Riparian Connectivity

Description

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 is the connected network of riparian areas in which natural vegetation occurs, providing natural cover for wildlife movement and plant migration. It includes all tree canopy, wetlands and shrublands down to 1 ac patches. This identifies stream reaches that haven't been developed and are critical travel corridors for a variety of wildlife species. Many stream sides are actively used for agriculture, which compromises their functionality as travel corridors.

Ecological Function

In addition to supporting the integrity of the lakes, ponds, rivers, and streams that they border, naturally vegetated riparian areas are especially important for providing cover for wildlife movement and other important wildlife habitat, such as nesting habitat for birds. Many wildlife species use riparian corridors for travel to find suitable habitat to meet their life requisites, but certain species are almost entirely restricted to riparian areas, including mink, otter, beaver, and wood turtle. The linear nature of riparian areas contributes to their function as movement corridors for wildlife. Roads, development, and agricultural lands fragment the Vermont landscape. The combination of Riparian Connectivity and Connectivity Blocks provide the best available paths for connectivity across the landscape, especially in highly fragmented areas of Vermont.

Guidelines for Maintaining Ecological Function:

Restoration is needed to provide a fully functioning network of riparian areas that support connectivity. Restoration of natural vegetation is needed for river and stream shorelines where it does not exist now, and especially in riparian areas that provide the best available terrestrial connectivity between relatively isolated Connectivity Blocks. The width of naturally vegetated riparian areas needed to provide riparian connectivity varies from 100 feet or less on some small streams (50 feet each side) to 600 feet or more (300 feet on each side) for larger rivers or riparian areas that span long distances of otherwise unsuitable habitat.

Riparian Wildlife 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.

Input Datasets and Selection Criteria

Riparian Connectivity was created by using a 1ac Habitat Patches dataset that uses a 1ac minimum threshold (rather than the 20ac version that was publicly released). This includes natural cover in patches of 1ac and greater consisting of tree canopy, shrublands and wetlands surrounded by roads development and agriculture. The Surface Water and Riparian Areas dataset was clipped to the 1-acre Habitat Block dataset. This Riparian Connectivity product was further refined by removing all Developed Land (derived from the 2016 0.5m pixel UVM Land Cover data). These Developed Lands included Bare Soil, Buildings, Roads, Railroads, and Other Paved surfaces.

1. **1ac Habitat Patches**, Hawkins-Hilke et al. 2023. Vermont Fish & Wildlife Department. (not released)

Description

The 2023 Habitat Blocks dataset uses a 20ac minimum threshold to define a habitat block, But the dataset was first built to include up to 1ac minimum patch size before the steering committee reviewed it for minimum acreage that should be considered a forest block. While insufficient to be called full on "forest" these > 1ac habitat patches were useful for showing riparian vegetation, particularly when these patches are more frequent and closer together. These include tree canopy, shrublands and wetlands just as the Habitat Blocks do.

Selection Criteria

All 1ac and greater habitat patches were included as the input for the Riparian Connectivity dataset and then clipped with the Surface Waters & Riparian Areas.

2. **Surface Waters & Riparian Areas Component**, VT Agency of Natural Resources, Natural Resources Mapping Project, BioFinder. 2012.

Description

The Surface Waters and Riparian Areas dataset combines buffers on the VHD stream centerlines with the Valley Bottom Land Type association.

Selection Criteria

Surface Waters and Riparian Areas component dataset was used as the maximum outer extent (clip feature) for the habitat patches.

