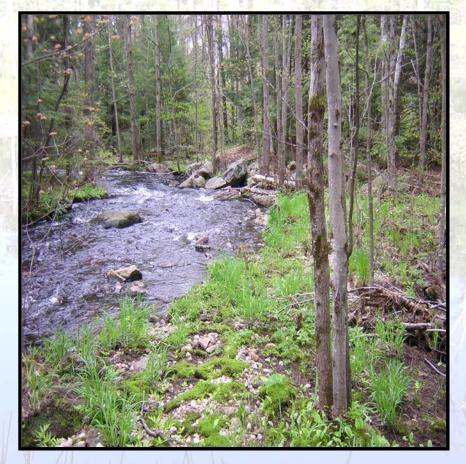
#### KNOW YOUR NATURAL RESOURES: USE YOUR NRI!

Jeffry N. Littleton Principal Ecologist Moosewood Ecological, LLC (603) 831-1980 jeff@moosewoodecological.com

#### **Natural Resources Inventories**

- What is an NRI?
- Conservation Commission's role in NRI?
- Why conduct an NRI?
- Uses an NRI?
- Components of an NRI?



#### RSA 36-A:2

"Such commission shall conduct researches into its local land and water areas [and] ... shall keep an index of all open space and natural, aesthetic or ecological areas within the city or town ... with the plan of obtaining information pertinent to the proper utilization of such areas, including lands owned by the state or lands owned by a town or city. It shall keep an index of all marshlands, swamps and all other wetlands in a like manner..."

# Why conduct a Natural Resources Inventory?

- Provides a foundation for informed decisionmaking, land use planning (i.e., resource conservation and protection, Master Plan)
- Contributes to vital part of cultural, economic and community structure
- Identifies resources threatened by human population growth and over exploitation
- Provides the first phase of a conservation plan

# How do we use a Natural Resources Inventory?

- Public Education and Civic Engagement
- Conservation Planning
- Master Planning
- Land Use and Zoning Changes
- Review Development Proposals
- Stewardship Planning
- Restoration Opportunities
- Prioritizes Detailed Studies

# Components of a Natural Resources Inventory

## Maps Data Report

# **Planning Your NRI**

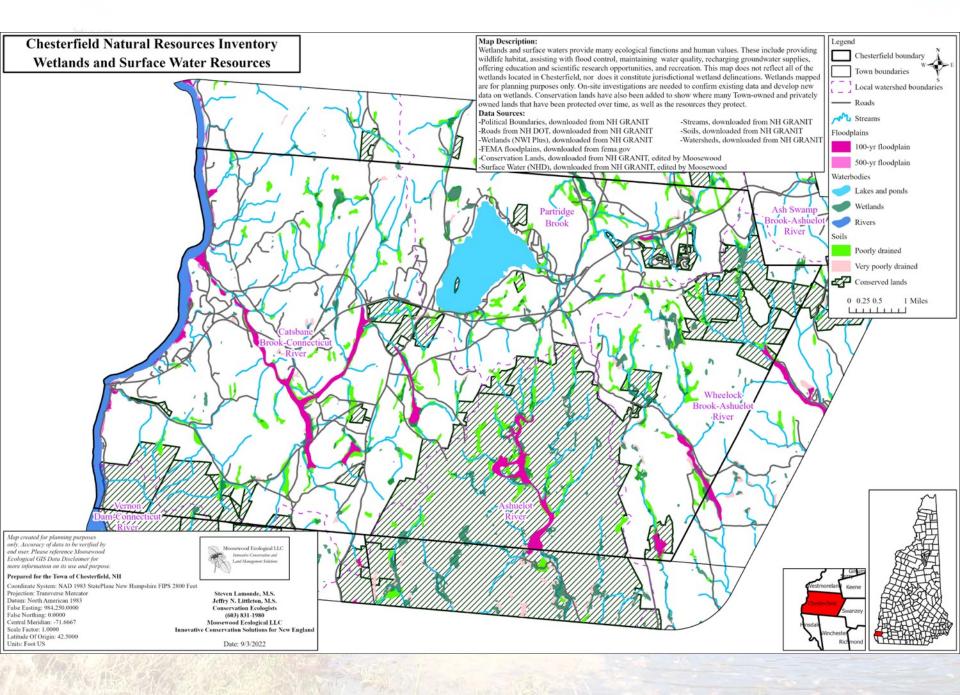
- Establish a Work Group
- Determine Goals and Scope of Project
- Determine Study Area
- Review Existing Documents
- Develop a Report Outline
- Develop a Budget

