

Rare Species (SN1)

Description

A rare species of plant or animal is one that has only a few populations in the state and that faces threats to its continued existence in Vermont. The Vermont Fish and Wildlife Department uses a ranking scheme to describe the relative rarity of species in Vermont, using a national Natural Heritage methodology. The range is from S1 (very rare) to S5 (common and widespread). Species are assigned a rarity rank based on the number of known individuals, the population size statewide, and the degree to which the populations are threatened. Rare species are generally considered to be those with twenty or fewer populations statewide, whereas uncommon species are generally considered those with more than 20 but 80 or fewer populations statewide.

Ecological importance

A species may be rare in Vermont for several reasons, including the following: the species is near the edge of the geographic range; the species only occurs in specialized habitats or rare natural communities; or human activities have resulted in a direct loss of the species or the habitat it requires. Rare species, like any species, are important for their intrinsic values – as organisms that have evolved over millennia. Each species is assumed to serve an important role in maintaining ecological integrity. Sometimes the details of this role may not be known until a species is lost or becomes extinct. Rare species, especially populations occurring at the edge of the species' geographic range, provide important genetic diversity which may be especially significant in allowing species to adapt and evolve to changes in the environment, such as climate change.

Rare Species Conservation Goal

To conserve populations of all rare species of plants and animals in Vermont, the habitat they need to survive, the ecological processes that support them, and to conserve landscape connectivity to allow individuals to disperse and populations to shift distribution over time in response to changing environmental conditions.

Component Mapping Goal

To identify and map occurrences of all populations of rare species in Vermont using the best available data.

Source Data and Selection Criteria

1. Natural Heritage Database, Vermont Fish and Wildlife Department

Description

The Natural Heritage Database contains detailed, geographically-referenced information on Vermont's uncommon, rare, threatened, and endangered species and significant natural communities. The database is periodically updated as new information on species and natural communities becomes available. The data used for BioFinder are current as of March 2012.

Selection Criteria

- a. All Element Occurrences (An “EO” is a specific record representing a place where the species occurs) in the Natural Heritage Database for species with an S-rank (state rank – describes relative rarity) of S1 (very rare) or S2 (rare). All Element Occurrences for species listed as state Threatened or Endangered. Element Occurrences with very poor mapping accuracy, such as those that are mapped to an entire town boundary, are excluded.
- b. All Element Occurrences for S1 and S2 species with EO-rank of H (Historic – there is a lack of recent information verifying the continued existence of the species at a specific location). Element Occurrences with very poor mapping accuracy, such as those that are mapped to an entire town boundary, are excluded.
- c. All EOs for species with S-rank of SH (State Historic – the species is missing from the state and known from only historical occurrences, but there is still some hope of rediscovery), except those species that are clearly extirpated from Vermont, those Element Occurrences that need to be eliminated because of very poor mapping accuracy, or other reasons. The following species are specifically excluded
 - *Betula x sandbergii*: a sterile hybrid plant species with no unique heritable lineage and known only from a single 1911 collection at Fairfield Pond. (1 EO)
 - *Betula x raymundii*: same as above but known from 1983 Colchester Bog specimens (searched for but not found a few times since) and 1914 Stowe specimens (no specific location). (2 EOs)
 - Loggerhead Shrike: a bird species no longer present in Vermont (2 EOs)
 - Puritan tiger beetle: pre-1932 record. Vermont no longer has habitat for this species (1 EO)

2. Bicknell’s Thrush observation data, Vermont Center for Ecostudies

Description

Vermont Center for Ecostudies maintains point location data on Bicknell’s Thrush, a bird species with an S-rank of S2B (very rare during the breeding season). This observational data for Bicknell’s Thrush is much more complete than the data for this species in the Natural Heritage Database. The data used for BioFinder are current as of March 2012.

Selection Criteria

All confirmed point locations for Bicknell’s Thrush mapped to the full extent of the associated Montane Spruce-Fir Forest polygon as mapped by Natural Heritage Inventory. Montane Spruce-Fir Forest is an accurate representation of the forest habitat used by this rare bird species. Exclude any duplicate Bicknell’s Thrush Element Occurrences from the Natural Heritage Database.

3. Jefferson Salamander data from the Vermont Vernal Pool Mapping Project, Arrowwood Environmental, Inc. and Vermont Center for Ecostudies

Description

The Vermont Vernal Pool Project is a statewide effort to map the locations of vernal pools. Vernal pools are small seasonal wetlands that typically occur in upland forests and provide critical habitat for breeding amphibians. Vernal pools are mapped using aerial photographs and are subsequently visited with landowner permission to confirm their existence and collect biological and physical data, including the presence of Jefferson Salamander, an S2 species. The data used for BioFinder are current as of March 2012.

Selection Criteria

All vernal pools that have been confirmed by site visits and that are being used by Jefferson Salamander. Each vernal pool is mapped as a 600 foot radius circle to include the pool and the expected life zone of amphibians that breed in the pool and use the surrounding forest for other life stages.

Component Strengths

Rare species records from all three data sources are highly accurate and are based on field inventory. Element occurrence data for rare species are mapped using consistent methodology developed by the Vermont Fish and Wildlife Department and NatureServe. Rare species records are typically considered one of the most important “fine filters” for conserving biological diversity. Bicknell’s Thrush observation points are mapped to expected forest habitat which is a more accurate representation of species’ needs than the mapped observation points.

Component Limitations

Statewide inventories for rare species are on-going and therefore our knowledge of rare species locations is incomplete, although our understanding is relatively high for some groups, such as vascular plants. Many rare species populations that are mapped in the Natural Heritage Database are mapped as circles, with the circle centered on the expected location of the population and the size of the circle representing uncertainty in the mapping accuracy. For older records with poor mapping accuracy this means that more area is mapped for the species population than it actually inhabits. Populations of rare species and other species change over time in response to shifting environmental conditions and periodic monitoring is required. Site visits are required to identify whether rare species occur on a site. Bicknell’s Thrush data is from multiple sources which contributes some uncertainty to the data.

Component Weight and Justification

Rare species were not assigned a weight as were most other components. Instead, rare species were assigned directly to Tier 1 of the prioritization due to the critical natural of rare species for conserving biological diversity.

Summary Statistics for Rare Species

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