

Natural Resource Inventories:

Forest Blocks, Wildlife Corridors, Natural Communities, and Rare Species!



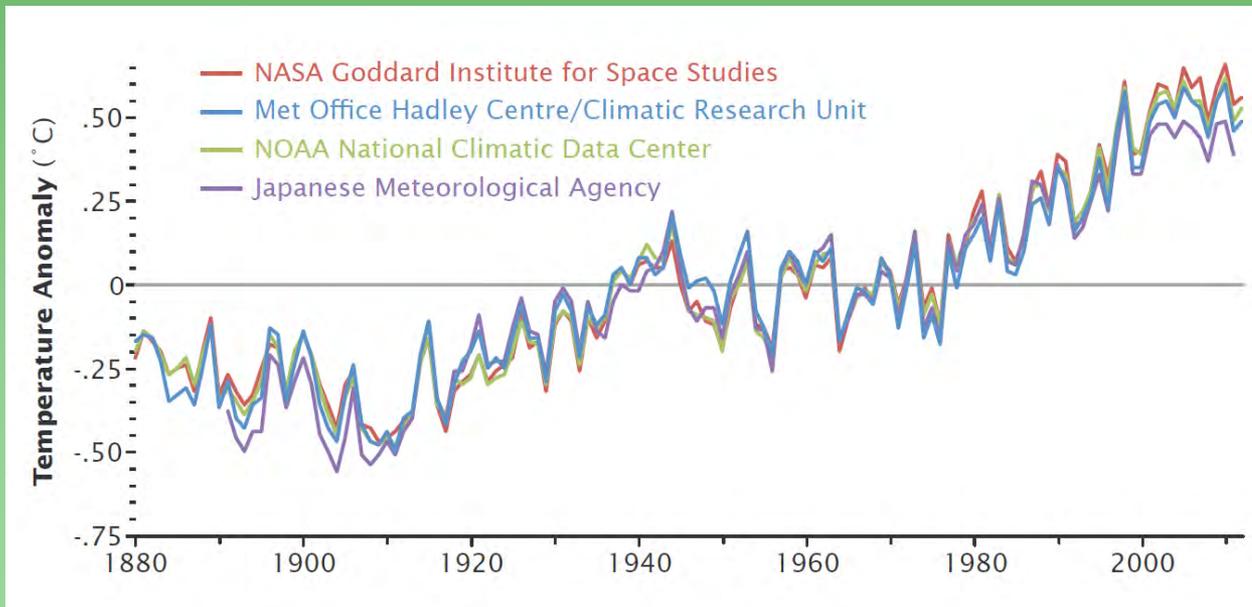
Everett Marshall and Eric Sorenson
Natural Heritage Inventory
Fish and Wildlife Department
Vermont Agency of Natural Resources

Outline

- **Background on threats and conservation of biological diversity – its relevance at the town level.**
- **Purposes and benefits of a town-wide inventory**
- **What natural resource features are commonly included in a detailed town inventory?**
- **Practical considerations in conducting a town inventory**
- **What data are available and how to get it?**
- **How to use forest block, connectivity, natural community, and rare species data at the town level?**

Primary Threats to Biological Diversity

- Population growth
- Habitat loss
- Habitat fragmentation
- Non-native, invasive species
- Climate change – direct and compounding effects



NASA



Terminology

Habitat Fragmentation: *dividing land with naturally occurring vegetation and ecological processes into smaller and smaller areas as a result of roads, land clearing, and development.*



Terminology

Landscape Connectivity: *the degree to which blocks of suitable habitat are connected to each other, allowing movement of species and functioning of ecological processes.*

Local Connectivity

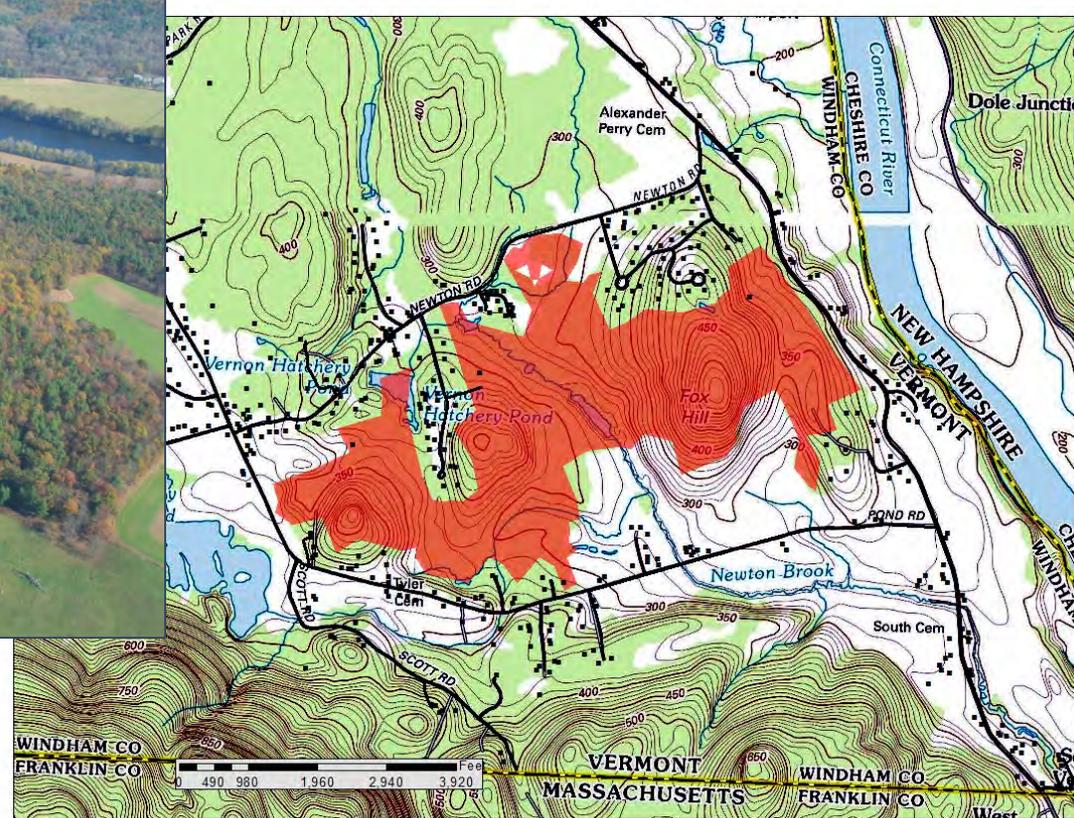


Regional Connectivity



Terminology

Forest Blocks: areas of contiguous forest and other natural habitats (wetlands, ponds, cliffs,...) that are unfragmented by roads, development, or agriculture.

