Wildlife Road Crossings (L9)

Description

Habitat Connectivity is a complex process that functions at different scales for different species. Generally speaking, connecting habitat is represented by land that links larger patches of habitat within a landscape, allowing the movement, migration, and dispersal of animals and plants. Wildlife Road Crossing are locations where wildlife are likely to cross roads. The dataset is the result of an assessment of structural components (i.e., where there is forest and/or other natural vegetation on both sides of a road) to predict the ease of movement for a variety of wildlife species. While this assessment is not specific to particular species, it offers a generalized sense of where the greatest variety of species is likely to move based on the assumption that wildlife.

Ecological Importance

Wildlife road crossings are a critical and vulnerable component of the network of connecting lands. These areas of habitat fragmentation are locations where wildlife species are most likely to cross roads, based on remote assessment of structural connectivity features. Movement of animals from one habitat patch to another is the most common function associated with connecting habitat. This function is particularly important for wide-ranging animals, such as bobcats and black bears, or for animals that require a great deal of space to meet their daily life needs, such as barred owls or otter. Although connecting habitat is often associated with wide-ranging mammals, it is equally important for animals with relatively small ranges. Spotted salamanders, for example, use connecting habitat in spring to move from their hibernation sites to breeding pools. The value of connecting habitat is a function of both seasonal and spatial patterns of wildlife behavior. For example, connecting habitat may allow black bears to access important food resources during a specific time of year (seasonal), or it may prevent isolation of bear populations by allowing free exchange of breeding adults (spatial). Ultimately, connecting habitat can ensure that the habitat, movement, migration, and behavior requirements of most native plants and animals are conserved across a broad landscape. The broader ecological value of connecting habitat is to join fragmented pieces of habitat, thereby reducing the deleterious effects of habitat fragmentation and population isolation. Linking small or otherwise isolated habitat patches may reduce the risk of local population extinctions by ensuring immigration, recolonization, reproduction, and exchange of genes for some plant and animal species. While conserving corridors has great merit, do not assume that conserving threads of vegetative cover within a developing landscape will maintain an area's ecological values and biological diversity. Nor will corridors alone meet the habitat needs of all of an area's plant and animal species. Only in conjunction with the conservation of large areas of undeveloped land with diverse habitat conditions, will vegetative corridors assist in supporting ecosystem functions and related public benefits.

Wildlife Road Crossing Conservation Goal

Conserve wildlife road crossings wherever possible, especially in fragmented landscapes. Wildlife Road Crossings are of critical importance in this network as they are the most threatened by future development.

Component Mapping Goal Statement

To map locations of potential wildlife road crossings statewide based on structural connectivity features.

Input Datasets (s) & Selection Criteria

Linkage Ratings, Habitat Block project. Sorenson & Osborne, in prep.

Description

Linkage Ratings is a dataset created by Vermont Fish & Wildlife Department using the Habitat Block dataset (Sorenson & Osborne, in prep.). A Linkage Ratings is an assessment of the structural connectivity across roads—the expected permeability of the road to crossing. Ratings were assigned to all known Vermont roads (except logging roads) on a scale of 1-5 with one being best and five worst. Ratings utilize a "cost-grid," a tool to help predict locally significant wildlife crossing areas, by identifying road segments where favorable habitat occurs on both sides of the road. Forested uplands and forested wetlands are considered the most favorable habitats (i.e., provide the least cost—resistance—for wildlife movement).Road segments with these land cover types on both sides receive the highest linkage rating. Road segments with favorable habitat on only one side, and areas in or near developed areas receive relatively lower linkage ratings.

Selection Criteria

First, we chose habitat blocks that are 200-acres or larger. Using GIS software, blocks were expanded, regrouped and then shrunk 80m from original polygon size to identify nearby connections. Then the local linkage score from Sorenson & Osborne was used. All roads class 4 or higher were selected from the linkage ratings dataset. Within that selection, linkage scores of 3, 4 or 5 were used. We intersected the expanded blocks and the 3,4,5 road sections to find important road sections that have 200ac or larger blocks on both sides of the road. Then we buffered interstate road sections by 80m. All other road sections were buffered by 100' to show an actual area (rather than a line with no area).

