Materials
Internet Device, Pencils, Notes/Textbook

Secondary 4 Science and Technology

Wolves in Yellowstone National Park: Ecology [Chapter 10]

Assessing the Problem

1) During the 20th century the forests of Yellowstone National Park shrank dramatically. The populations of Willow and Aspen trees were greatly reduced and forests gave way to fields. What are some things that could have caused this *disturbance*?

-Human Logging	-Invasive species	-Acid Rain Damage
-Forest Fires	**-Over-browsing by *Herbivores***	
-Climate change	-Storm Destruction	

2) In the 1990s ecologists and park rangers came up with the idea of introducing wolves to Yellowstone National Park. Why would they choose to introduce wolves to solve a problem about trees?

-Wolves were a natural part of the ecosystem in the past

-The problem was caused by Elk, which wolves hunt for food

-As a *high order consumer* (or apex/top predator) wolves weren't in danger of being hunted by other organisms

-Wolves had been wiped out by humans, reintroducing them could fix two issues with one action

How Wolves Change Rivers Video

https://www.youtube.com/watch?v=ysa5OBhXz-Q

Analyzing the Results

3) When the wolves were brought back to Yellowstone they affected several populations. What type of interaction did the wolves have with the following species and what were the consequences?

Species	Type of Interaction (With Wolves)	Trophic Level	Consequences
Elk (Large Deer)	Predation (Prey)	*Primary Consumer*	Elk would be hunted by wolves and their population would decrease thereby allowing trees and shrubs to increase in population size.
Coyotes	Competition	*Secondary Consumer*	Coyotes compete with wolves over smaller prey like rabbits and small deer. Wolves may kill coyotes for territory. The coyote population would decrease.
Willow Trees	Commensalism	*Producer*	With the wolves hunting and killing the elk, young willow trees are able to grow taller and the willow population increases. The trees offer no benefit to the wolves but the wolves effectively protect the trees from herbivores.
Beavers	Commensalism	*Primary Consumer*	The trees that are protected by the hunting of elk by wolves are the beaver's main food and building resource. The beaver population benefits (increases) from the increased amount of trees and wood both for food and building lodges and dams.

4) How did introducing wolves affect the primary productivity of Yellowstone National Park?

The introduction of wolves allowed forests to expand into areas that had effectively been all fields. The *biomass* of a forest is much greater than that of a field and its *primary productivity* tends to be greater as well. The eventual slowing of rivers by beaver dams and stabilised banks could also allow more water plants and algae to grow in the river.

5) Once the populations of Elk fell and their browsing* behaviour changed forests began to regrow, first as shrubs then as full grown trees. What is this an example of?

*Browsing is a type of feeding that involves eating branches and leaves from short plants.

This is an example of *ecological succession*, the cycle that an ecosystem goes through as it recovers from a disturbance. Forests, for instance regenerate short, fast growing plants first, followed by shrubs and fast growing trees and then finally large slow growing trees.