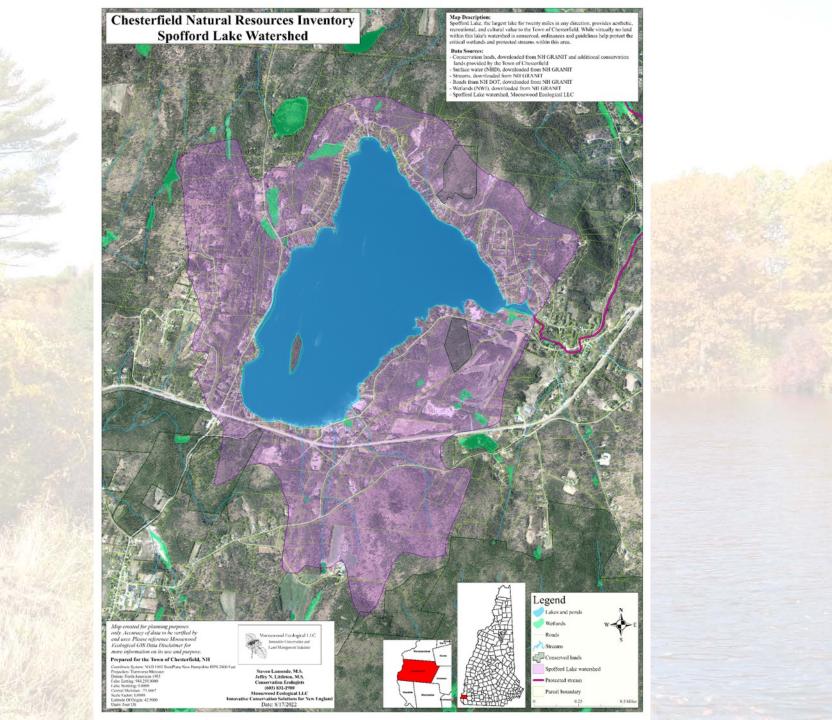
# **Planning Your NRI**

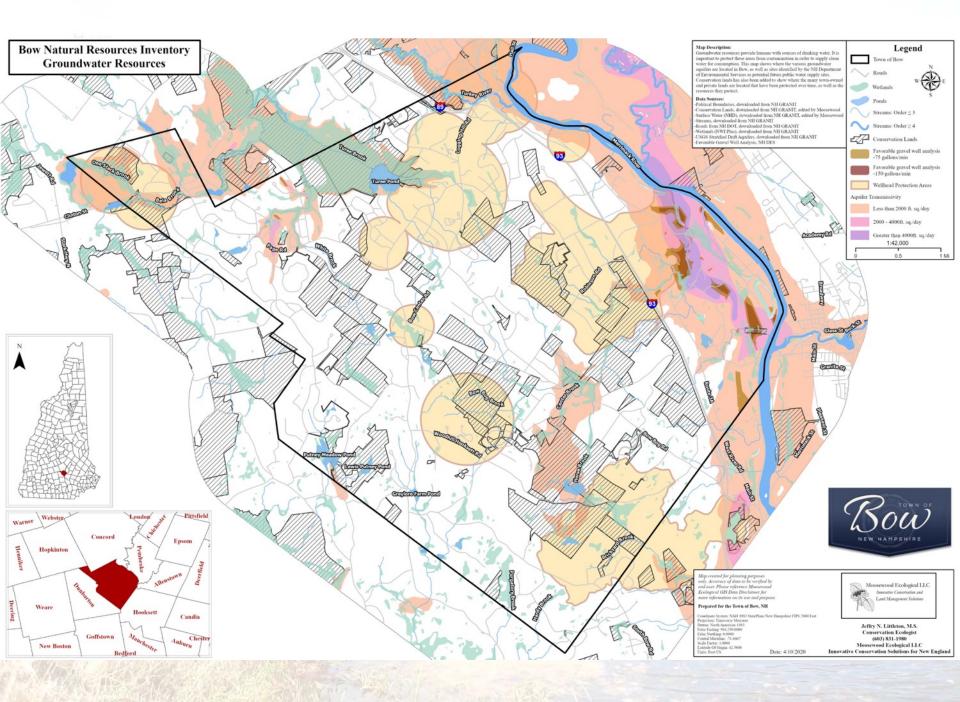
- NH Association of Conservation Commissions
- UNH Cooperative Extension
- Taking Action for Wildlife
- Natural Resources Professionals
- https://nhnriguide.org/natural-resources-inventories
- GRANIT View
- NH Wetlands Mapper
- NH Fish and Game habitat and ranking maps