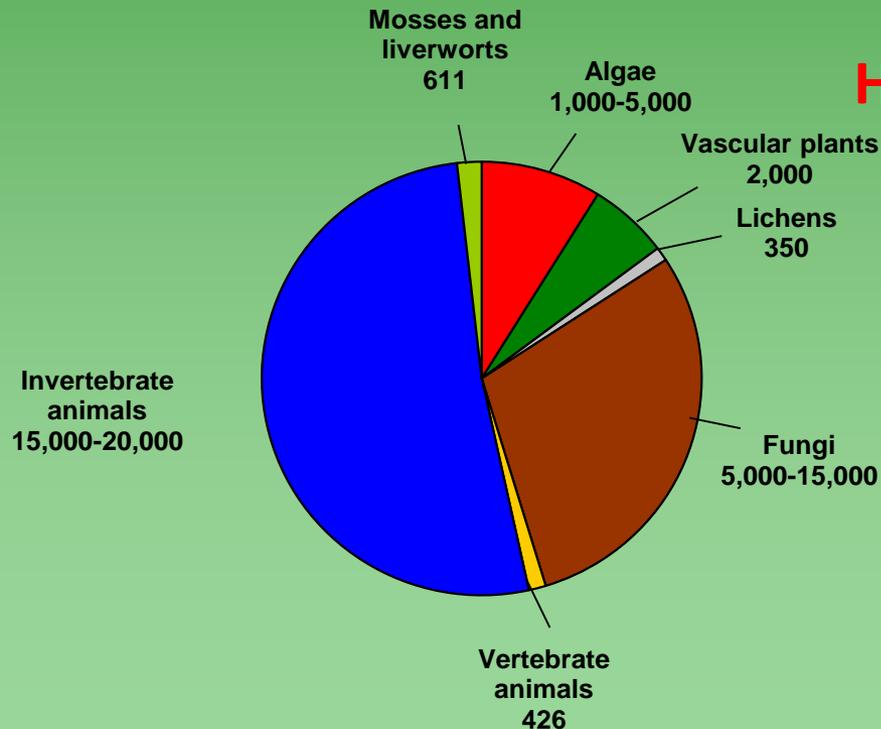


Department Mission:

“Conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected.”

Consistent with a goal of conserving biological diversity.

Species in Vermont: 24,000 to 43,500 estimated!



How do we protect them all?



Elfin Skimmer

Coarse filter/fine filter approach to conservation

If examples of all coarse-filter elements are conserved at the scale at which they naturally occur, most of the species they contain – trees, mammals, birds, insects – will also be conserved. Some species will always need special attention.



Conservation Design at Three Scales

Landscapes



Champlain Valley

Natural Communities



Dry Oak-Hickory-Hophornbeam Forest

Species



Southern Twayblade (*Listera australis*)

Interior Forest Blocks
Connectivity Blocks
Surface Waters and Riparian Areas
Riparian Areas for Connectivity
Physical Landscape Diversity Blocks
and Wildlife Road Crossings

Upland and Wetland
Aquatic
Vernal Pools...
Old Forest
Young Forest
(next two years)

Rare Species
Grasslands
Spp of Greatest Cons. Need
Deer
Pollinators...
(next two + years)

Purposes and benefits of a town-wide inventory

- **Conserving biological diversity.**
- **Planning! Vision for the future of the town.**
- **Incorporate results into the town plan.**
- **Increasing connection between town residents, landowners, and natural features in town.**
- **Improving understanding of how town fits into broader conservation picture.**
- **Identify targets for conservation and/or restoration.**



What natural resource features are commonly included in a detailed town inventory

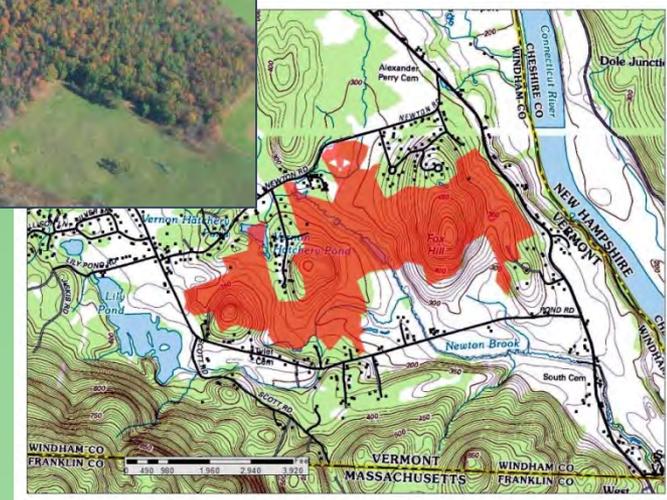
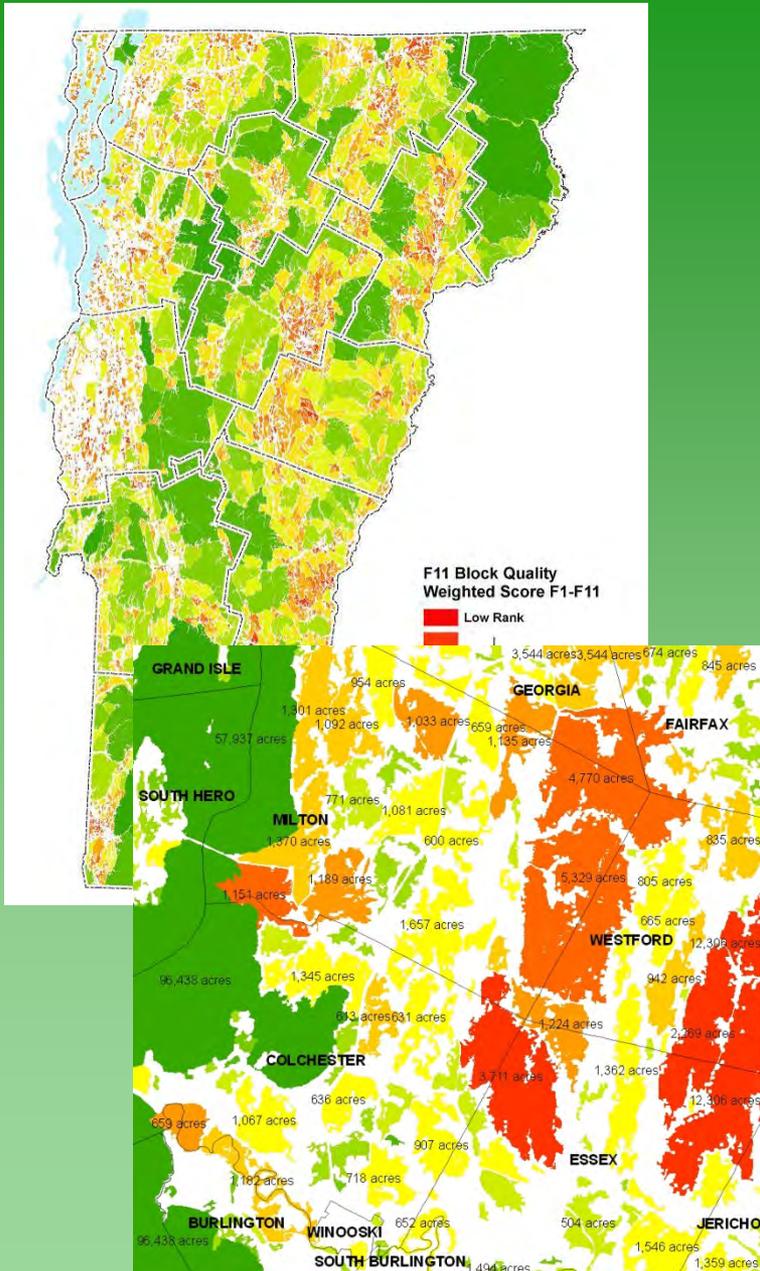
Landscape scale (large features that function beyond town boundaries)

- Forest blocks
- Habitat connectivity or travel corridors

Inventories can provide site-specific information to supplement the statewide data that are available.

