



## Science Behind the Scenes Video Script Elk and Vegetation

Welcome to Rocky Mountain National Park's on-going series, the Science Behind the Scenery. I'm Judy Visty. This segment focuses on the park's twenty-year plan to manage elk and vegetation. The plan is a complicated, multi-faceted strategy but it really begins right here in a small valley on the east side of the park.

The shrub towering over me is a willow, a vegetation type commonly found throughout the United States along streams and lakes. If you've ever spent time in this type of environment, you don't need a scientist to tell you that a willow community's home to a wide variety of birds and insects. And though you may not see them, willow is also home to small mammals such as muskrat, shrews, bobcat, and beaver.

That last animal, the beaver, has a special relationship with willow. Here in Rocky Mountain National Park, beaver eat primarily willow with some aspen and other vegetation. Beaver also use willow as a building material to construct homes called lodges in the middle of streams.

Beaver are quite picky about their food. When a beaver goes foraging it looks for tall willows with thick stems that have a lot of leaves. Willow that have been heavily browsed by elk may not be very tall, have slender stems and not many leaves—just not good beaver food.

As important as willows are to beaver, in the big scheme of things, beaver are also very important for willow. As we learn in school, beaver construct dams and the dams create ponds. The ponds are escape places for the beaver, and they also provide a place for the beaver to store their food in the winter.

Beaver dams also have a significant effect on an area adjoining the stream. A scientist who studies water, a hydrologist, would say that the beaver dam raises the water table. That means that the water level underground actually moves closer to the surface. And, if you are walking near a beaver dammed-stream, you'll notice that the ground can be quite mushy.

Since willows only thrive when their roots are in water, beaver-created wetlands foster willow growth. Beaver ponds are typically rimmed by moist fertile soil, and when willows reproduce, they do so by scattering tiny seeds on the wind that must germinate almost immediately on—you guessed it—moist, fertile soil.

Now that you have a sense of a healthy willow community, we are going to make an abrupt change of scene.

This is Rocky Mountain National Park's Moraine Park famous for its stunning views of mountains and glaciers.

Believe it or not, the shrub I'm standing next is a willow. In fact, it's quite likely it's the same species as the ten-foot high specimen we saw earlier.

The difference between this willow community and the one we were in a moment ago is that Moraine Park is used year-round by a large number of elk. In fact, Moraine Park has the highest elk counts—285 animals per square mile—ever recorded in a survey of a natural environment. Although Moraine Park is called “winter range,” it is, in fact, now used through all seasons by elk, and elk duds cover the ground.

Here elk consume approximately 55% of the growth produced by willows each year. Biologists who have specialized in

the study of natural grazing environments believe that shrub communities in semi-arid places like Colorado, can sustain only 40% browse before they change dramatically.

There is even more to this ecological distress story: elk eat the same two foods preferred by beaver, aspen and willow. But in a naturally balanced system, beaver harvest the willows and then move out of the immediate area allowing the willows a chance to recover. In Moraine Park and a few other areas of Rocky Mountain National Park, high levels of elk browsing mean that willows never have a chance to recover to a height and leafiness that are suitable for beaver. When beaver can't find food they either leave or die.

When beaver are no longer active on a landscape, the appearance of the valley changes. Streams without dams narrow and cut down within their banks—the water table drops. If willows remain, their roots may not reach the water table, and they no longer thrive or set seed.

Photo comparisons of Moraine Park show that surface water coverage has declined more than 70% since the 1940s. And park records indicate that beaver numbers have declined from around 100 in 1964 to just six beaver now, one beaver family.

In this presentation, I focus on the relationship of beaver, elk, and willow. But similar stories could be told about the impact that heavy elk browsing has had on aspen regeneration and the birds that use aspen forests or on shrub communities that are the preferred habitat of mule deer. Unnatural numbers of elk means fewer birds, butterflies, and other animals.

Some areas outside the national park are also affected by high numbers of elk, but the National Park Service is only responsible for management within its boundaries.

This brings us to the specifics of Rocky Mountain National Park's elk and vegetation management plan, a mouthful of words for the intention of the National Park Service to restore natural conditions to the damaged elk winter range—about 2% of the park's total area—and to prevent future damage from taking place.

The plan is backed by more than fifteen years of comprehensive scientific research.

Component one: the number of elk will be reduced to fall within the natural range for the population. This range is based on all available documentation about elk within the park and adjoining areas.

Because natural predators—wolves, grizzlies, and native hunters, are no longer limiting elk numbers, their presence will be simulated by lethal reduction or culling, the purposeful removal of selected animals from park herds. Culling has not been used to manage elk since the late 1960s. A change in policy—eliminating regular herd reductions—likely led to many of the changes in the park's elk winter range. Mild winters, human development within the Estes Valley, and a long-term decline in hunter harvest outside the park are also significant factors.

However, it's important to keep in mind that predators act on animal populations not just by killing individuals but also by making the whole population more wary. As wolf reintroduction has demonstrated in Yellowstone National Park, when elk have predators chasing them, they are more dispersed across the landscape, and spend more time hiding in the forest. Elk that are concerned about predators move around more reducing the browsing pressure on willows.

Biologists believe that it is the absence of predators that has resulted in the unnaturally high concentrations of elk seen in the large open areas of Moraine Park, Beaver Meadows, Horseshoe Park, and the Kawuneeche Valley.

So the second component of the plan is to use hazing methods such as exploding cracker shells over the backs of animals to disperse them.

The third component of the plan is to use elk-proof fences called exclosures, to protect stands of willow and aspen while they recover from years of overbrowsing. Experiments to date show that once fenced, vegetation recovers quickly and often beaver will move into the exclosure, build dams, and that will lead to natural stream restoration within the gated beaver community. Biologists believe that the fences need to be in place for a decade or more in order to allow

adequate recovery.

Lastly, component four: monitoring will be conducted to determine how much of each year's growth is being consumed by elk and whether the ground water level has risen as a result of beaver activity.

The plan is set up for what ecologists call adaptive management. That means the methods will be adjusted depending upon results. If harsh winters reduce the herd or hunter harvest is significant, then fewer animals will need to be removed by culling. Alternatively, if browsing levels remain high, then hazing may need to be intensified.

The plan is a kind of experiment, and biologists will monitor the results closely. During your visit, you may see aspects of the plan including fences, grazing cages, or perhaps even rangers hazing animals. But most activities will take place out of public view, and changes will be relatively slow.

Still, if you visit the park over a period of years, you will see willows grow tall, the appearance of young aspen seedlings amidst old stands, and the return of complex, biological communities to those areas altered by elk.

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