## Who has an NRI?

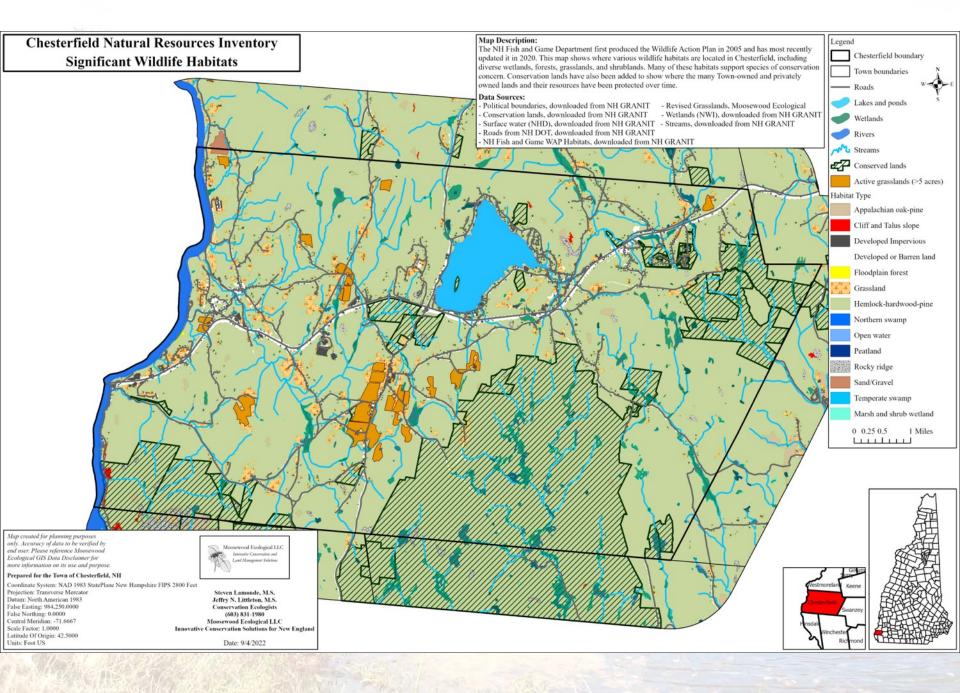
• Water Resources

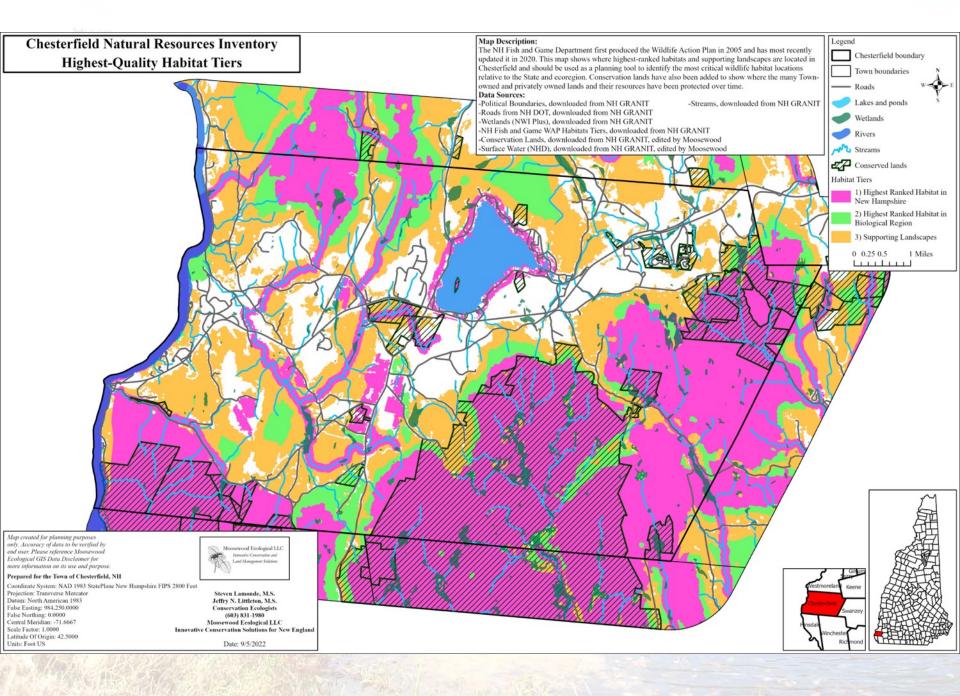


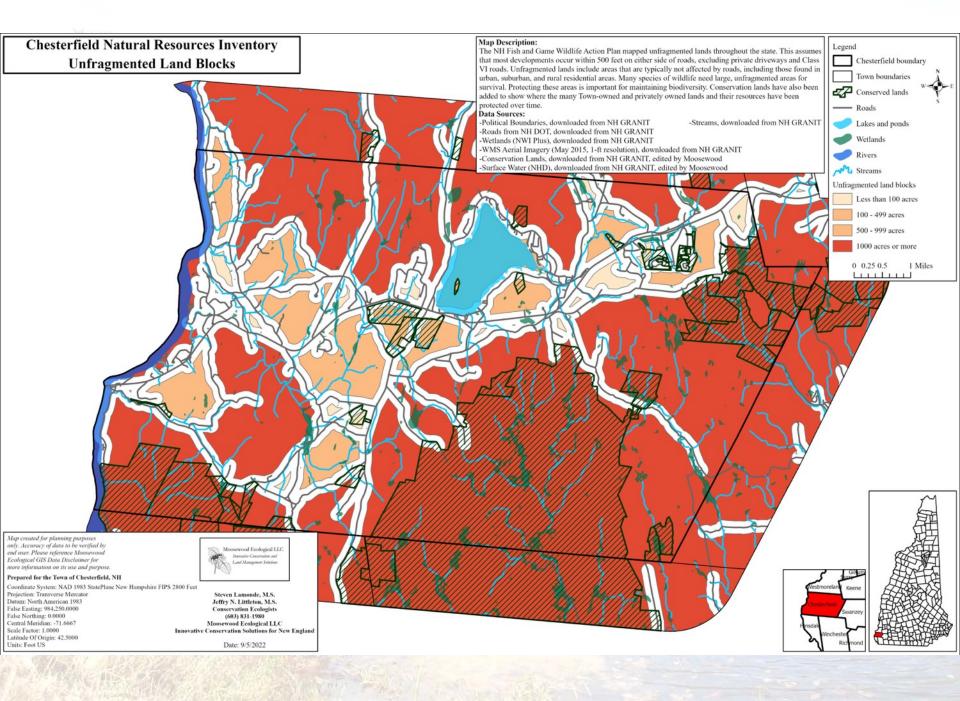




- Water Resources
- Ecological Resources



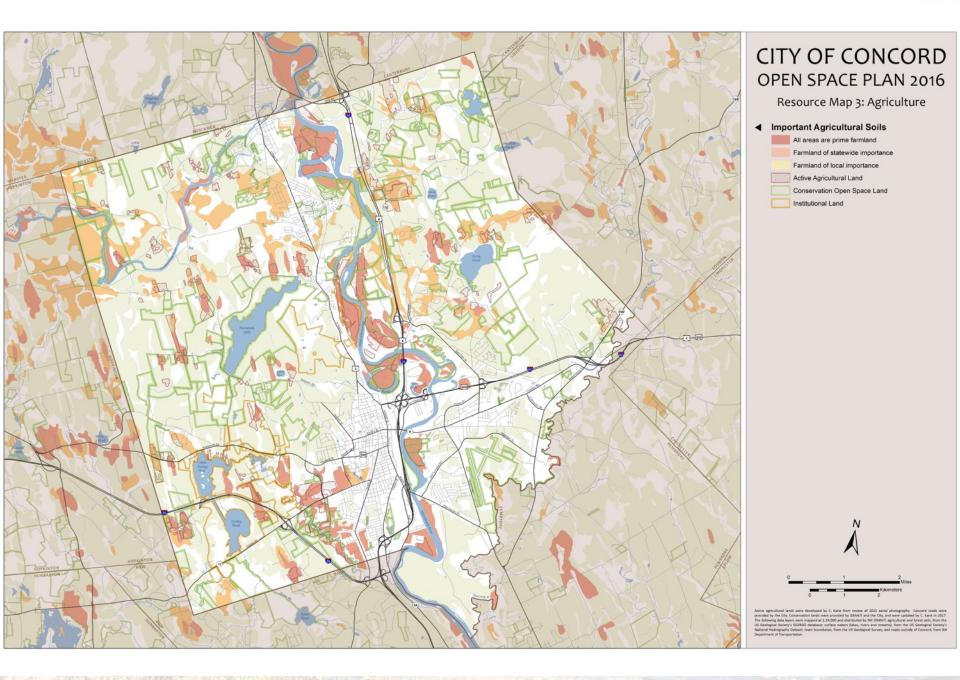


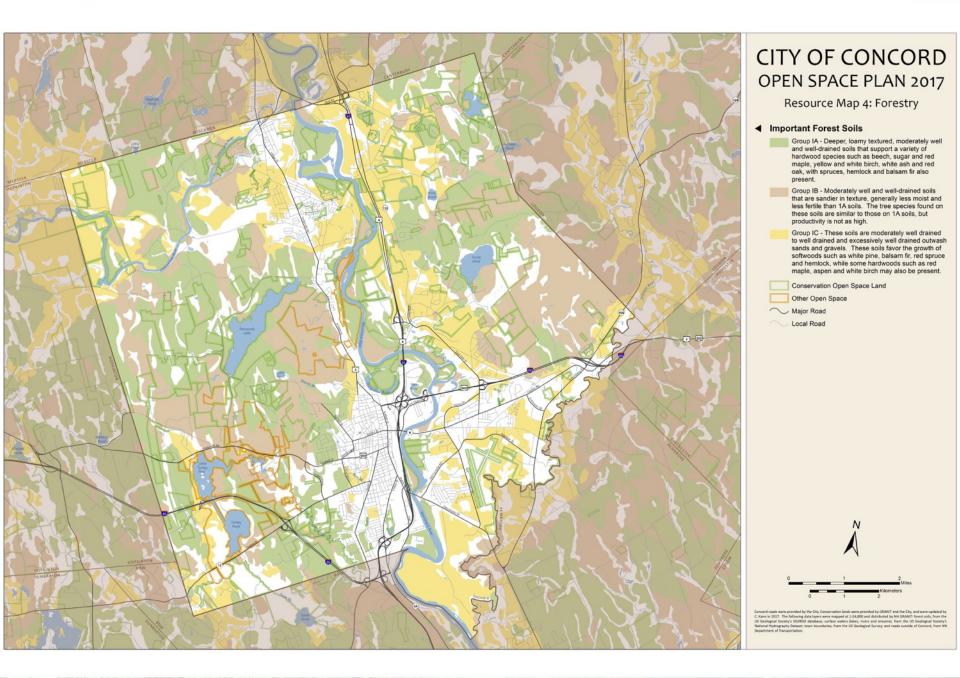


		100-499 Acres	500-2,500 Acres	>2,500 Acres
1-19 Acres	20-99 Acres			
raccoon	raccoon	raccoon	raccoon	raccoon
	hare	hare	hare	hare
				coyote
small rodent	small rodent	small rodent	small rodent	small rodent
	porcupine	porcupine	porcupine	porcupine
		States and the second		bobcat
cottontail	cottontail	cottontail	cottontail	cottontail
	beaver	beaver	beaver	beaver
				black bear
squirrel	squirrel	squirrel	squirrel	squirrel
	weasel	weasel	weasel	weasel