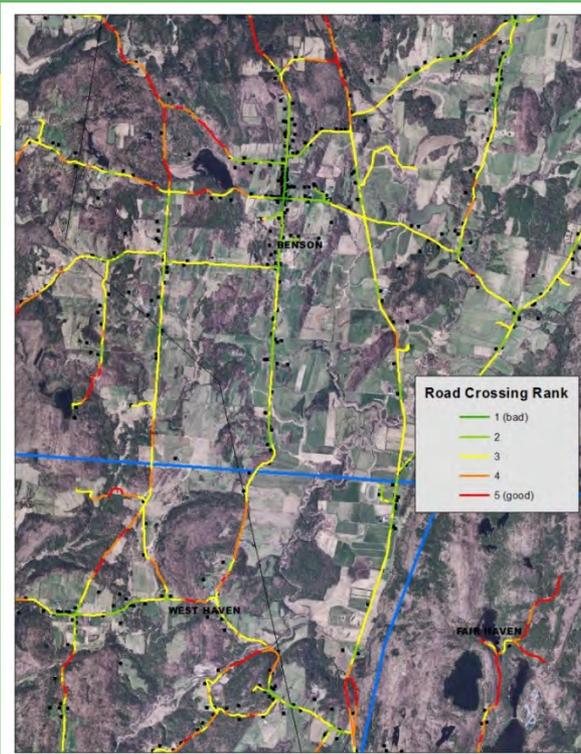
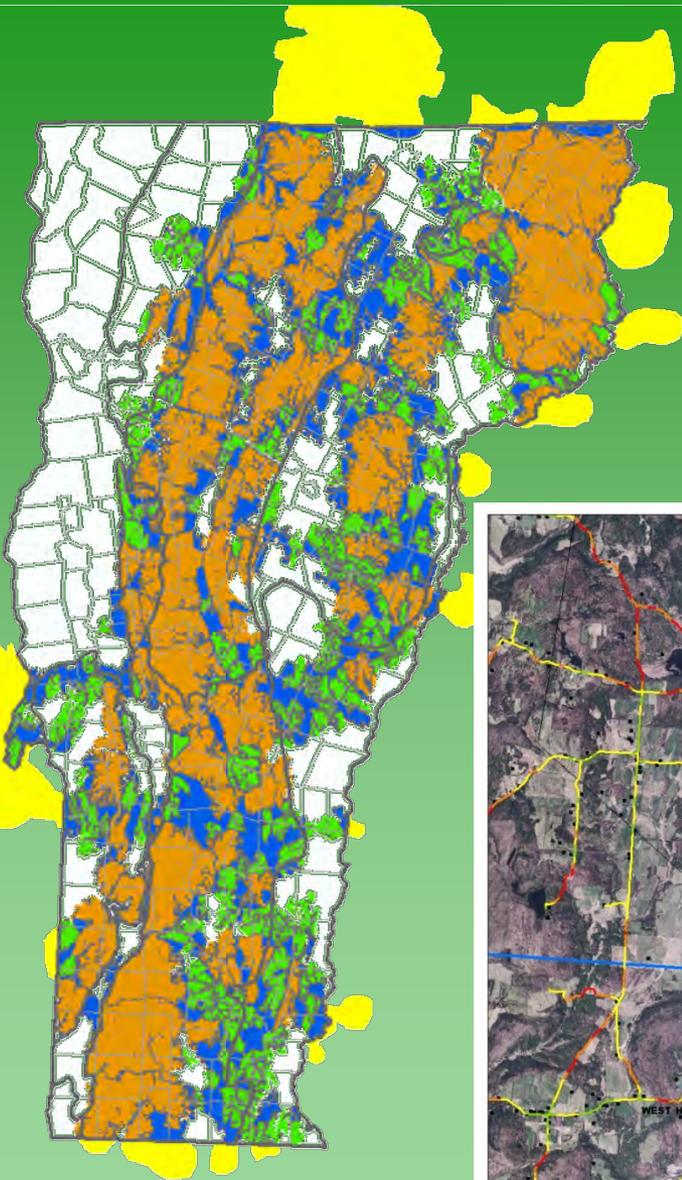
Forest Blocks

- Forest blocks provide interior forest habitat for many wildlife species and are the source of many ecological services (clean & cold stream water, carbon storage)
- 4,055 forest blocks identified
- Each block ranked for 11 biological and physical factors and total weighted score



Habitat Connectivity and Travel Corridors

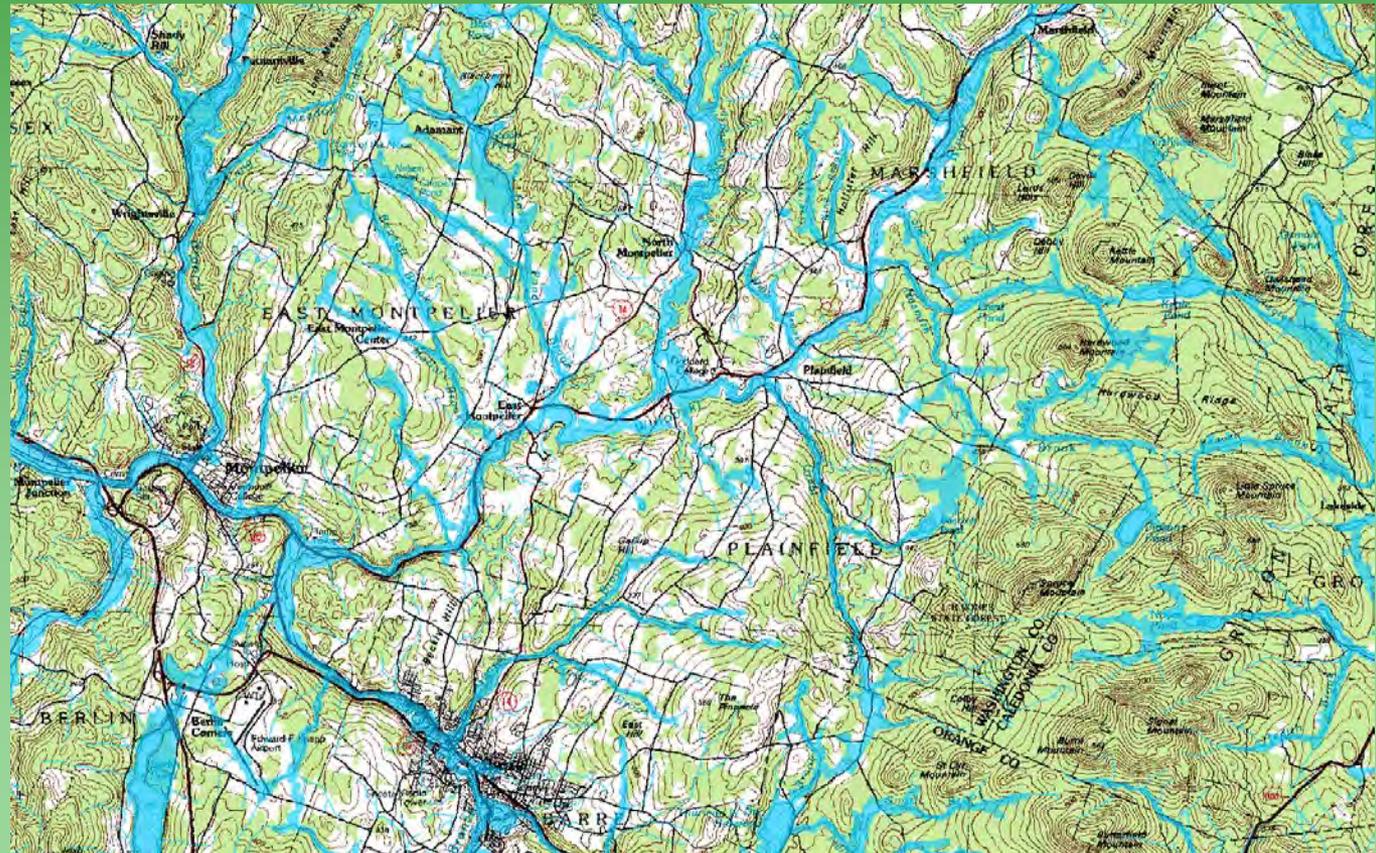
- wildlife road crossings
- movement corridors for plants and animals
- riparian areas!
- adaptation for climate change



Riparian Areas

- flood storage and river processes
- movement corridors for plants and animals
- biological diversity

Combination of riparian corridors and network of connected lands is an important step in identifying statewide habitat connectivity.



