

## Before



### Elk

**BEFORE:** Without cunning predators keeping them on their toes, elk mow down lush willows and other vegetation along rivers and streams.

**AFTER:** More alert for wolves, elk spend less time feeding in some streamside areas and instead spread across the landscape.

### Rivers and streams

**BEFORE:** With plants chewed down and little vegetation to hold them in place, stream banks wash away and silt darkens water.

**AFTER:** Willows and other plants rebound, their roots stabilizing soil along the edges of streams.

### Scavengers

**BEFORE:** On their own for food.

**AFTER:** Each wolf in Yellowstone kills an average of two elk per month. Their leftovers become a feast for scavengers, including ravens, eagles and sometimes grizzly bears.

### Coyotes

**BEFORE:** In absence of wolves, coyotes multiply and take over the role of leading predator. But their influence on elk is not as great. Coyotes compete with foxes, depressing fox numbers.

**AFTER:** Wolves kill many coyotes. With coyotes depressed, rodents and other animals they once preyed on are left as prey for foxes, badgers and eagles.

### Beavers

**BEFORE:** Sparse streamside greenery offers little for beavers to eat. Few beavers remain to engineer dams.

**AFTER:** Plants lure more beavers. They build dams, creating ponds that slow streams. Water and plants attract songbirds. Silt settles out, leaving water cleaner, and deeper pools may be cooler and more hospitable for fish.

## After



**Trophic cascade** is an ecological phenomenon triggered by the addition or removal of top predators and involving reciprocal changes in the relative populations of predator and prey through a food chain, which often results in dramatic changes in ecosystem structure and nutrient cycling.

Image from:  
<http://srcomm.umn.edu/news/trophic-cascades-highlight-need-apex-predators>