

Surface Waters and Riparian Areas (A1)

Description

This component includes all rivers, streams, lakes, and ponds – all aquatic habitats in Vermont. In addition, this component includes the valley bottoms in which rivers and streams flow. Specifically, the valley bottoms are the areas of alluvial soils (soils deposited by flowing water) through which rivers and streams migrate over time and where seasonal river or stream flooding is expected. Finally, this component includes a band of riparian habitat adjacent to all rivers, streams, lakes, and ponds or to the valley bottom.

Ecological importance

While Vermont's rivers, streams, lakes, and ponds cover a small percentage of Vermont's area, they provide vital habitat for a rich assemblage of aquatic species, including fish, amphibians, reptiles, invertebrates (e.g., insects, mussels, snails, worms, freshwater sponges), and plants. This represents an enormous contribution to Vermont's biological diversity. All of Vermont's rivers, streams, lakes, and ponds are important for the aquatic biota that they support.

As aquatic species are mobile, it is important to maintain connected aquatic habitats in order to protect the diversity of species. Water quality and temperature of upstream reaches directly influences the ability of downstream receiving waters to support aquatic assemblages. Fish and other aquatic populations may travel extensively throughout the lake and stream network for seasonal and life cycle needs. Therefore, it is critical to protect the entire aquatic network in order to maintain the ecological processes necessary to sustain these aquatic populations and assemblages. It is because of this that the decision was made to include all rivers, streams, lakes, and ponds in this BioFinder component.

The ecological integrity of rivers, streams, lakes, and ponds is closely linked with the condition of their riparian areas and contributing watersheds. Naturally vegetated riparian areas provide many critical ecological functions, including stabilizing shoreline against erosion, storage of flood waters, filtration and assimilation of sediments and nutrients, shading of adjacent surface waters to help moderate water temperatures, and direct contribution of organic matter to the surface water as food and habitat structure. Riparian areas are also critical habitat for many species of wildlife that are closely associated with open waters, including mink, otter, beaver, northern oriole, kingfisher, spotted sandpiper, and wood turtle. In addition, the shorelines and riparian areas of rivers and lakes support floodplain forests, several rare and uncommon natural communities, and many species of rare plants and animals.

The ecological integrity of rivers and streams is also closely linked to the stability of the river channel and the river corridor within which the river meanders. Rivers and streams channels naturally migrate within their meander belt widths – the part of a valley bottom across which a stream shifts its channel from time to time in response to erosion and deposition. Meander belts are governed by landforms in the valley bottoms, surficial geology and soils, and other characteristics of the river channels and watersheds. River corridors may be narrow in valleys restricted by bedrock or they may be wide in flat valley bottoms with deep alluvial soils.

Surface Waters and Riparian Areas Conservation Goal

To conserve the ecological integrity of all rivers, streams, lakes, and ponds and the aquatic biota they support and to contribute to a landscape that is more resilient in the face of increasingly frequent and severe flood events, by conserving and restoring watershed processes that support properly functioning aquatic habitats and riparian areas, and by maintaining or restoring river channel equilibriums.

Component Mapping Goal

To map all rivers, streams, lakes, and ponds and their associated riparian areas and river and stream valley bottoms.

Source Data and Selection Criteria

1. Vermont Hydrographic Dataset (VHD) 1:5,000

Description

The Vermont Hydrographic Dataset 1:5,000 is a spatially accurate statewide mapping of rivers, streams, lakes, and ponds.

Selection Criteria

All rivers, streams, lakes, and ponds mapped as lines or polygons. For those smaller rivers and streams mapped as line features in the VHD 1:5,000, the expected stream width from Table 1 is used to map these rivers and streams as polygons. Use the VHD 1:5,000 polygons for larger rivers and all lakes and ponds.

2. Valley Bottom Land Type Associations (Ferree & Thompson 2008)

Description

Valley Bottom LTAs, developed by Ferree & Thompson (2008), are used to map the valley bottoms, floodplains, and river corridors statewide. The Valley Bottom LTA data provides a statewide modeled map of river and stream valley bottom that effectively captures flat valley bottoms and associated alluvial soils, wetlands, and floodplains without extending mapped areas beyond the valley floors. Although partially a GIS model, major portions of the Valley Bottom LTA are based on soil mapping by Natural Resources Conservation Service and wetland mapping by National Wetlands Inventory.

Selection Criteria

All Valley Bottom LTAs are included. Riparian area widths are added to all streams and rivers as described in Table 1. This river and stream riparian area is measured from the outer edge of each side of the mapped river or stream polygon or the outer edge of the Valley Bottom LTA, whichever is wider. A 100 foot riparian area is mapped for all lakes and ponds.

Table 1. Stream Widths & Riparian

Stream Order	1	2	3	4	5	6	7	8
Stream Width (feet)	4	10	20	33	66	150	230	
Riparian area (feet) measured from the outer edge of Valley Bottom LTA (if one exists) or the outer edge of stream width (whichever is wider).	50	50	50	100	100	100	100	100

Component Strengths

The Vermont Hydrographic Dataset 1:5,000 is a spatially accurate statewide mapping of rivers, streams, lakes, and ponds. The Valley Bottom LTA data provides a statewide modeled map of river and stream valley bottom that effectively captures flat valley bottoms and associated alluvial soils, wetlands, and floodplains without extending mapped areas beyond the valley floors. Although partially a GIS model, major portions of the Valley Bottom LTA are based on soil mapping by Natural Resources Conservation Service and wetland mapping by National Wetlands Inventory, for which there is relatively high confidence in the mapping accuracy. Valley bottom LTAs and riparian areas includes many of the ecological processes associated with these areas.

Component Limitations

The Vermont Hydrographic Dataset 1:5,000 does not include many small headwater streams which are critically important habitat for some species and the primary source of cool water to lower stream segments. The Valley Bottom LTA is constructed partially as a GIS model, so these portions are not based on field data.

Component Weight and Justification

Surface waters and riparian areas were assigned a weight of 6 out of 10. This medium weighting is based on the very high value of this component in its contribution to biological diversity along with the recognition that the values of these areas will also be represented by other components, including Riparian Connectivity, Important Aquatic Habitats and Species Assemblages, and Representative Lakes.

Summary Statistics for Surface Waters & Riparian Areas

Table 2. 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.

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 Eric Sorenson, Vermont Fish & Wildlife Department, 802-476-0126, eric.sorenson@state.vt.us