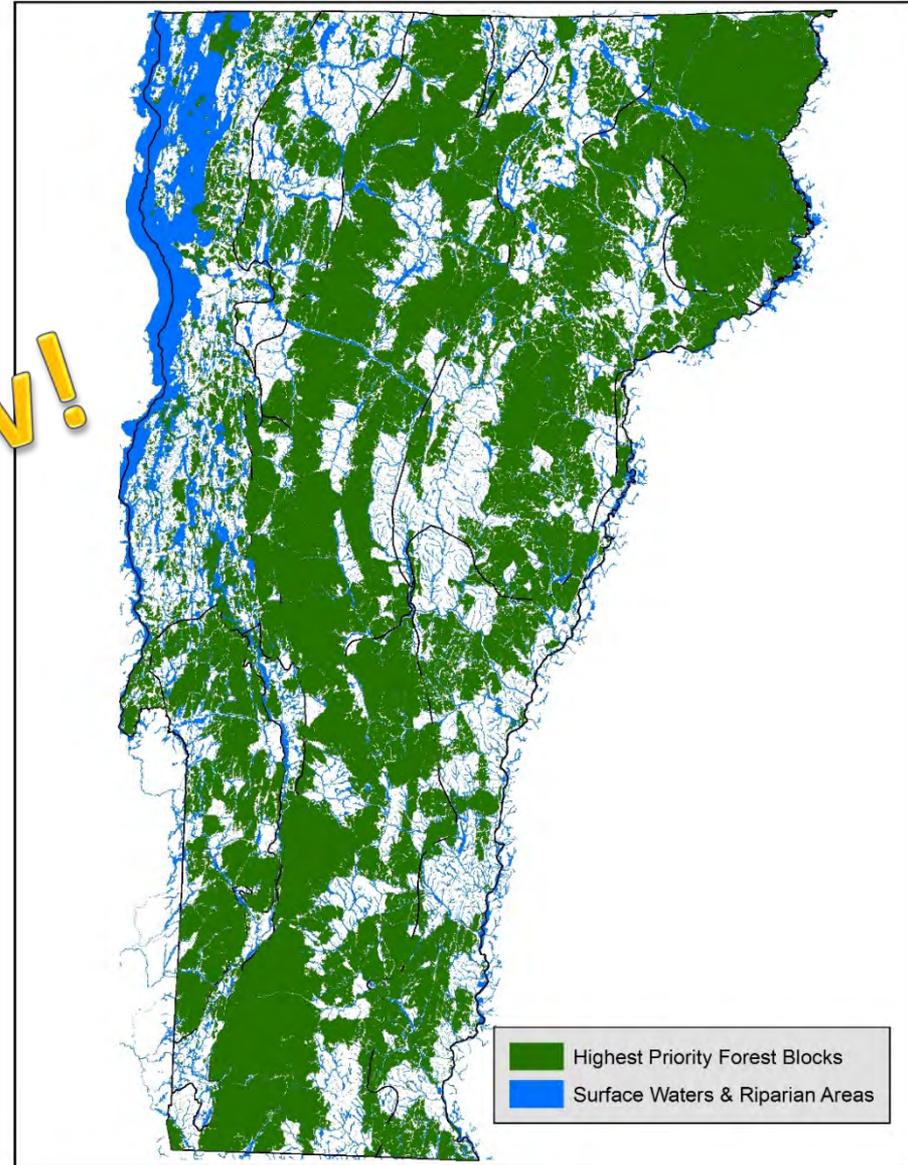
Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape

- Interior Forest Blocks
- Connectivity Blocks
- Surface Waters and Riparian Areas
- Riparian Areas for Connectivity
- Physical Landscape Diversity Blocks
- Wildlife Road Crossings

New!

Protect the ecological function of each element.

(report on FWD website)



What natural resource features are commonly included in a detailed town inventory

Natural Community scale

- **Significant natural communities**
- Wetlands
- Lakes and ponds
- Rivers and streams
- Riparian areas

A natural community type is an assemblage of plants and animals that is found recurring across the landscape under similar environmental conditions where natural processes, rather than human disturbances, prevail.

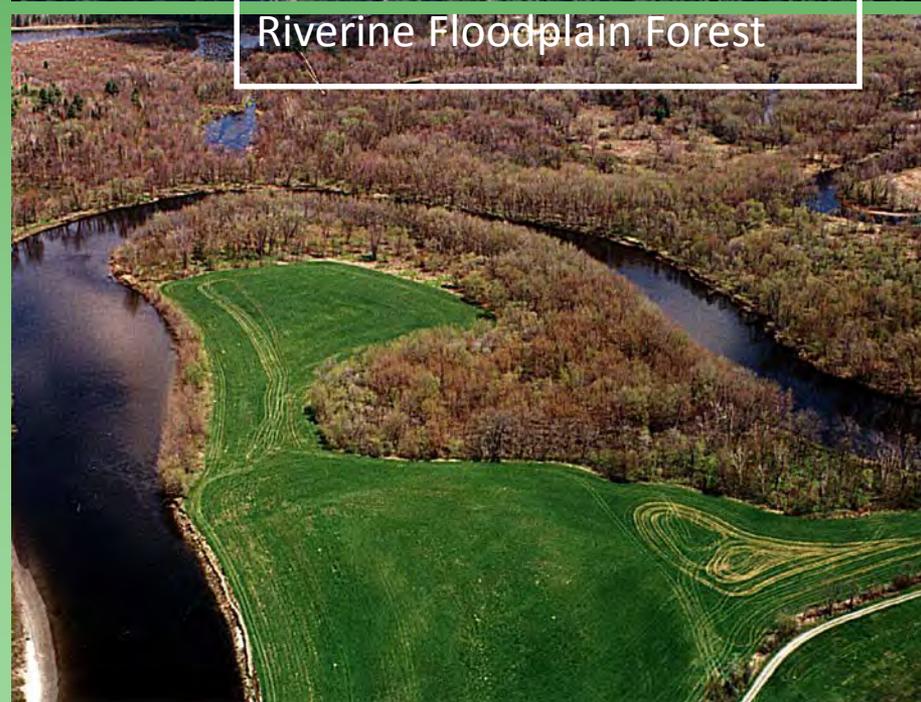
Natural Community Classification

- 90 types (upland and wetland)
- dominant vegetation
- climatic setting
- ecological processes
- rarity of type (S1-S5)
- size at which it occurs

Can be mapped and classified at the town level.



Silver Maple-Ostrich Fern
Riverine Floodplain Forest



Examples of Upland Natural Communities



Dry Oak-Hickory-Hophornbeam Forest

Limestone Bluff Cedar-Pine Forest

Examples of Wetland Natural Communities:

Black Spruce Swamp



Wetland Natural Communities



Poor Fen



**Alluvial
Shrub
Swamp**



What natural resource features are commonly included in a detailed town inventory

Species and Habitat scale

- **Rare species**
- Deer winter habitat
- Mast stands
- Early successional habitat
- Ledge, talus, and cliff
- Grassland birds

What are Rare, Threatened & Endangered Species

- **Endangered**: a species in immediate danger of becoming extirpated in the state (state and federal laws) (ex. Indiana Bat and Dwarf Chinquapin Oak)
- **Threatened**: a species with high possibility of becoming endangered in the near future (state and federal laws) (ex. Eastern Ratsnake and Creeping Juniper)
- **Very rare**: (S1) generally fewer than 5 populations statewide
- **Rare**: (S2) generally 20 or fewer populations statewide
- **Uncommon**: (S3) generally fewer than 80 populations

Why is rare species information so important?

Conserving healthy populations of all native species is the cornerstone of conserving biological diversity.