	The Part of the second	mink	mink	mink
				fisher
	woodchuck	woodchuck	woodchuck	woodchuck
		deer	deer	deer
muskrat	muskrat	muskrat	muskrat	muskrat
			moose	moose
red fox	red fox	red fox	red fox	red fox
songbirds	songbirds	songbirds	songbirds	songbirds
		sharp-shinned hawk	sharp-shinned hawk	sharp-shinned hawk
			bald eagle	bald eagle
skunk	skunk	skunk	skunk	skunk
		Cooper's hawk	Cooper's hawk	Cooper's hawk
		harrier	harrier	harrier
		broad-winged hawk	broad-winged hawk	broad-winged hawk
			goshawk	goshawk
		kestrel	kestrel	kestrel
			red-tailed hawk	red-tailed hawk
		great-horned owl	great-horned owl	great-horned owl
			raven	raven
		barred owl	barred owl	barred owl
		osprey	osprey	osprey
		turkey vulture	turkey vulture	turkey vulture
		turkey	turkey	turkey
most reptiles	most reptiles	reptiles	reptiles	reptiles
	garter snake	garter snake	garter snake	garter snake
	-	ring-necked snake	ring-necked snake	ring-necked snake
most amphibian		most amphibians	amphibians	amphibians
		wood frog	wood frog	wood frog

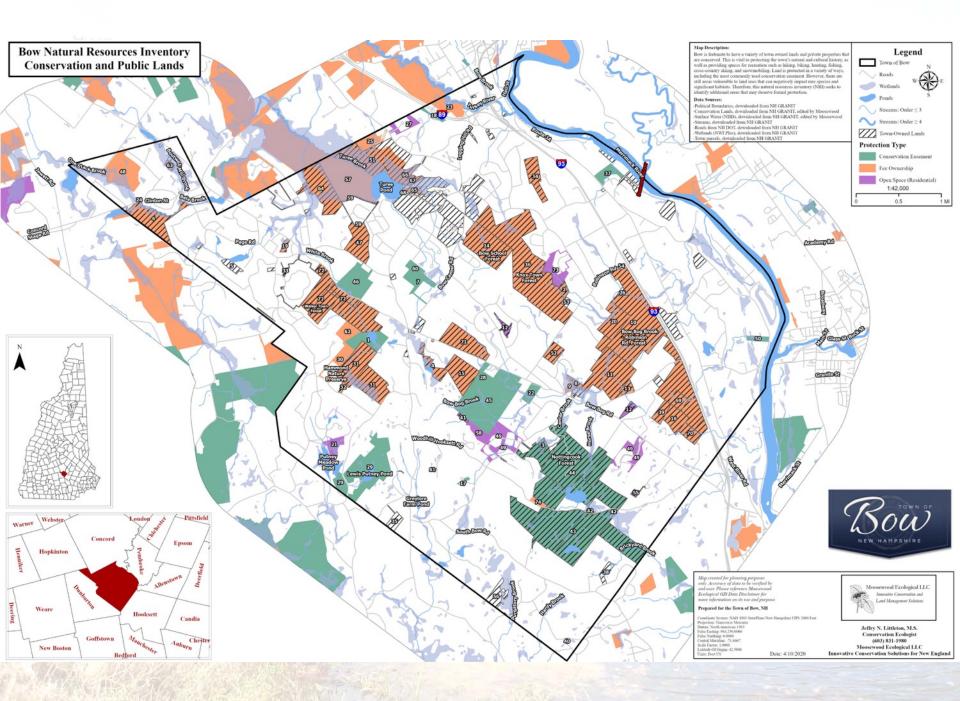
- Water Resources
- Ecological Resources
- Working Landscape

o Agricultural Resources
o Forest Resources





- Water Resources
- Ecological Resources
- Working Landscape
  - o Agricultural Resources
  - Forest Resources
- Conservation Lands



# **Mapping Resources**

- GRANITView
- TNC Resilient and Connected
- Landscapes
- Wetlands Mapper
- DES Aquatic Mitigation Mapper
- Ecological/GIS Consultant
- Wildlife Corridor Mapper

