

STAYING CONNECTED

Why did that bear cross the road?

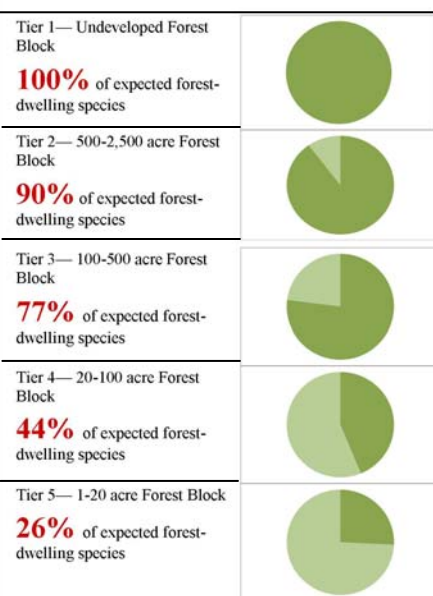
A Guide to Habitat Connectivity:

While some animals remain in the same location for much of their lives, this is not true for all wildlife. Many species need to travel from one place to another. Young beavers are pushed out of their parents' pond, and they may travel long distances overland to find a suitable stream for building a new dam. Bears eat a variety of nuts, berries, grubs, roots, and other food sources at different times of the year, such as early spring wetland plants in the valleys or fall beech and oak nuts on the higher hillsides. Because they require so much food to maintain their size and make it through the winter, they travel huge distances, eating constantly. Other species travel to look for mates, like the fish that spawn upstream in headwaters and then return to lower elevation rivers to complete their lifecycle. Some move in seasonal mass migrations, like the spotted salamanders that come out of the upland earth each spring and travel to a nearby wetland or woodland pool for breeding, only to return to the forest once more in the next spring rain. Many bird species migrate on the scale of entire continents, moving southward for the winter and returning home to the north in the spring.



Vermont Fish & Wildlife Department

The pathways these animals travel may look different from one another. Movement changes with the seasons and is different for each species. Bears move many miles from spring through fall and generally prefer places at least a half a mile from human development. Amphibians on the other hand, move only a few hundred feet on just a few nights in the spring, a migration that could be quite close to homes and development. Still, the basic concept is the same: these animals need different types of habitats at different times,



The number of forest-dwelling wildlife species in a given area is closely tied to the size of the forested habitat

and they need to be able to move freely between them. Whatever the animal's purpose for traveling, these movements can be important not only in providing the individual animals with the appropriate food and mates, but also for maintaining healthy populations of wildlife across the Northeast.

The importance of size: For wildlife habitat, bigger is better

In general, large blocks of forest support a wider diversity of wildlife species than smaller blocks. In part, this is because a larger area is likely to fulfill the requirements of more individual species. For animals with big home ranges such as bear, moose, fisher, and bobcat, these large forest blocks are especially important. These animals need to move around a lot, and unlike birds, they can't simply fly over the areas of poor quality habitat to find what they need.

We live at the crossroads of an extensive wildlife habitat network

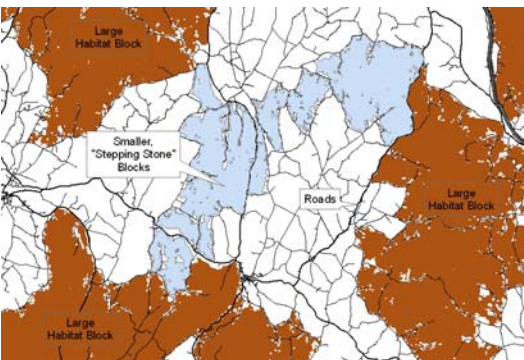
Smaller blocks of habitat can serve as “stepping stones” between large ones