Erwin Bauer USFWS



Example of a Natural Resource Inventory

“Science to Action”

<http://www.ccrpcvt.org/science-to-action/>

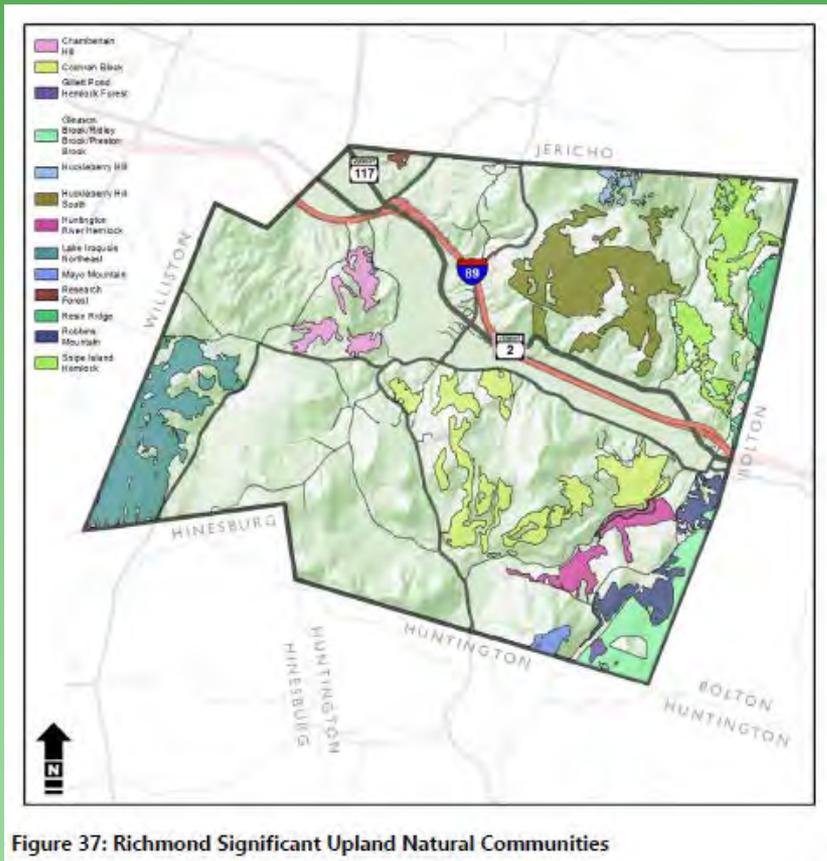
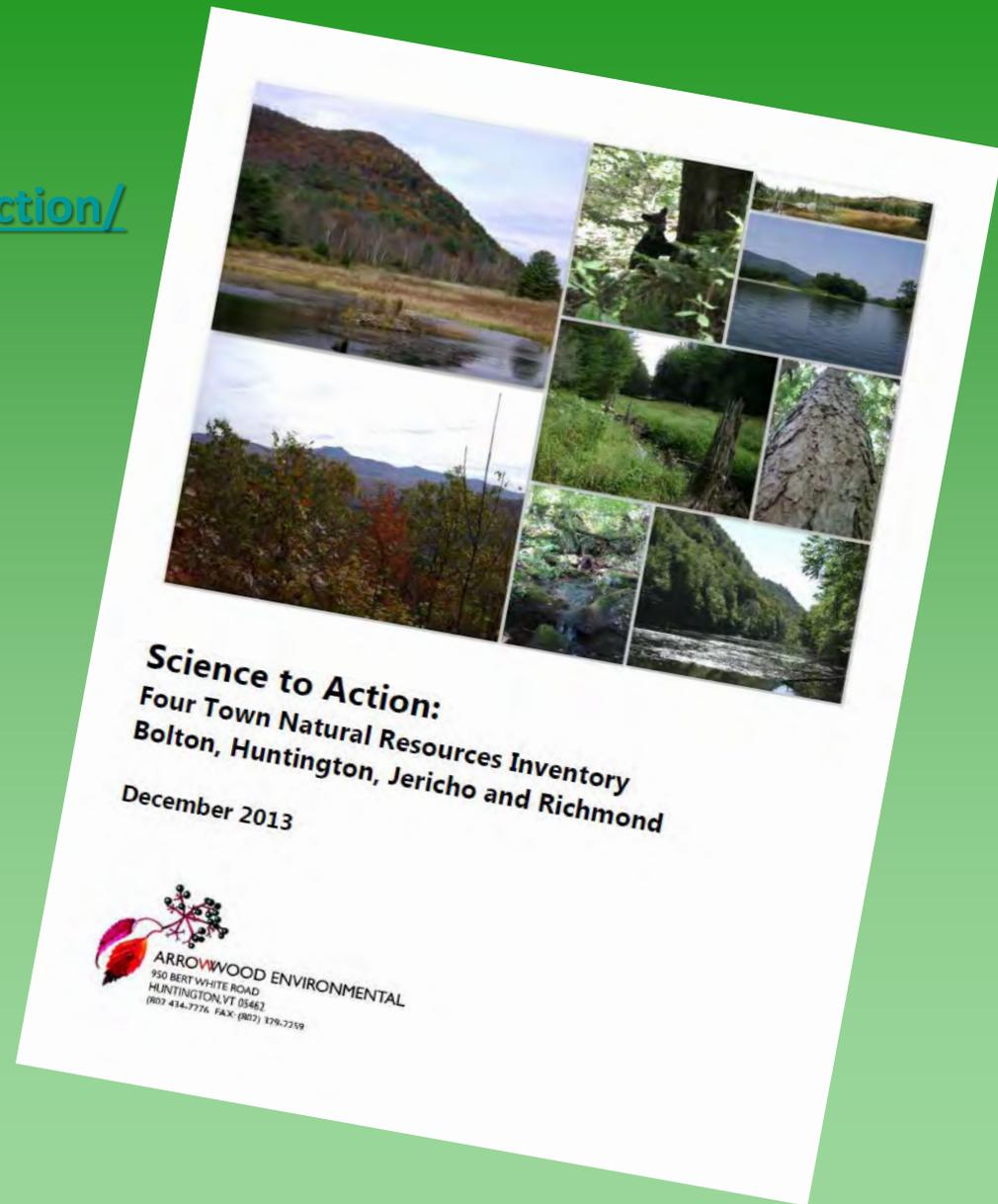


Figure 37: Richmond Significant Upland Natural Communities



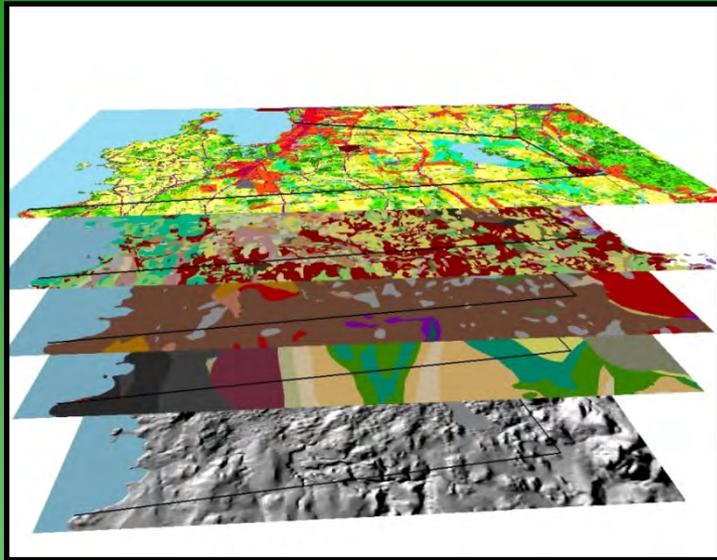
Chittenden County “Science to Action” project includes these features in inventory (towns of Huntington, Jericho, Bolton, Richmond)

- **Contiguous Habitat Units and Corridors**
- **Land Cover**
- **Upland Natural Communities**
- **Wetland Natural Communities**
- **Wildlife Habitats**

The full report and maps are available at the CCRPC

Collecting Existing Information for the Town

- VT Fish and Wildlife Data
 - Natural Heritage species and nat. comm.
 - Deer wintering areas
 - Forest blocks
 - Vermont Conservation Design
- Conserved Lands
- Land Use & Land Cover
- Prime Agricultural Soils
- Aerial Photos
- Bedrock Geology and Soils
- Water Resources and Wetlands
- Tax map overlays



The screenshot shows the Vermont Fish & Wildlife Department website. The main heading is "Wildlife Programs" with a sub-heading "Basic Natural Resource Inventory (NRI)". There is a "GET YOUR LICENSE & TAGS" button. Below the heading, there are four small images representing different natural resources: a map, a rock outcrop, a forest, and a wetland. A navigation bar includes "Home", "Planning", "Inventory", "Elements", "Tools", and "Resources".