# Conservation Priorities and Co-occurrence Analyses

Parcel-based Ecological Analyses

o GIS assessment

o Field assessment

#### I. Parcel Size

a. 15-49 acresb. 50-199 acresc. 200-500 acres

#### II. Wetlands

Percent Wetland Cover

a. no wetlands
b. <10% wetlands</li>
c. 10-50% wetlands
d. >50% wetlands

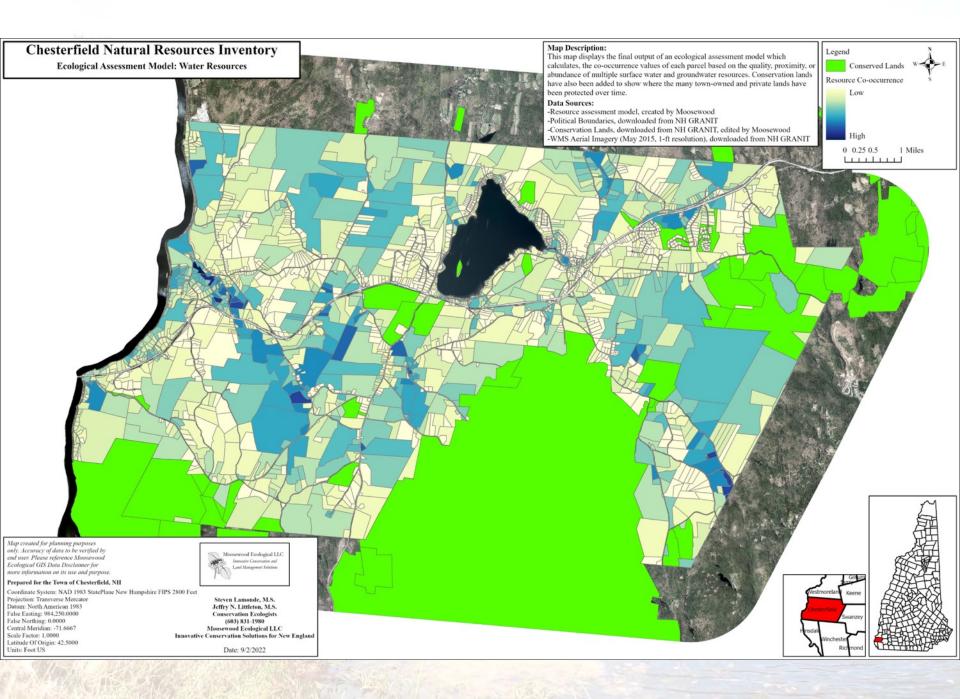
1 points 2 points 3 points

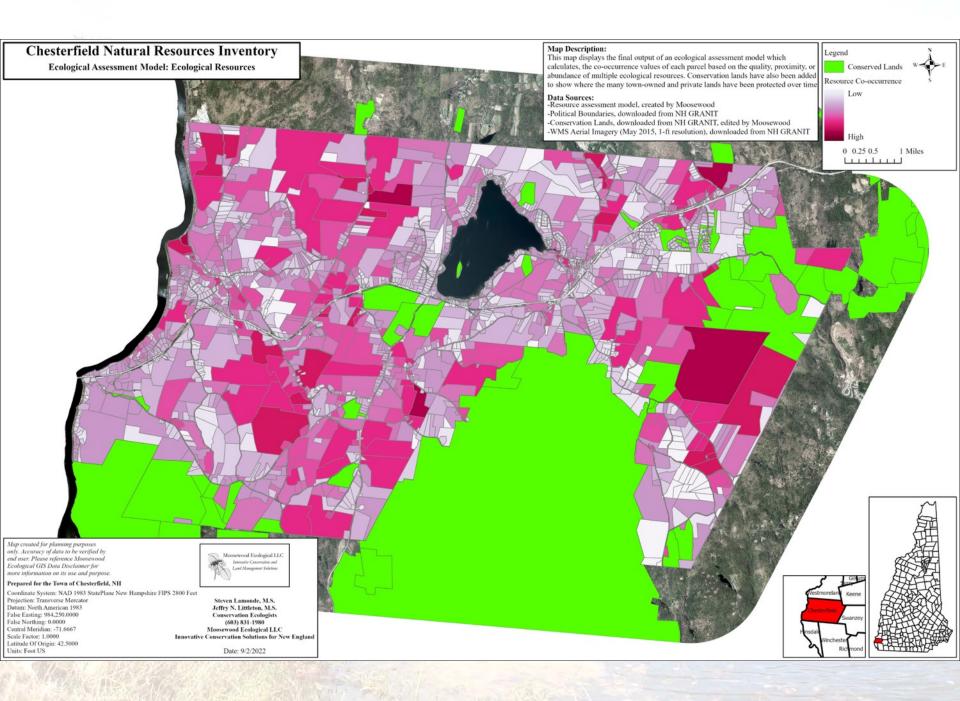
0 points 1 point 2 points 3 points

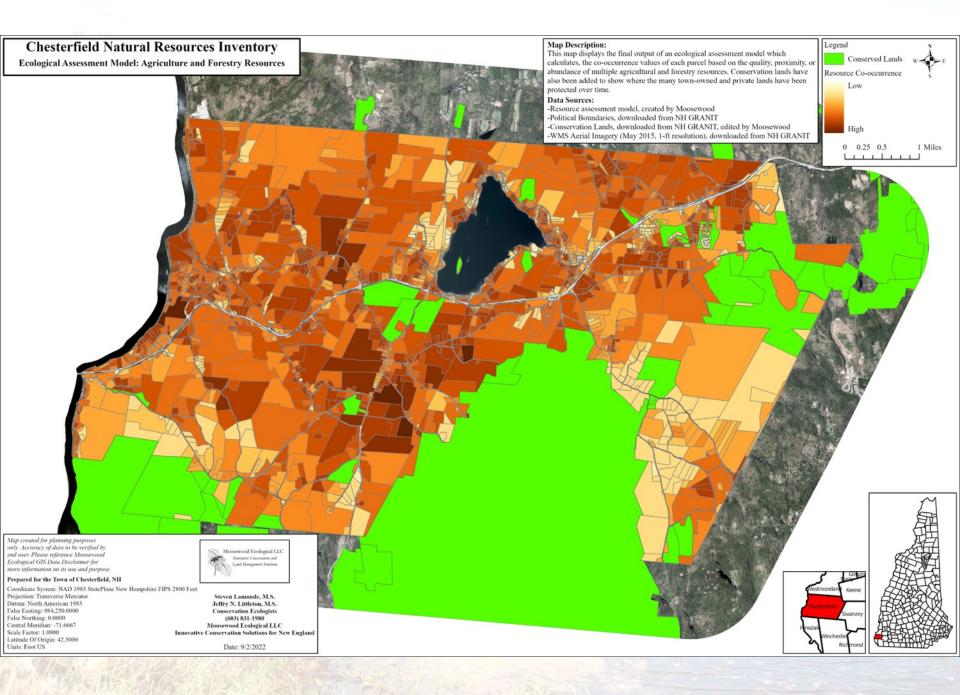
#### **III. Surface Waters**

Waterbodies (ponds)

