Riparian Connectivity (L8)

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. Riparian connectivity refers specifically to lands along streams and rivers and lakes and ponds used by wildlife and plants to move. Sometimes these areas are called "corridors" even though they are not always linear, as the term implies.

The word "riparian" literally means of, or pertaining to, the bank of a river or lake. Riparian areas are ecosystems comprised of streams, rivers, lakes, wetlands, and floodplains that form a complex and interrelated hydrological system. These ecosystems extend up and down streams and along lakeshores, and include all land that is directly affected by surface water (Verry et al., 2000). Riparian ecosystems are generally high in biological diversity. They are "characterized by frequent disturbances related to inundation, transport of sediments, and the abrasive and erosive forces of water and ice movement that, in turn, create habitat complexity and variability…resulting in ecologically diverse communities" (Verry et al., 2000).

Riparian connectivity, in the context of BioFinder, includes all non-developed cover classes within the Surface Waters and Riparian Area (A1) dataset. Developed land classes were filtered-out from the surface waters dataset to create the riparian connectivity component. This identifies stream reaches that haven't been developed and are critical travel corridors for a variety of wildlife species. Many of these areas are actively used for agriculture, which compromises their functionality as travel corridors.

Ecological Importance

Riparian connectivity is especially important for wildlife species that are closely associated with rivers and lakes, including mink, otter, beaver, and wood turtle but are used by a wide assortment of wildlife. The riparian connectivity component represents the vegetated portions of river and stream valley bottoms and lakeshores which provide numerous ecological functions relating to surface water quality, flood attenuation, and shoreline stability. It also includes floodplain forests and other riparian natural communities that together provide habitat for many rare species represent a concentration of biological diversity.

Riparian Connectivity Conservation Goal

Conserve a connected network of lands, waters, and riparian areas that allow for functioning of ecological processes across the landscape and dispersal, movement, and migration of plant and animal species in response to changing environmental conditions. Restoration and conservation of riparian connectivity is especially important in areas of Vermont that are highly developed.

Component Mapping Goal

To identify riparian areas statewide with natural vegetation cover and those in agricultural use (e.g., hay, pasture, grassland) except for cultivated crops.

Input Datasets and Selection Criteria

Description

1. **Surface Waters & Riparian Areas Component (A1),** VT Agency of Natural Resources, Natural Resources Mapping Project, BioFinder. 2012.
2. **Regional Land Cover**, NOAA Coastal Change Analysis Program (CCAP), 2006.

Selection Criteria

BioFinder's Surface Waters and Riparian Areas component dataset (A1) serves as the basis for Riparian Connectivity. All developed land classes (NOAA CCAP dataset) were filtered-out (removed) leaving only natural or modified land cover classes. These include grassland, herbaceous and shrub cover classes as well as all forested and wetland cover classes. Agricultural lands are included.

Component Strengths

The Riparian Connectivity dataset is the first of its kind for all of Vermont as it identifies all river and lake riparian areas that have natural or semi-natural vegetation cover – a critical part of landscape connectivity. The other four datasets related to habitat connectivity all focus on terrestrial animals and are generally biased towards far-ranging mammals. This dataset includes all riparian habitats along rivers and streams that aren't currently developed to support movement along rivers, streams, and valley bottoms in general. It is still focused on terrestrial animal movement, but gets at the critically-important land-water interface. There is relatively high confidence that riparian connectivity dataset accurately maps the portions of valley bottoms with natural cover

Component Limitations

The Riparian Connectivity dataset does not factor in aquatic organism passage or other within-stream connectivity functions, but instead looks at stream-side connectivity. This is a limitation given that both of these types of connectivity are ecologically important.

Even with this focus on streamside connectivity, there are still limitations. Stream and river sections are not ranked by length or ecological importance so sections that are longer and can facilitate greater movement, are not prioritized. With the limited time available for this project we could not develop mapping algorithms sufficiently sensitive enough to account for section length and ecological importance without over-weighting headwater streams relative to main-stem channels. Therefore all riparian connectivity sections are treated as equally important. We recommend that future efforts to refine this dataset incorporate a ranking factor.

This dataset uses the Vermont Hydrological Dataset (VHD) that identifies stream centerline data to which a standardized buffer was added to establish stream width at various locations. While centerline data is very accurate in showing the location of a waterbody, the process needed to show the area (width) of that stream section creates inaccuracies. We believe the final product is still the best available data that includes all of Vermont's waterways and as with all features included in BioFinder, we recommend site-specific surveys prior to making any land-use decision

Component Weight and Justification

Riparian Connectivity was weighted an 8 on a scale of 1-10 (with 10 as highest contribution to biological diversity).

Summary Statistics for Riparian Connectivity

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

Verry, E. S., J. W. Hornbeck, and C. A. Dolloff (eds). 2000. Riparian management in forests of the continental Eastern United States. Lewis Publishers, Boca Raton, FL. 402p.

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.