Figuring out what natural resources are present is critical in any conservation planning process. We recommend that each town complete at least a basic Natural Resource Inventory. This can be a computer review of existing natural resource data with the production of six basic maps. This could be done by volunteers in the town with basic GIS skills or could be hired out for contract. Since the basic NRI involves the use of existing data, it shouldn't be too expensive. See [Resources](#) for contacting your Regional Planning Commission or private consultant. Or [Contact Us](#).

- [What GIS data do I need?](#)
- [Community Value Mapping](#)
- [High Public Value](#)
- [Where do I get GIS data for Vermont?](#)
- [How do I look at GIS data online](#)
- [Field Work](#)

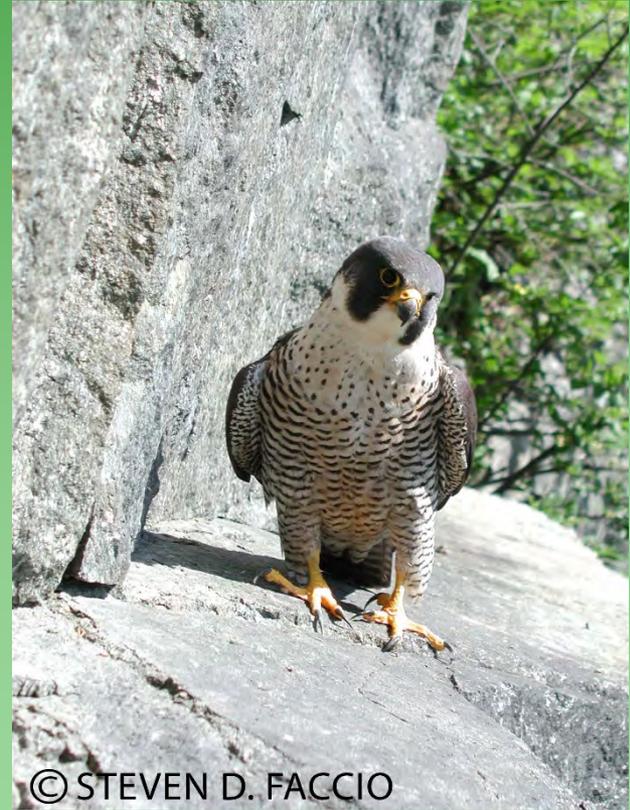
http://www.vtfishandwildlife.com/cwp_inventory.cfm

- **Rare threatened and endangered species**
 - also a new layer called uncommon species
- **Natural communities**
- **Deer winter areas**
- **Bear mast stands and spring feeding areas**
- **Forest blocks, Statewide connectivity and Riparian areas**
- **Road crossing**
- **more...**



What data are available from VFWD/NHI





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How to get the data



ANR's Natural Resource Atlas – an online mapping program that includes many of the Agency's important resource layers
<http://anrmaps.vermont.gov/websites/anra/>

ANR's BioFinder – a map and database identifying Vermont's lands and waters supporting high priority ecosystems, natural communities, habitats, and species.
<http://biofinder.vermont.gov/>

Vermont Center for Geographic Information
<http://vcgi.vermont.gov/>

Your local regional planning commission

Contact Everett Marshall with VFWD at 802-371-7333 for custom reports and data use agreements. everett.marshall@state.vt.us



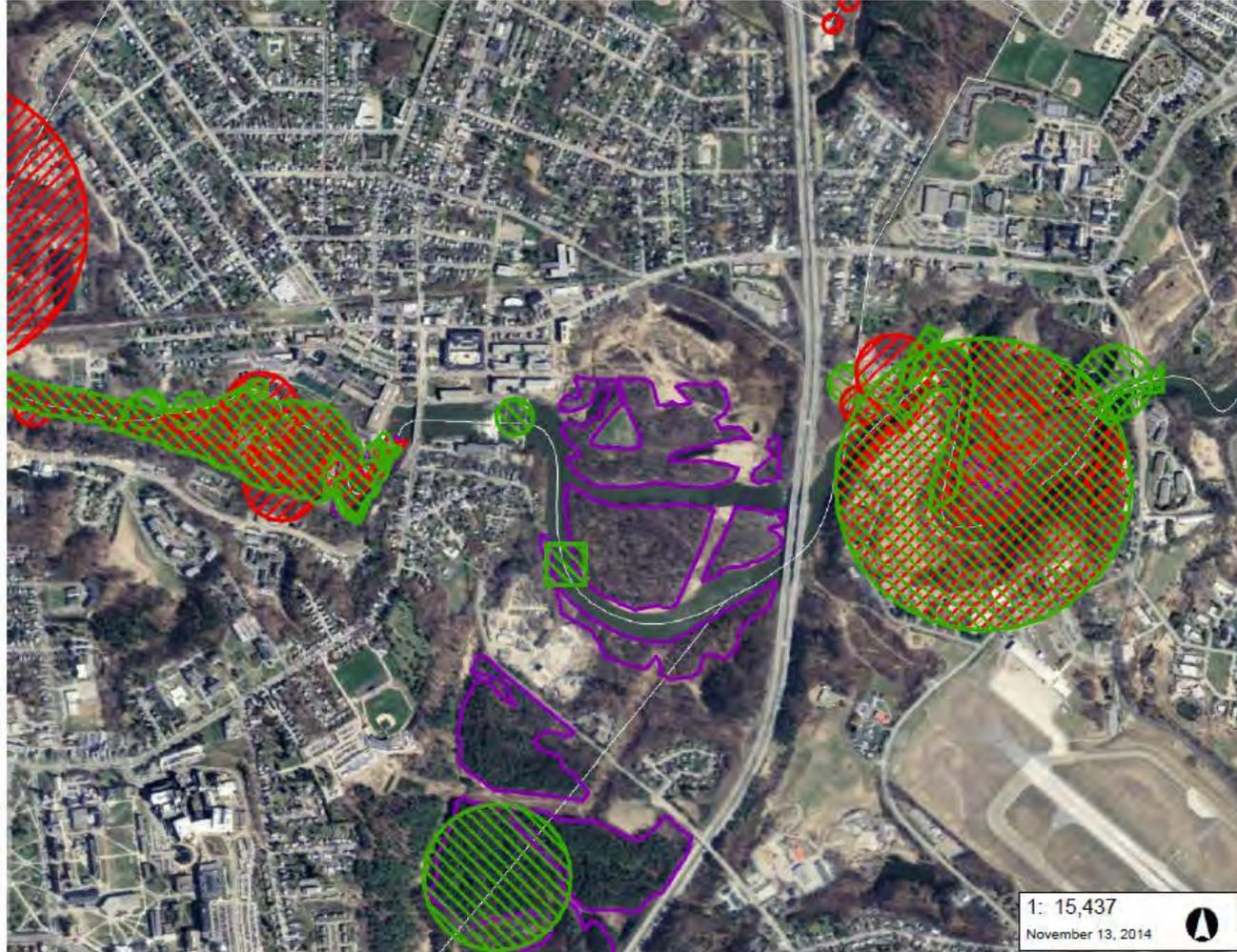
Example of Natural Heritage Inventory data for Winooski



