

## Important Aquatic Habitats & Species Assemblages (A3)

### Description

This component includes those Vermont lakes, ponds, rivers, and streams that support important aquatic habitats and species assemblages. Important aquatic habitats and lakes and river segments with important species assemblages were selected based on biological data and professional judgment. The selection is made primarily based on the occurrence of fish species, although other biological conditions and information was also considered.

### Ecological importance

The selected aquatic habitats and river/stream segments represent locations with concentrations of rare species, especially diverse areas, and/or important species assemblages. As such, these waters make an exceptional contribution to Vermont's biological diversity. The ecological importance of each selection is explained in more detail under the selection criteria, below.

### Important Aquatic Habitats and Species Assemblages Conservation Goal

To conserve all important aquatic habitats and species assemblages and the ecological condition of the waters, riparian areas, and watersheds that support them.

### Component Mapping Goal

To identify and map lakes, ponds, rivers, and streams that support important aquatic habitats and species assemblages based on the best available data and professional judgment.

### Source Data and Selection Criteria

**Department Databases**, VT Fish and Wildlife Dept and VT Dept of Environmental Conservation

#### Description

The two departments each maintain extensive databases on the location of fish species in Vermont's rivers, streams, lakes, and ponds.

#### Selection Criteria

The two databases were consulted and combined with the professional judgment/experience of fisheries biologists and aquatic ecologists to select the following lakes, ponds, rivers, and streams.

#### Lakes and Ponds

- a. **Lake Champlain:** due to the influence of biogeography, Lake Champlain supports native fish and mussel species from two glacial refugia.
- b. **Oligotrophic Lakes:** supporting lake trout and/or round whitefish. Great Averill, Little Averill, Beaver, Caspian, Crystal, Echo, Elligo, Seymour, Willoughby
- c. **Rutland County Lakes:** supporting or expected to support species assemblages including blackchin shiner, bridle shiner, blacknose shiner, and redfin pickerel. Austin, Beebe, Black, Breese, Burr, Choate, Doughty, Echo, Halfmoon, High, Hinkum, Hough, Johnson, Mud (Benson), Mudd (Hubbardton), Perch, Roach, Spruce, Sunrise, Sunset, Walker
- d. **High elevation ponds:** habitats characterized by simple, cold water obligate aquatic communities. Bourn and Branch (Sunderland), Stratton (Stratton), Lake Pleiad (Middlebury), North Pond (Chittenden), Griffith Lake (Mount Tabor), Big Mud (Mount Tabor), and Little Rock (Wallingford).

## Rivers and Streams

- a. **Lake Champlain tributaries upstream to the fall line (150 feet elevation):** Due to the influence of biogeography, these waters support native fish and mussel species from two glacial refugia. Unlike the remainder of Vermont waters which were populated only by eastern species, the mid- and lower elevation waters in the Champlain drainage contain both eastern and western species resulting in streams that support greater numbers of species than streams of similar size elsewhere in Vermont. Due to the direct connection with Lake Champlain, these waters also provide habitats necessary for the support of Lake Champlain populations.
  - i. Large Rivers
    1. Missisquoi River
    2. Lamoille River
    3. Winooski River
    4. Mallets Creek
    5. LaPlatte River
    6. Lewis Creek
    7. Otter Creek
    8. Poultney River
    9. East Creek
  - ii. All other small rivers and streams that drain directly into Lake Champlain.
- b. **Large coldwater streams:** Large streams with specific geologic and hydrologic features that support coldwater species assemblages due to the combination of high alkalinity and abundant cold baseflow from groundwater inputs.
  - i. Batten Kill from New York-Vermont border upstream on the main stem Batten Kill to elevation 798 feet (East Dorset) and on the West Branch to elevation 926 feet (Dorset Marsh in Dorset).
  - ii. Castleton River from Whipple Hollow Road in West Rutland Marsh (West Rutland) to confluence with Poultney River (Fair Haven).
- c. **High elevation coldwater streams:** Streams characterized by simple, cold water obligate aquatic communities dominated by native species, especially brook trout and sculpin. While found at lower elevations, above an elevation of 1400ft almost 100% of the stream miles support native coldwater obligate species. These streams will be the refugia for cold water obligate taxa under predicted climate change warming in the next century. All streams above 1,400 feet elevation are included.
- d. **Connecticut River**
  - i. Upper Connecticut River supports burbot, round whitefish, and coldwater fish communities. For that section of the river shared by New Hampshire and Vermont, this reach is delineated to the north by the state line (River Mile 319.0) and just upstream of Moore Reservoir (River Mile 247.0).
  - ii. Lower Connecticut River: River Mile 120.0 (below Bellows Falls power station) and the bypassed river section reported to be the historic upper limit of American shad in river. From this point downriver to the state line the river is habitat for blueback herring and alewife floater.

## Component Strengths

The selected lakes, ponds, rivers, and streams are known locations for important aquatic habitats and species assemblages and therefore are important for conservation of biological diversity.

## Component Limitations

The dataset is compiled primarily based on fish data and does not include other biota comprehensively. There is not site specific data available for all high elevation streams, but there is high confidence that these streams support cold water obligate species and that they contribute cold water to downstream waters. Fish and mussel data from small Lake Champlain tributaries is incomplete.

**Component Weight and Justification**

Important aquatic habitats and species assemblages were assigned a weight of 8 out of 10. This high weighting is based on the critical contribution of these waters to the conservation of biological diversity and the high confidence in the mapping accuracy.

**Summary Statistics for Important Aquatic Habitats and Species Assemblages**

**Table 1. BioFinder component datasets, component weights, and the distribution (%) of components across tiers**

| Data #                                   | Weight   | Component   | Tier 1<br>Greatest | Tier 2<br>Very High | Tier 3<br>High | Tier 4<br>Moderate | Tier 5<br>Low |
|--|----------|---|--------------------|---------------------|----------------|--------------------|---------------|
| <b>Landscapes</b>                        |          |   |                    |                     |                |                    |               |
| 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%         |
| <b>Aquatics</b>                          |          |   |                    |                     |                |                    |               |
| 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%          |
| <b>A3</b>                                | <b>8</b> | <b>Important Aquatic Habitats &amp; Species Assemblages</b> | <b>19.9%</b>       | <b>75.2%</b>        | <b>4.9%</b>    | <b>0.0%</b>        | <b>0.0%</b>   |
| <b>Species &amp; Natural Communities</b> |          |   |                    |                     |                |                    |               |
| 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**

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