- a. no waterbodies present b. waterbody <10 acres present c. waterbody >10 acres present *Watercourses (streams)* a. no watercourses present b. 1<sup>st</sup> order perennial stream c. 2<sup>nd</sup> order perennial stream d. 3<sup>rd</sup> order perennial stream e. 4<sup>th</sup> order or larger stream
- 0 points 1 point 2 points
- 0 points 1 point 2 points 3 points 4 points



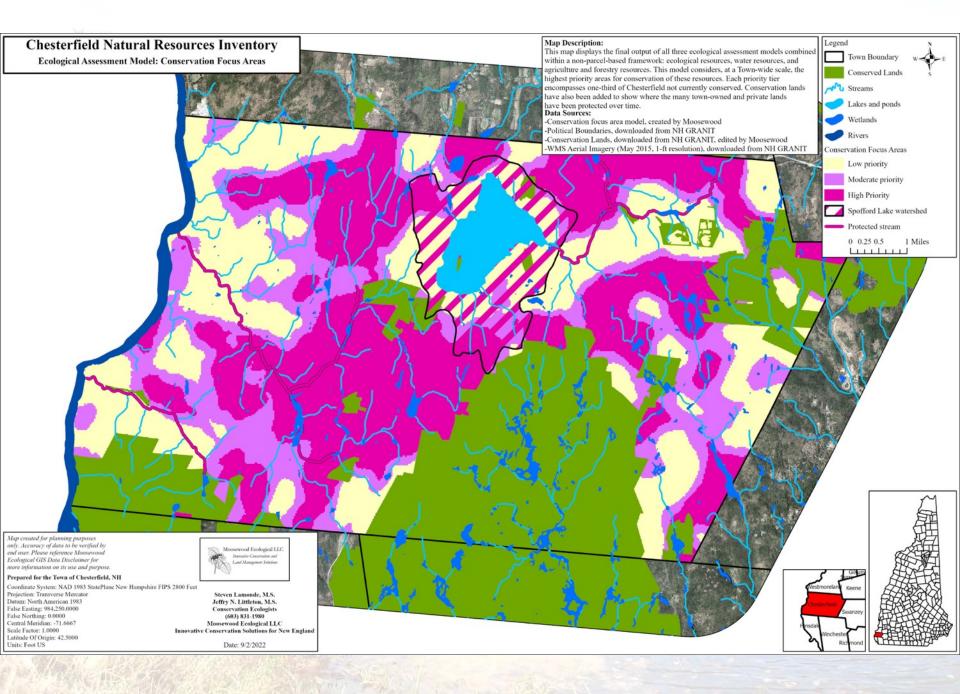




# Conservation Priorities and Co-occurrence Analyses

Parcel-based Ecological Assessment

**Co-occurrence** Analyses



## **Community Outreach**

#### • Community Forums

#### **Strengths and Challenges**

- What are the strengths of natural resources and working lands (forestry and agriculture)?
- What are some of the challenges and concerns facing these resources?

Consider the social, political and physical characteristics

## **Significant Open Space Areas**

- What Open Space/Natural Areas do you visit?
- Why do you visit these areas? What makes them interesting or significant Open Space?
- What could enhance your use of these areas?

#### **Future Open Space Protection**

• What other Open Space lands would you like to see protected?

• Why specifically would you support the protection of these areas?

# **Community Outreach**

- Community Forums
- Community Survey
- Educational Workshops and Hikes
- Communications with Town Boards
- Bioblitz iNaturalist
- NH Extension Nature Groupie