Piecing the land together

But sometimes, bigger just isn't possible. In our lived-in landscape, large blocks of forest are becoming increasingly rare. As development by people expands across our towns and hillsides, many large forest patches are broken up into smaller islands of habitat in a sea of developed lands. Roads begin the process of breaking up large forest blocks into separate pieces in a process called fragmentation. The development of homes and buildings along those roads further decreases the size of the blocks and decreases their value for wildlife. The resulting islands of habitat are not enough to provide sufficient food, shelter, and other resources to maintain healthy populations of diverse species. Moreover, the small wildlife groups that are able to survive on those islands may become inbred without others nearby. The small, isolated groups of any given species of wildlife are more likely to die out over time or all at once if there is an environmental disturbance or disease without the introduction of different genes from other populations to provide genetic diversity. When there are connections on the landscape that allow animals to move between one block and another, they effectively increase the size of the available habitat. There are many examples of far-ranging mammal species living in forests that are



This shows a fragmented landscape where agricultural fields, roads and development separate quality forested habitat. Note the isolated “island” of habitat at center. *Above and Beyond*, 2000 by permission



Large blocks of habitat (in brown) are anchors on the landscape. Smaller blocks (blue) can be used as stepping stones between roads from one large block to the next.

smaller than their minimum home range. Clearly, they must be using multiple blocks to get what they need to survive. But how do they do it? Even if a patch is too small to be of much use on its own, wildlife can travel through these small patches of forests, using them as stepping stones and pathways as they travel from one block to another. They might cross roads when there's forest on both sides to protect them, they might follow streams where associated trees and brush provide necessary cover, and they sometimes even use hedgerows that cross open land to move between forested areas. Generally speaking, these connecting lands are lower quality habitat than the forest blocks they connect but are sufficient for many wild species to travel through. They may be more open or even contain roads and some buildings but these connecting lands still move wildlife. So, while it may be surprising to find a large mammal beside a small hedgerow, these connecting lands are actually critically important to wildlife because of their role in linking larger forests.

At this time, our region still has a network of connective habitat that is relatively intact. However, as development continues, the risks to wildlife from fragmentation and isolation are heightened. Many of the connections that exist now are tenuous and could easily be lost if we do not plan our development carefully.



A) Cities & highways. B) Habitat blocks and wildlife movement. C) Overlapping the human and wildlife transportation / movement networks. (Note the number of places where wildlife cross roads).

An intersection of two travel networks

Wildlife are not the only ones that connect large patches of habitat with smaller pathways and connections through less hospitable terrain. If you think about our own networks of footpaths, roads and highways that connect us to the things we need to survive—like food, shelter, and other people—the two networks are not so different. Like wildlife, there are places where we spend most of our time, and trips that we make from this home point. Some trips we might make quite frequently, like getting food, and some trips we might make much less often but are nonetheless quite important, like visiting far-away relatives. The pathways taken by wildlife may look a bit different, but the idea of a travel network is just the same.

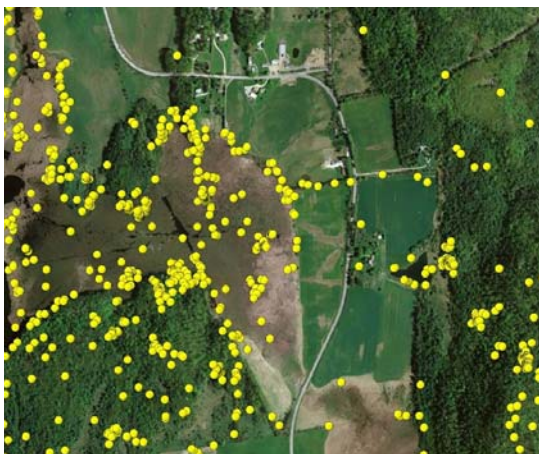
How can we have these two overlapping systems, one for moving people, the other for moving wildlife, on the land at the same time? The answer lies in looking specifically at the places where the systems overlap.