Natural Heritage Data for Winooski

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Rare Threatened Endangered
- Threatened or Endangered
- Rare
- Significant Natural Community
- Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

784.0 0 392.00 784.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 1286 Ft 1cm = 154 Meters

© Vermont Agency of Natural Resources THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

Example of
Natural
Heritage
Inventory
data for
natural
communities
in Pownal



900.0 0 450.0 900.0 Meters

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How to use forest block, wildlife corridor, natural community, and rare species data at the town level:

- Provides knowledge for landowners and community members
- Federal and state conservation programs, such as EQIP (Environmental Quality Incentives Program) provide assistance to landowners
- Conservation easements
- Town Plan – defines the important features!
- Town conservation areas, such as town forests
- Subdivision regulations
- Zoning

Practical considerations in conducting a town inventories

- **Grant sources**

- **Municipal Planning Grants – Agency of Commerce and Community Development**
- **Watershed Grants – VT DEC and VT FWD – water related projects, including inventory (current deadline in November 21, 2014!)**

- **Hire consultant with town inventory experience**

- **Typical (low) cost for town natural resources**

inventory: \$10,000 to \$15,000 – not including landowner contact

Practical considerations in conducting a town inventories

- **Get residents and town committees involved!**
 - Send a postcard or letter to residents
 - Post on Front Porch Forum (<http://frontporchforum.com/>)
 - Hold workshops in town with the consultant

- **Landowner Contact**
 - Get landowner permission to visit their property!
 - Volunteers and town committees make contacts
 - send letter or card to landowners or call landowners
 - Landowner contact increases town involvement

Many Ways of Moving Forward

Range of options

Landowner

Education

Landowner
Management
decisions

Incentive
Programs

Management
Agreements

Conservation
Easements

Land Acquisition

Municipal

Education
& Outreach

Inventory

Town
Plan

Conservation
Plan

Bylaws

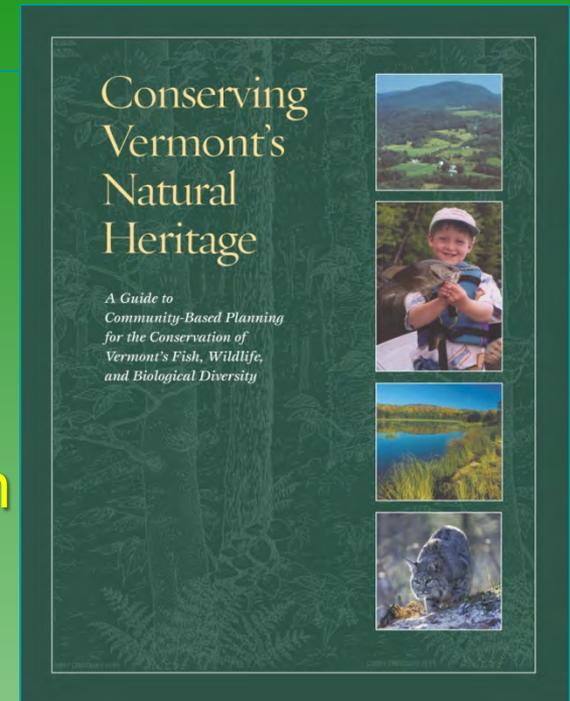
Zoning

No one tool is right for every landowner or town

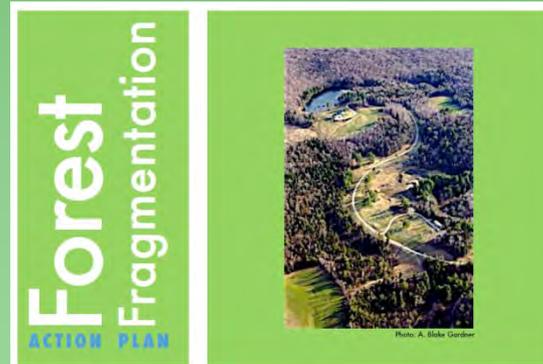
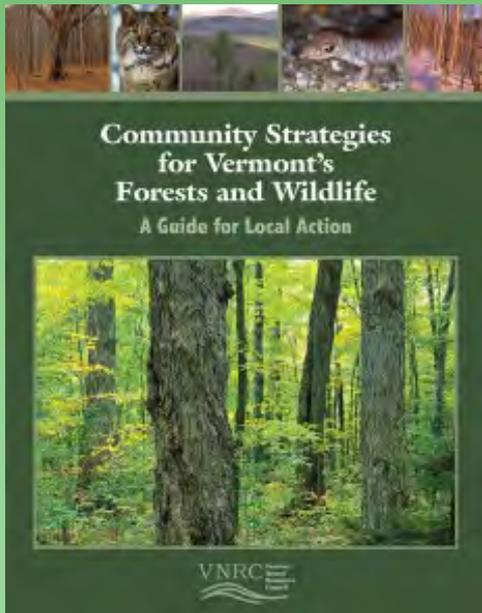
Reviewing and Revising Town Documents

- Town Plans
- Zoning and Subdivision
- Regional Plans

These publications offer strategies for applying biodiversity information in town and regional plans



<http://www.vtfishandwildlife.com/>



<http://vnrc.org/>

Non-Regulatory Approaches

- Use Value Appraisal (Current Use)
- Conservation easements and land trusts (prioritize features)
- Site design around mapped natural resource features – biological inventories, management plans
- Compact, village-style development
- Town Forests



Regulatory Approaches

- Standards for development review must be clear and unambiguous! Define terms. (See VNRC's guidance)
- Conservation/forest zoning districts
- Overlay districts
- Subdivision regulations
- Planned Unit Developments
- Clustering and conservation subdivisions



Town plan example

Goals

- Ensure adequate protection and preservation of rare, threatened, and endangered species (RTE) and significant natural communities.
- Protect important natural areas, critical wildlife habitat and overall biodiversity, with the help of landowners.
- Provide connectivity among natural areas and critical wildlife habitat.



Example continued...

Objective

Determine the location of critical wildlife habitat, contiguous forest blocks, wildlife corridors, surface waters and wetlands, RTE species, significant natural communities, conserved and protected areas...

...to establish land use, conservation and outreach priorities.



Example continued...

Implementation

The town should adopt regulations which encourage development away from RTE species, significant natural communities, surface waters, fluvial erosion zones, riparian habitats, and other sensitive natural resources

.... and create incentives for landowners and developers to protect them.



Implementation cont.

