

How Animals and Plants Respond



Take a walk in my paws – how animals and plants respond to restoration treatments.

Have you ever wondered what a linear feature is like from a wolf's perspective? What about from a spruce tree's perspective? These are the kinds of questions researchers have to think about if they're to figure out how to successfully restore these areas.

Linear Features from a Wolf's-Eye-View

Imagine yourself walking through a park – is it easiest to follow the trail? Or cut through the trees and underbrush? It's generally much easier to take the trail – that's what they're for, after all. Now put yourself in a wolf's shoes – or paws, that is. How would you rather get from point A to point B? By winding your way around trees and over logs, or by taking a long, straight path free of obstacles? Like ourselves, animals are keen to find ways to save energy as they go about their day-to-day activities, and wolves are no different. Linear features are a boon to these animals, allowing them to cover more ground in the same amount of time and have access to areas they usually wouldn't explore. This spells bad news for caribou, whose main strategy to avoid wolves is to use difficult-to-access lowlands as a safe area.

In order to ensure linear features are no longer giving wolves an unfair advantage, they must no longer be easy to travel on. Some restoration techniques, like mounding, tree felling, or coarse woody debris, create obstacles along the linear feature which the wolf must now step over/around (check out the [Silvicultural Toolkit](#) to learn more about these techniques).

Could such treatments be enough to bring caribou predators back to a level playing field? Some researchers have begun to investigate this question, and are finding mixed results. Camera trap monitoring of the [Algar Caribou Restoration Project](#) area has shown that predators like wolves are still using treated lines, suggesting that treatments like mounding or woody debris are not always sufficient to stop predators (Tattersall et al. In Prep). However, other research has found that these techniques can in fact mitigate some of the advantages linear features afford predators. In the Cold Lake Air Weapons Range, researchers have found that wolves used less intensely treated linear features than those that were heavily treated, and that their speed on heavily treated linear features was reduced by a third (McNay et al. In Prep). **It appears that treatment intensity – e.g., how big the mounds are, or how much woody debris is applied to the site – is an important factor.**

Of course, mounds and woody debris are not the only way to slow down wolf travel. Trees are what slow down wolves in the forest, and they can slow down wolves on a linear feature as well. But how tall does a tree need to be? Put yourself in a wolf's paws again. You would have to wind your way around tall trees, but tiny saplings you can step over with ease. As those tiny saplings get bigger, however, it gets harder and harder to simply walk over them. [Multiple studies](#) have found that about half a meter is the height vegetation needs to reach to significantly curtail wolf movement.

Making Linear Features a Place to Put Down Roots

Growing trees on linear features is a critical part of restoration, not only for the purpose of slowing down predators, but also for recreating forest habitat on the landscape. Let's step out of the wolf's paws and into the roots of a black spruce seedling. What do you need to survive and grow into a proper tree?

You need adequate light, the right kind of nutrients in the soil, and enough moisture. It is also important that the soil is not too compact, so that your roots are able to spread easily. Finally, it's important that you're not crowded in by competitive neighbours like grass, which tend to hog all the resources. If any one of these factors is not quite right, then trees will fail to regenerate on the linear feature.

Researchers have found that water is a big factor preventing the regeneration of trees – but perhaps not in the way you might expect. While trees need water to survive, too much of a good thing is just as bad, and it is the [wettest areas that are the least likely to regenerate](#). This is because the peat that makes up the surface of lowland areas tends to get compacted in the seismic exploration process. This compaction means that trees growing on the surface are very close to the water table, and as they grow bigger, their roots dip below the surface and become waterlogged. This causes rot, and eventually kills the tree. In such cases, seedlings benefit from treatments like mounding, which provide seedlings with a raised platform away from the water table.

Of course, even if all your ideal growing conditions are met, the tire of an off-highway vehicle will quickly dash your dreams of becoming a grown-up spruce tree. Human activity on linear features can often prevent vegetation from regenerating, therefore linear features selected for restoration should be protected from off-highway vehicles. Once the vegetation on a linear feature has reached about [two to four metres in height](#), it is no longer vulnerable to off-highway vehicle use.

Understanding the effects of linear feature restoration on plants and animals takes a lot of work, and there is still much to learn. But with good science, we are beginning to understand how and where to use restoration treatments to have the best impact.

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