Our land use and transportation system provides many obstacles to wildlife, the most obvious being roads and buildings. Agricultural and other unforested open lands are another barrier for many species. For forest-dwelling creatures, moving through agricultural land is a stress to avoid if at all possible, or to move through only over short distances. Fences can stop the passage of all sorts of wildlife, and even small man-made waterfalls in a stream can present a major barrier for fish where it is impossible to jump up and through a culvert. Of course, the magnitude of the barrier is entirely dependent on the species of animal. Even a 6 inch roadside curb can be an insurmountable impediment to amphibians, while many residents of the Northeast tell stories of moose plowing straight through strong fences as though they were not there.

But there are also places where human and wildlife networks do overlap effectively. As mentioned above, these are the places where landscape features connect larger forest blocks to one another, such as hedgerows across open land, streams or vegetated stream banks, or large bridges or culverts that might allow animals to avoid the dangerous road surface.



Vermont's Bennington Bypass includes oversized bridges to allow wildlife to pass underneath.
VT Agency of Transportation & M. Bellis



GPS points on a bobcat in Shelburne, VT show the cat crossing an open agricultural field beside a hedgerow and then crossing a busy state highway beside a treeline.

VT Fish & Wildlife Department

Where do the animals cross the road?

Roads are probably the place where the human and wildlife networks most often collide, often quite literally. Because these encounters can be dangerous for both drivers and for wildlife, identifying places where different species of wildlife are likely to attempt to cross can be an important first step in making the roads safe for everyone.

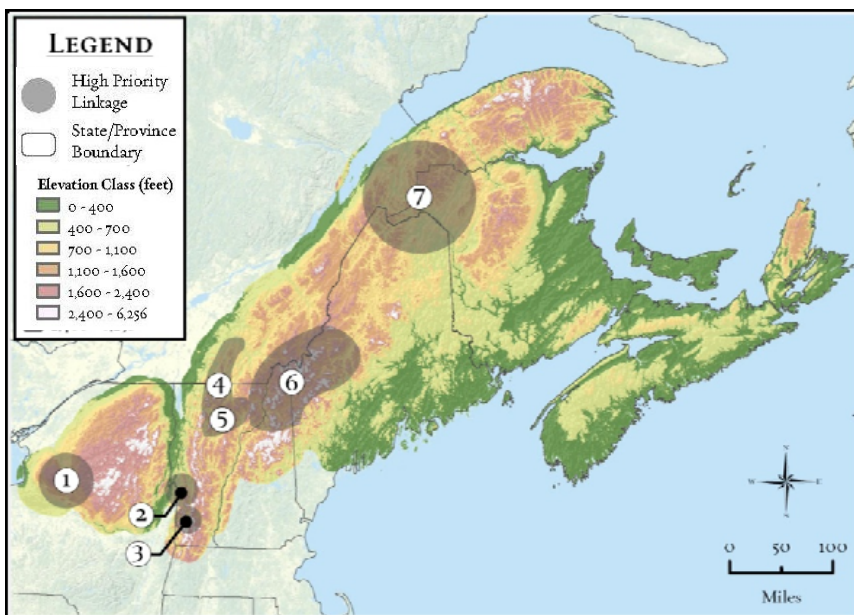
Research has revealed that many wildlife species attempt to cross roads where there is evergreen forest or wetland habitat close to BOTH sides of the road. This is true for such species as bear, moose, fisher, bobcat, and coyote. Where streams go under the road at culverts or bridges, beaver, river otter and mink may also cross. If the culvert is installed at grade with the stream, spawning fish can also move through here. Where a ridge comes down into a valley, wildlife sometimes follow those shoulders down into the valley and back up into the hills. Many wildlife cross roads where they are accustomed to, and it can take some time to learn of new, safer places to cross dangerous roads.

The best crossings have evergreen & wetland habitat on both sides of the road

A regional network of wildlife

Up to now, we have been looking at habitat connectivity at a relatively local scale. We could also consider, however, a bigger picture. Currently, wildlife populations are connected across the entire Northeast, from the Adirondacks to the Green Mountains, the Greens to the Whites Mountains, and on up into the Blue and Sutton Mountains of Maine and Quebec. How do wildlife connect these areas? It doesn't happen very often that an individual animal makes a long journey from one mountain range to another, like movement from the Adirondacks to the Green Mountains. More often, this long-range movement may happen over the course of a number of generations for a particular species. In either case, it is an extremely important event because it allows mixing the gene pools of different populations of that species, making them stronger and more resilient to whatever diseases or disturbances may occur. So, at a regional scale, habitat connectivity is about sustaining entire wildlife populations, genetic diversity and the ability of individuals and populations to overcome disease and disturbance.