Source Data Strengths

This dataset provides our best look at local-scale movement areas. While areas such as the Champlain Valley of Vermont are not considered important for regional scale movement between the Adirondacks and the Green Mountains, a network of patches of intact forest and small connecting lands between them still exist. Though fragmented habitat, they nonetheless provide connectivity to help wildlife populations persist into the future. This dataset is the best we have for addressing fine scale connectivity.

Component Limitations

Field surveys to document wildlife movement have not been performed in most of these areas. Wildlife road crossings were selected based on the presence of adjacent natural cover (e.g., forest, wetlands and waters). This dataset does not rank crossing areas based on ecological importance. For example, a wildlife road crossing on I-89 may be significantly more important to the overall connectivity network than a rural road in that the interstate is one of the state's most significant barriers to wildlife movement. Under the time limitations of this project we could not discriminate between a crossing of this most significant barrier and the crossing of a small rural road. We recommend that future efforts to refine this dataset incorporate a ranking factor. As with all features included in BioFinder, we recommend site-specific surveys prior to making any land-use decision.

Component Weight and Justification

Wildlife Road Crossings was weighted a 4 on a scale of 1-10 (with 10 as highest contribution to biological diversity).

Summary Statistics for Wildlife Road Crossings

Table 1. BioFinder component datasets, component weights, and the distribution (%) of components across tiers

Data #	Weight	Component	Tier 1 Greatest	Tier 2 Very High	Tier 3 High	Tier 4 Moderate	Tier 5 Low
Landscapes							
L1	7	Habitat Blocks	12.7%	18.1%	30.1%	39.1%	0.0%
L2	3	Grasslands & Shrublands	4.3%	20.8%	22.7%	10.9%	41.3%
L3	9	Rare Physical Landscape	15.7%	53.9%	11.0%	19.4%	0.0%
L4	4	Representative Physical Landscape	17.2%	19.1%	43.4%	13.7%	6.6%
L5	7	Connecting Lands (<2000ac)	10.1%	23.4%	19.1%	47.4%	0.0%
L6	4	Connecting Blocks	9.2%	12.2%	24.0%	51.8%	2.7%
L7	3	Anchor Blocks	12.1%	19.7%	35.3%	32.7%	0.1%
L8	8	Riparian Connectivity	36.4%	52.9%	10.8%	0.0%	0.0%
L9	**4**	**Wildlife Road Crossings**	**12.8%**	**28.1%**	**20.9%**	**26.8%**	**11.4%**
Aquatics							
A1	6	Surface Waters & Riparian Areas	31.1%	48.6%	12.9%	7.4%	0.0%
A2	4	Representative Lakes	10.3%	84.5%	5.3%	0.0%	0.0%
A3	8	Important Aquatic Habitats & Species Assemblages	19.9%	75.2%	4.9%	0.0%	0.0%
Species & Natural Communities							
SN1	Tier 1	Rare Species	100.0%	0.0%	0.0%	0.0%	0.0%
SN2	6	Uncommon Species	62.1%	21.7%	10.0%	6.1%	0.0%
SN3	Tier 1	Rare Natural Communities	100.0%	0.0%	0.0%	0.0%	0.0%
SN4	6	Uncommon Natural Communities	57.4%	31.0%	11.4%	0.2%	0.0%
SN5	3	Common Natural Communities	9.8%	52.9%	37.1%	0.2%	0.0%
SN6	7	Vernal Pools (Confirmed)	20.5%	57.0%	8.3%	14.1%	0.0%
SN7	5	Vernal Pools (Potential)	6.0%	30.1%	52.3%	2.4%	9.2%
SN8	8	Wetlands	60.9%	31.0%	5.1%	3.0%	0.0%
SN9	4	Mast production areas	10.3%	49.3%	35.2%	4.0%	1.2%

The sum of percentages for each component is 100.

References

Sorenson, E. and J. Osborne. In prep. Vermont Habitat Blocks & Wildlife Corridors, an analysis using geographic information systems. Vermont Fish & Wildlife Department. Draft report.

For more information

A complete report on BioFinder development, methods and findings, including all 21 component summaries can be found at www.BioFinder.vt.us. For more information specific to this component, contact Jens Hilke, Vermont Fish & Wildlife Department, 802-879-5644, jens.hilke@state.vt.us.