

Surface Waters and Riparian Areas

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 Function

Vermont's rivers, streams, lakes, and ponds 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. The ecological integrity of an aquatic system is dependent on the condition of the watershed in which it occurs but is also critically tied to the condition of the riparian area adjacent to the stream or pond. For stability, rivers and streams must have access to their floodplains and freedom to meander within their valley bottoms or river corridors. Naturally vegetated riparian areas provide many significant ecological functions, including stabilizing shorelines 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 very essential habitat for many species of wildlife that are closely associated with the terrestrial and aquatic interface, including mink, otter, beaver, kingfisher, spotted sandpiper, and wood turtle. The shorelines and riparian areas of rivers and lakes support floodplain forests, several other rare and uncommon natural communities, and many species of rare plants and animals. In addition to these ecological functions that are tied to aquatic systems, the linear network of riparian areas provides a crucial element of landscape connectivity for plant and animal movement in response to climate change (Beier 2012). Although many riparian areas and river corridors are highly altered by agriculture, roads, and urbanization, the risk of flooding serves as a natural deterrent for future development. Riparian areas also respond rapidly to restoration efforts (Beier 2012).

Guidelines for Maintaining Ecological Function:

Restoration is needed in order for Surface Waters and Riparian Areas to provide full ecological functions. Specifically, river channel equilibriums need to be maintained or restored. Natural vegetation should be maintained or restored in undeveloped riparian areas of rivers, streams, lakes, and ponds of adequate width to maintain water quality, stabilize shorelines, provide shade and biological support for aquatic systems, maintain biological diversity, and provide functional connectivity, both aquatic and terrestrial.

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

The Surface Waters and Riparian Areas dataset brings together three different mapped layers. First is all lakes and ponds from the Vermont Hydrographic Dataset with a 100' buffer to capture shore habitats. Second is all rivers and streams from the Vermont Hydrographic Dataset with a buffer to include adjacent streamside vegetation (Buffer changes based on how far up the watershed the stream is – called “Stream Order”. And third is a model of “Valley Bottom” Land Type Associations that was created by Ferree & Thompson in 2008.

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 6 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

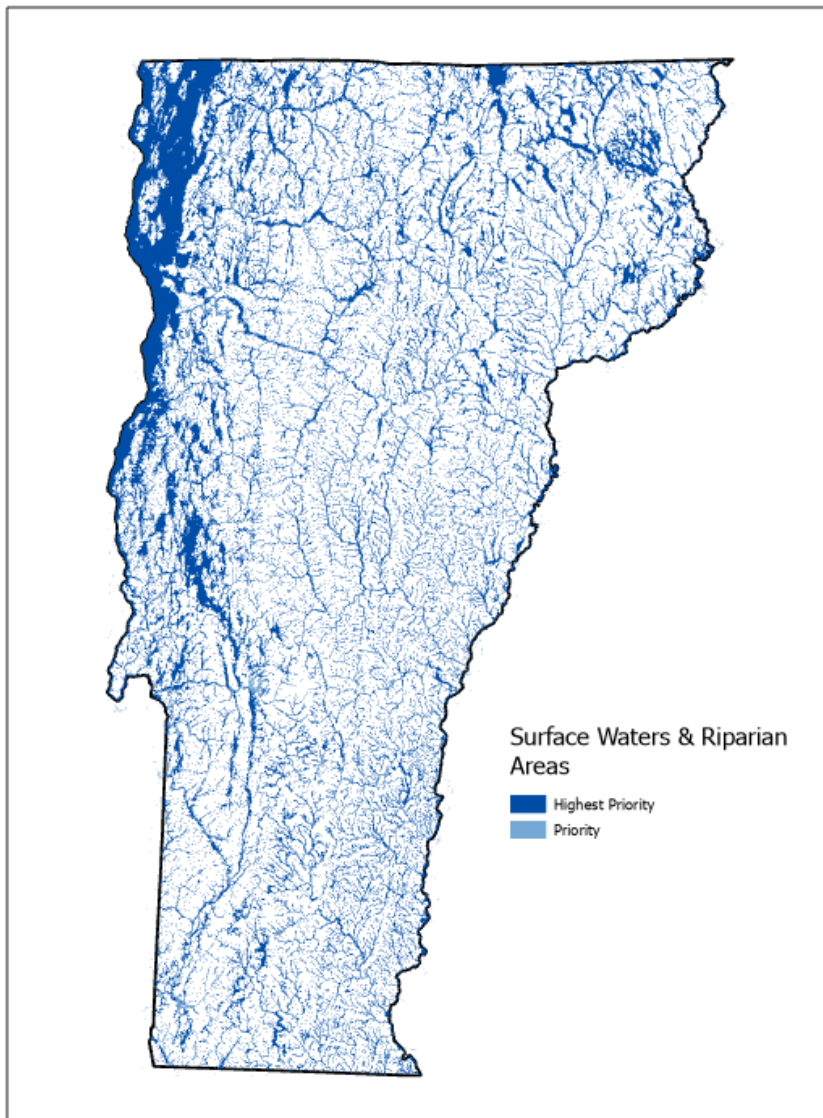
All Valley Bottom LTAs are included. Riparian area widths are added to all streams and rivers as described in Table 1. This river and stream riparian area is measured from the outer edge

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 3.1 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

Figure 3.2 Map of the Surface Waters and Riparian Areas Component



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 Priority & Justification

Surface waters and riparian areas were divided into highest priority & priority based on land cover and land use data.

Priority: All of the aquatic network of lakes, ponds, rivers, and stream and the valley bottoms in which the rivers and streams occur; to be conserved or managed in such a way as to achieve full functioning of all natural processes.

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 including the Vermont hydrography layer and a buffer that is proportional to stream order.

These areas are of critical importance for water quality, flood attenuation, erosion prevention and wildlife movement. This 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 Wildlife Connectivity, Important Aquatic Habitats and Species Assemblages, and Representative Lakes.

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