

Wetlands (SN8)

Description

Wetlands are vegetated ecosystems characterized by abundant water. Wetlands include the vegetated, shallow-water margins of lakes and ponds and the seasonally flooded borders of rivers and streams. They occur in an amazing diversity of topographic settings across the landscape, including basins, seepage slopes, and wet flats. All wetlands have three characteristics in common. First, all are inundated by or saturated with water during varying periods of the growing season. Second, they contain wetland or hydric soils, which develop in saturated conditions and include peat, muck, and mineral soil types. Finally, wetlands are dominated by plants that are adapted to life in saturated or inundated soils. As a group, these plants are referred to as hydrophytic vegetation. There are several types of wetlands that are commonly recognized. Swamps are wetlands dominated by woody plants, either trees or shrubs. Marshes are wetlands dominated by herbaceous plants. Fens are peat-accumulating open wetlands that receive mineral-rich groundwater. Bogs are also peat-accumulating wetlands but are isolated from groundwater or surface water runoff by deep peat and therefore receive most of their water and nutrients from precipitation. Vernal pools are small, isolated, seasonally inundated wetlands typically surrounded by upland forests. Vermont's wetlands range in size from vernal pools and seeps that may be a few hundred square feet or less to vast swamps and marshes occupying thousands of acres along Otter Creek and Lake Champlain.

Ecological importance

Few natural systems have been studied as much for their ecological functions as have wetlands. Wetlands store large volumes of water and attenuate downstream flooding, a function that is likely to increase in importance in Vermont as climate change brings more frequent and larger storm events. Wetlands help maintain surface water quality by trapping sediments and removing nutrients and pollutants from surface waters before that water reaches streams or lakes. Many wetlands are associated with groundwater discharge and form the headwaters of many cold water streams, another function that is likely to increase in importance with the expected warming and reduction in snowpack associated with climate change. Wetlands are well known for the critical wildlife habitat they provide for many species of birds, mammals, reptiles, amphibians, and insects, but some wetlands also provide critical spawning and nursery habitat for fish species. Although wetlands occupy only about five percent of the land area in Vermont, they provide necessary habitat for the survival of a disproportionately high percentage of the rare, threatened, and endangered species in the state. Examples of wetland dependent rare species include Calypso orchid, Virginia chain fern, marsh valerian, sedge wren, spotted turtle, and four-toed salamander.

Wetlands Conservation Goal

To conserve the full diversity of wetland types across their geographic ranges. Effective conservation should include appropriate upland buffer zones, the ecological processes that support wetlands (especially hydrology), and a network of connected lands, waters, and riparian areas to allow ecological exchange between wetlands, including the ability of component species to shift over time in response to changing environmental conditions.

Component Mapping Goal

To identify and map all wetlands that are expected to provide significant ecological functions.

Source Data and Selection Criteria

Vermont Significant Wetland Inventory (VSWI), VT Department of Environmental Conservation

Description

All wetlands mapped by the Vermont Significant Wetland Inventory (VSWI). The VSWI maps are based on the National Wetlands Inventory maps produced by the U.S. Fish and Wildlife Service, but have been updated periodically by the Vermont Department of Conservation and the Vermont Natural Resources Board.

Selection Criteria

All wetlands in the dataset.

Component Strengths

The VSWI maps are a well-known dataset based on National Wetlands Inventory maps and updated periodically for Vermont based on additional inventory and work by Vermont Department of Conservation and the Vermont Natural Resources Board. The maps are generally very accurate in identifying wetland presence, although the boundaries are not necessarily precise. Studies and on-going regulatory review by the Department of Environmental Conservation have shown that most wetlands mapped on VSWI provide ecological functions at a significant level.

Component Limitations

Not all wetlands with significant ecological functions are included on the VSWI maps. The VSWI maps do not include attribute information describing the wetland type present at a site. Site visits are always needed to identify whether a wetland is present on a site and to determine the actual boundary of the wetland.

Component Weight and Justification

Wetlands are assigned a weight of 8 out of 10. This high weight is based on the high level of ecological functions provided by wetlands, the large number of plant and animal species that are dependent on wetland habitat for survival, and the high accuracy of the VSWI maps for identifying wetland presence.

Summary Statistics for Wetlands

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.

For more information

A complete report on BioFinder development, methods and findings, including all 21 component summaries can be found at www.BioFinder.vt.gov. For more information specific to this component, contact Alan Quackenbush, Vermont Department of Environmental Conservation, Wetlands Division, 802.490.6179, alan.quackenbush@state.vt.us.