Figure 4.1 Map of the Riparian Connectivity Component

Riparian Connectivity 2023

Highest Priority
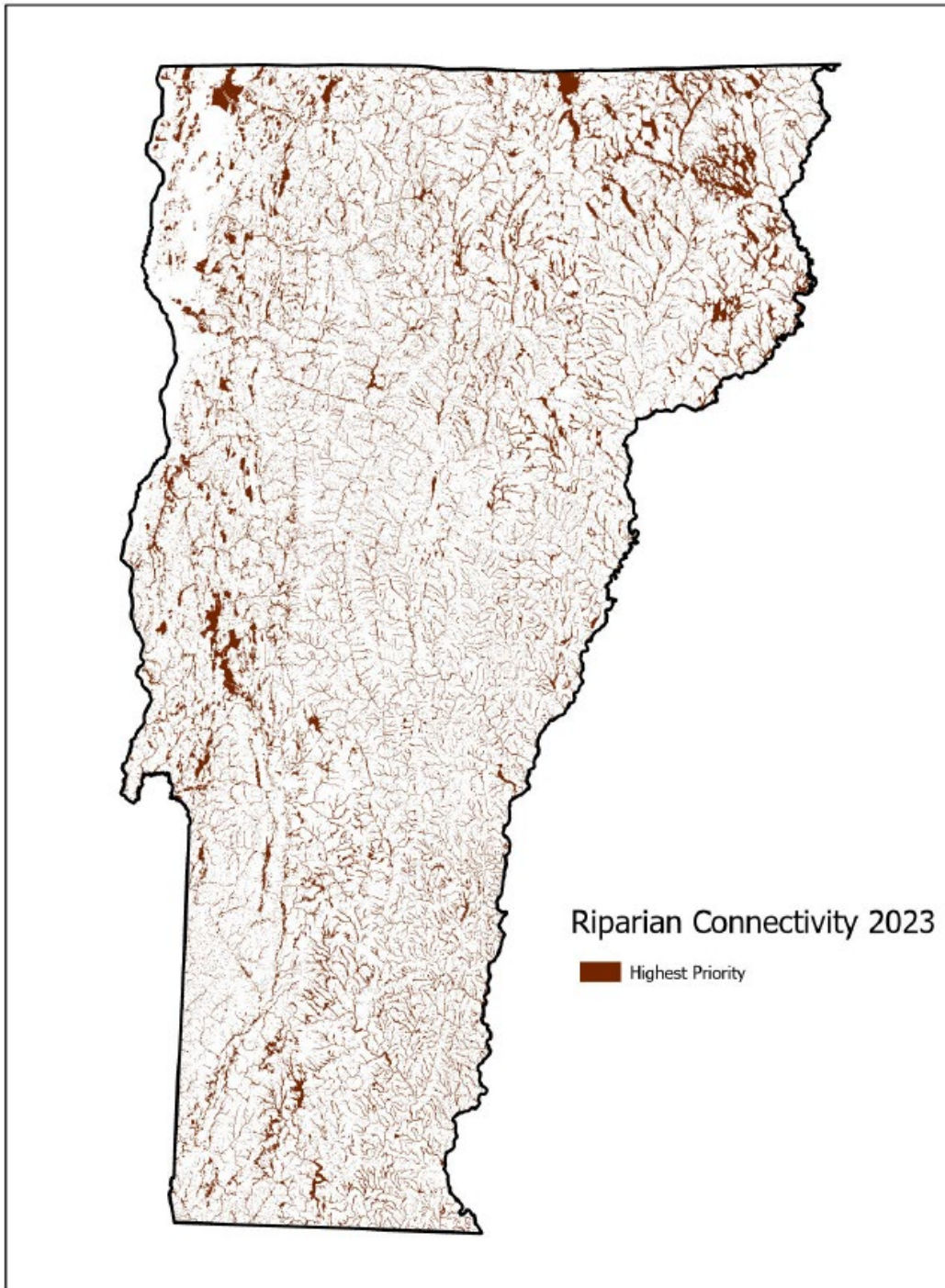
Component Strengths

The Riparian Connectivity dataset has been reworked to reduce errors in the previous version by using the 1ac Habitat Patches dataset that itself is based on 0.5m Tree Canopy dataset from the University of Vermont Spatial Analysis Lab. This increased resolution leads to a substantially better product than previous versions. It identifies all river and lake riparian areas that have natural or

semi-natural vegetation cover – a critical part of landscape connectivity.

The other datasets related to habitat connectivity all focus on terrestrial animals and are generally focused on 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 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.

Component Priority & Justification

All Riparian Connectivity was ranked as highest priority because it is critically important component of the larger system of wildlife movement and genetic exchange.

Highest Priority: All of the aquatic network of lakes, ponds, rivers, and streams and the valley bottoms in which the rivers and streams occur, excluding developed land and agricultural land.

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

For more information specific to this component, contact Vermont Fish & Wildlife Department, Jens Hilke, at 802-461-6791, jens.hilke@vermont.gov and Bob Zaino, at 802-476-0128, Robert.Zaino@vermont.gov