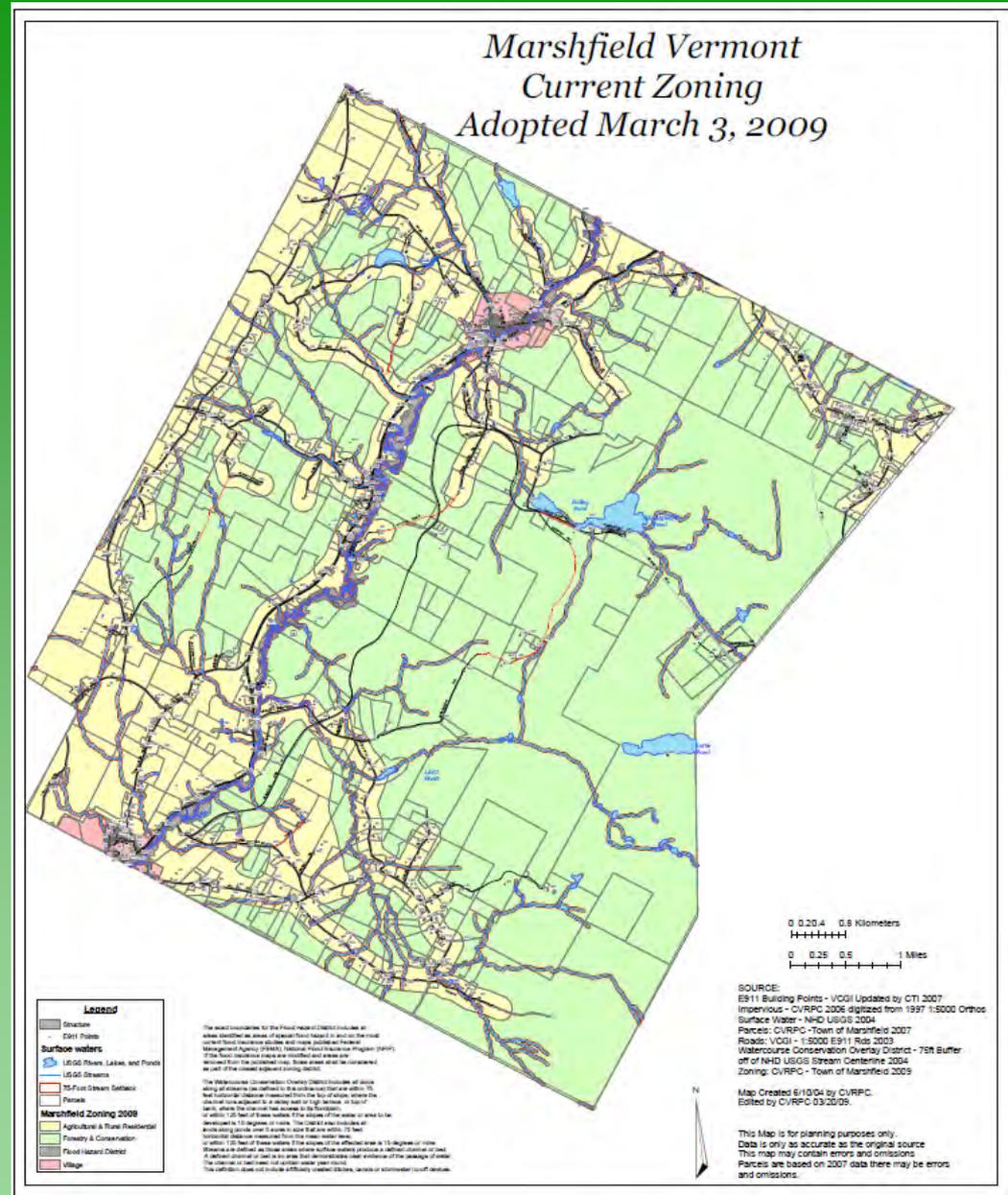
The Planning and Conservation Commissions will meet to review existing information and inventories to determine priorities and needs, including grant funding...

... and make recommendations to conserve these natural resources.



Marshfield Example of Conservation Zoning District

- includes the “largely unsettled part of Marshfield...”
- “The district provides vital wildlife habitat and significant opportunities for outdoor recreation, in addition to its very important function as a woodland.”
- Permitted uses include agriculture, outdoor recreation, wildlife refuge,...
- Residential uses allowed with an approved PUD

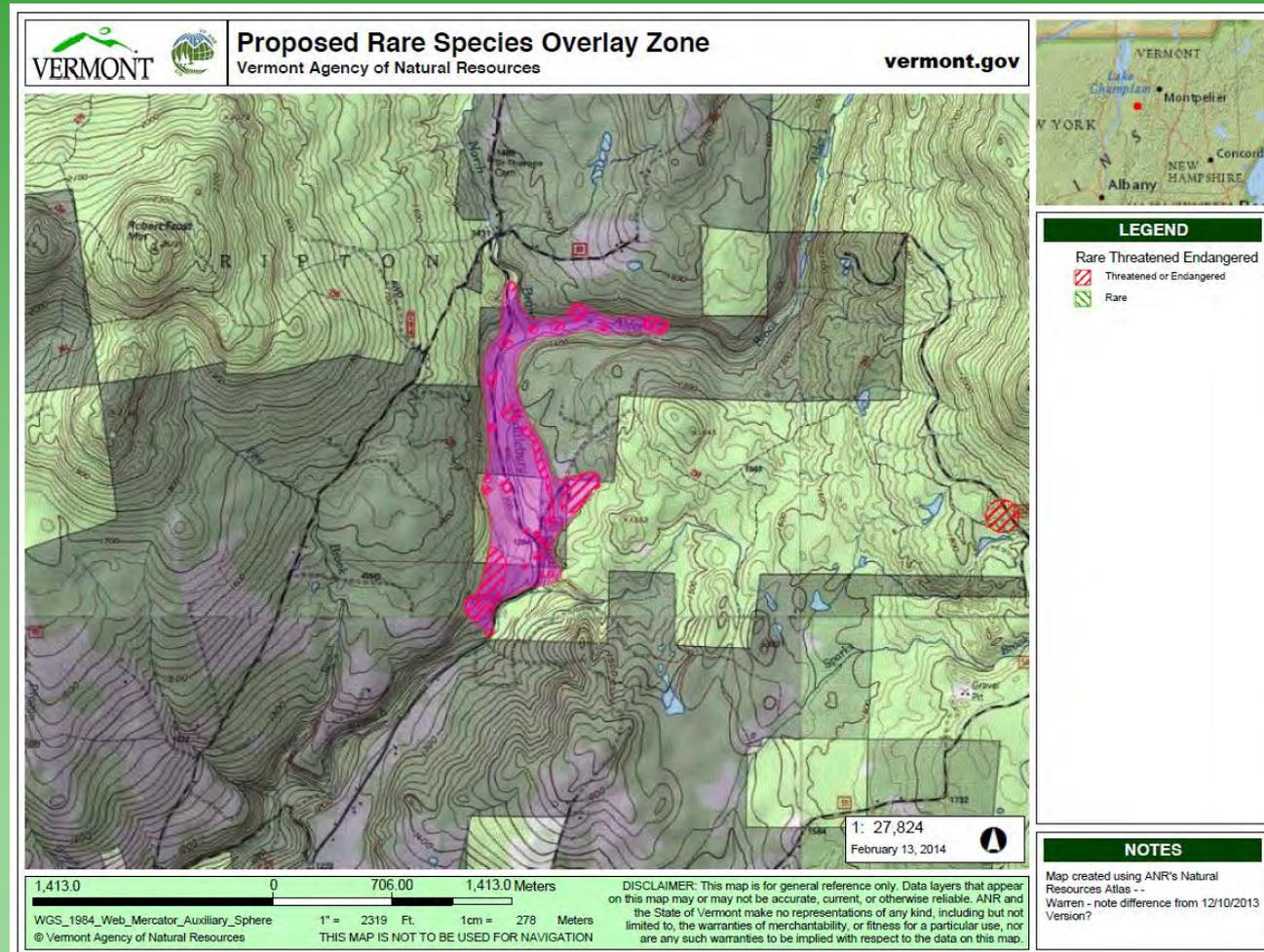


Lincoln VT Example: Jacob's Ladder (S2, Threatened plant)

- Lincoln has developed draft language for rare species overlay zone
- requires a 50 foot buffer and review of development by ANR



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Fish and Wildlife Department Contacts:

Jens Hilke – conservation planning – 879-5644

Dave Adams – habitat specialist – 879-2330

Everett Marshall – access to datasets – 371-7333

Eric Sorenson – natural communities – 476-0126

Bob Popp – rare plants – 476-0127

Mark Ferguson – rare animals – 279-3422

Or e-mail us: first.last@vermont.gov

Questions? Discussion ...