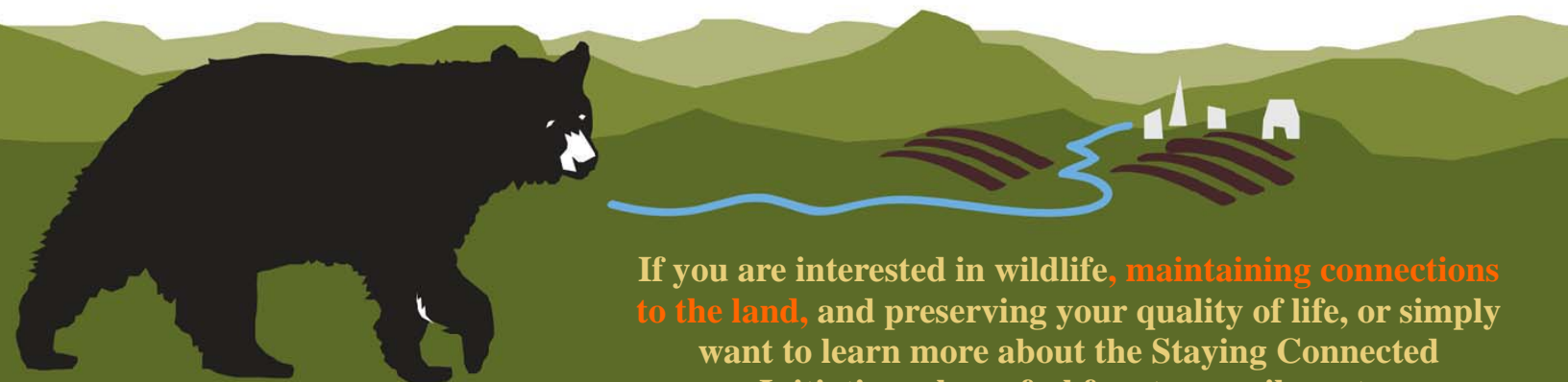
Of course, the regional network would not exist without a much more local one, made up of individual animals getting from one forest to the next, crossing one road at a time. If you think about the place where you live, where might wildlife there be able to get from one forest patch to the next? What roads might act as barriers for travel? And where are the places where an animal might attempt to cross that road? Wherever you are in the Northeast, it may be that your landscape provides a key link for wildlife as they move across the landscape.



The map above shows priority areas for maintaining habitat connections across the Northern Appalachian region. These areas are the focus of the Staying Connected Initiative, an emerging effort among public agencies, nonprofit organizations, local communities, and others to sustain landscape connections for wildlife and people in this region. From west to east, these include;

- 1- Tug Hill Plateau \Leftrightarrow Adirondack Mountains (NY)
- 2- Adirondack Mountains \Leftrightarrow Green Mountains (NY-VT)
- 3- Taconic Mountains \Leftrightarrow Southern Green Mountains (NY-VT)
- 4- Northern Green Mountains (VT-Canada)
- 5- Worcester Range \Leftrightarrow Northeast Kingdom (VT)
- 6- Northeast Kingdom \Leftrightarrow Northern NH \Leftrightarrow Western Maine Mountains (VT-NH-ME)
- 7- Maine's North Woods \Leftrightarrow Quebec's Gaspé Peninsula (ME-Canada)

STAYING CONNECTED



If you are interested in wildlife, **maintaining connections to the land**, and preserving your quality of life, or simply want to learn more about the Staying Connected Initiative, please feel free to e-mail us at:
StayingConnectedInitiative@gmail.com