-Royale-Predator-Prey-Interactions\)](#) . You can change the values to learn how predator population and prey populations are deeply intertwined. Use your mouse to change the values of the predator and prey populations, or time that the simulation will run. Play around with the values in any way that you wish, but pay attention to the relationship between the number of wolves and moose over time.

Step 1) To get you started, change the simulation length to 100 in the settings tab.



Step 2) Based on the following 4 scenarios below, adjust the initial population size for both wolf and moose population and hit 'simulate' at the top left of the page to view the graph. This graph will measure the moose and wolf population as a function of time. Record your observations for each scenario.

After you have set initial parameters, select the "simulate" button at the top left to run the simulation

**Moose**  
The initial number of moose on the island at the start of the simulation.  
426

**Wolves**  
The initial number of wolves on the island at the start of the simulation.  
20

**Describe what happens to each of the scenarios bellow.**

a) Set the wolf population to 20, and the moose population to 400

Initially, the number of moose increases by a margin of 54 over a time period of 18 years. The number of moose also increase by 2404 over a time period of 14 years. However, the number of wolves and moose decrease and increase at a similar trend from the graph, with the number of moose being higher in each case. The number of the moose then decrease to zero, drawing along the number of wolves too because reducing the moose reduces the wolves' prey.

b) Decrease the moose population to 0, while leaving the wolf population at 20

After decreasing the moose population to zero, the wolves take approximately 21 years to level off their population to zero. The number of wolves do not rise again because there is no prey available

c) Set the wolf population to 20, and moose population to 50

After increasing the number of moose by 20, it takes approximately 7 years for the number of wolves to initially increase in number in similar trend to the moose. Both animals level off to zero and take about 19 years to increase in number in similar trend, with the number of moose increasing first and then the wolves.

d) Set the moose population to 20, and wolf population to 50

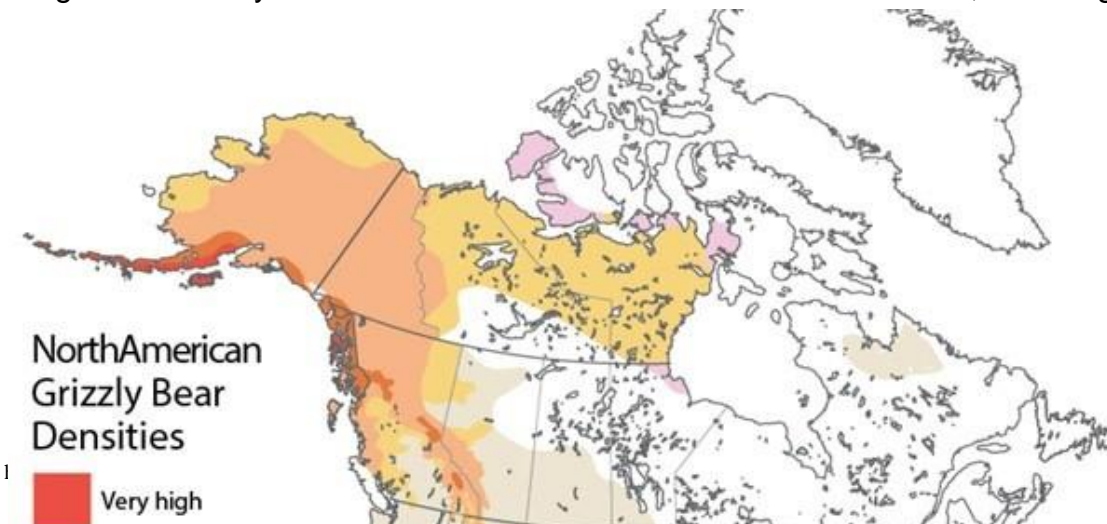
The number of wolves level off to zero after a period of about 13 years and start increasing 9 years after, as the number of moose also increase from 20. The moose reach a peak number of 7407 and the wolves achieve a peak number of 186 before starting to decline as the number of moose also decline. The numbers level off to zero and take about 30 years to start increasing again, with the moose numbers rising first.

e) What general trends did you see? How would you describe the shape of the curves (the lines) of the predator and prey populations?

the general trend observed is that the prey(moose) controls the number of the predator. When the number of moose was set to zero, all the wolves died within a time period of 21 years. Increasing the number of moose leads to a similar increase in the number of wolves and vice versa. However, the rate of increase and decrease of the number of moose is higher than that of the wolves.

Question 3) A **keystone species** is a species that is critical to the survival of an ecosystem.

Unfortunately, many species over the last century have been entirely removed from their historic ranges. The historic range of the Grey Wolf used to be two thirds of the United States, but has been restricted to the mid-west, Upper Rockies, and parts of the Pacific Northwest. The brown bear (*Ursus arctos*), another keystone species known for its iconic placement of the Flag of California, has lost much of its historic range. The Grizzly bear used to be found across southern California, including San Diego county.



Several conservation groups are attempting to reintroduce brown bears and wolves to California ([Source ↗ \(https://www.discovermagazine.com/planet-earth/grizzly-bears-might-return-to-california-is-the-state-ready\)](https://www.discovermagazine.com/planet-earth/grizzly-bears-might-return-to-california-is-the-state-ready)). Although these efforts are not focused on reintroducing them to southern California, do you think this is a wise decision? Why or why not? What do you think the implication's of this are for the health of California's ecosystems?

I don't think it's a wise decision. This is because of human- wildlife conflict expected to develop as a result of this. For instance, the Grizzly bear was driven away by people about a census ago, according the magazine article. Therefore, most people of California are not aware that it existed in their environment in the first place. Though the author argues that there will be a lot of free space for the Grizzly bear to live because of the settlement patterns of the people in California, I believe it will attract human-wildlife conflict with the few people living in those regions. Most of these animals being reintroduced are omnivores, feeding on both plants and animals, and therefore are expected to have very major changes in the ecosystem, being the keystone species. This may lead to some plant or animal types becoming extinct due to overfeeding by the reintroduced animal species or due to the effect of the major changes in ecosystem i.e, when the predator of a certain animal or plant species increases spontaneously in number. The example of the effect of the wolves on Yellowstone, from the first video, when they were re-introduced in 1995 says it all.