# BIOLOGICAL INVENTORY and iNATURALIST Project



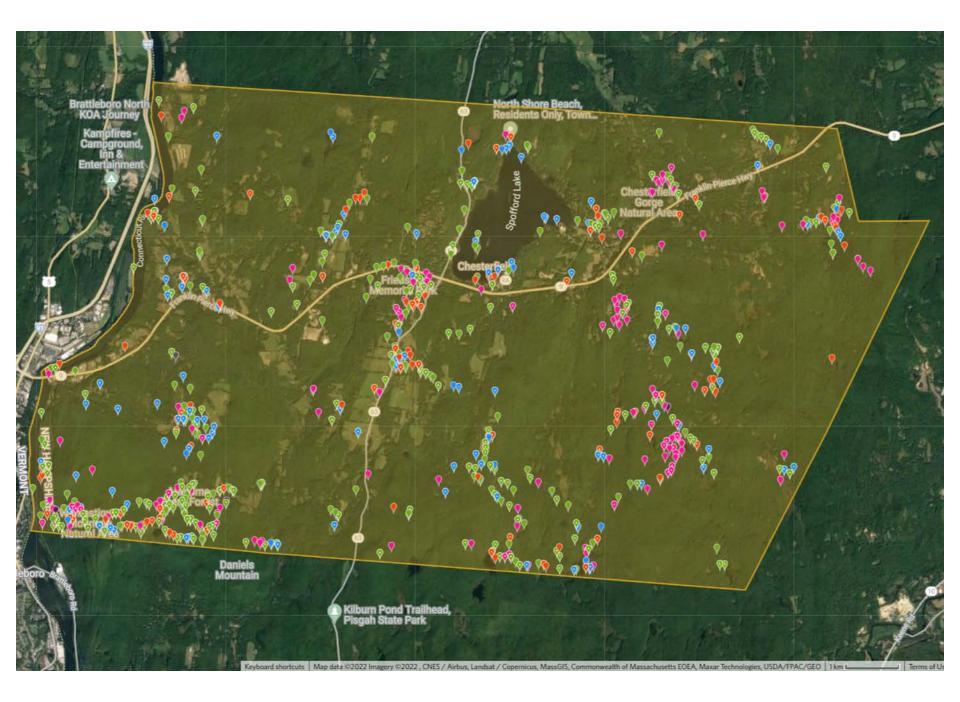
**IDENTIFIERS** 

**OBSERVERS** 

Overview

**OBSERVATIONS** 

SPECIES





Mountain Laurel (Kalmia latifolia)



American Chestnut (Castanea dentata)



Hobblebush (Viburnum lantanoides)



Eastern Hemlock (*Tsuga canadensis*)



Striped Maple (Acer pensylvanicum)



American Beech (Fagus grandifolia)



White Oak (Quercus alba)



Shagbark Hickory (Carya ovata)



Glossy Buckthorn (Frangula alnus)



Northern Red Oak (Quercus rubra)



Ghost Pipe (Monotropa uniflora)



Jack-in-the-Pulpit (Arisaema triphyllum)



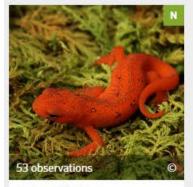
Indian Cucumber Root (Medeola virginiana)



Partridgeberry (Mitchella repens)



Eastern White Pine (Pinus strobus)



Eastern Newt (Notophthalmus viridescens)



Eastern Chipmunk (Tamias striatus)



Spotted Salamander (Ambystoma maculatum)



Chalk-fronted Corporal (Ladona julia)



Black-capped Chickadee (Poecile atricapillus)



American Toad (Anaxyrus americanus)



Common Whitetail (Plathemis lydia)



White-tailed Deer (Odocoileus virginianus)



American Beaver (Castor canadensis)



Japanese Beetle (Popillia japonica)



Stream Bluet (Enallagma exsulans)



Barred Owl (Strix varia)



North American Porcu... (Erethizon dorsatum)



Hemlock Woolly Adel... (Adelges tsugae)



Common Eastern Bum... (Bombus impatiens)



Smooth Rock Tripe (Umbilicaria mammulata)



Summer Oyster Mushr... (Pleurotus pulmonarius)



Blood Red Russula (Russula rosacea)



Viscid Violet Cort (Cortinarius iodes)



Turkey-Tail (Trametes versicolor)



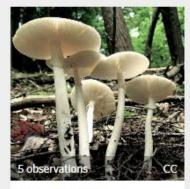
Hemlock Varnish Shelf (Ganoderma tsugae)



Smokey-eyed Boulder ... (Porpidia albocaerulescens)



Jackson's Slender Cae... (Amanita jacksonii)



Eastern North Americ... (Amanita bisporigera)



Common Toadskin Lic... (Lasallia papulosa)



Crowded Parchment (Stereum complicatum)



Reddish Brown Bitter B... (Tylopilus rubrobrunneus)



Flame Chanterelle (Craterellus ignicolor)



Chicken of the Woods (Laetiporus sulphureus)



Many-forked Cladonia (Cladonia furcata)

## **Biological Inventory Results**

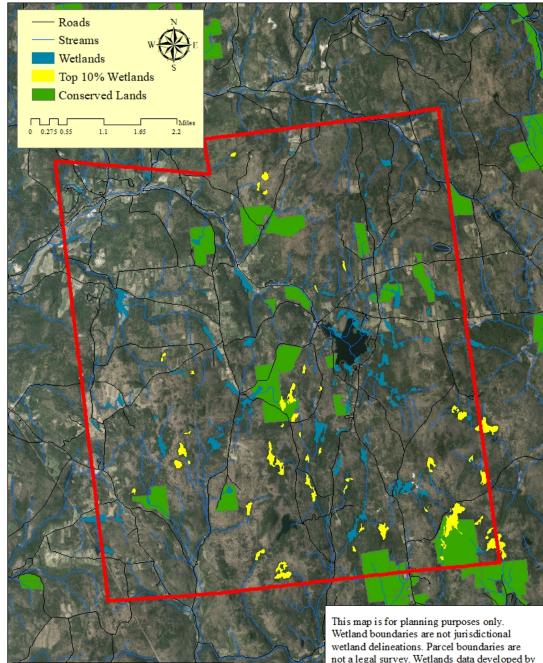
More than 4,000 observations submitted

- Over 1,000 species documented
- Participation from >200 people

•

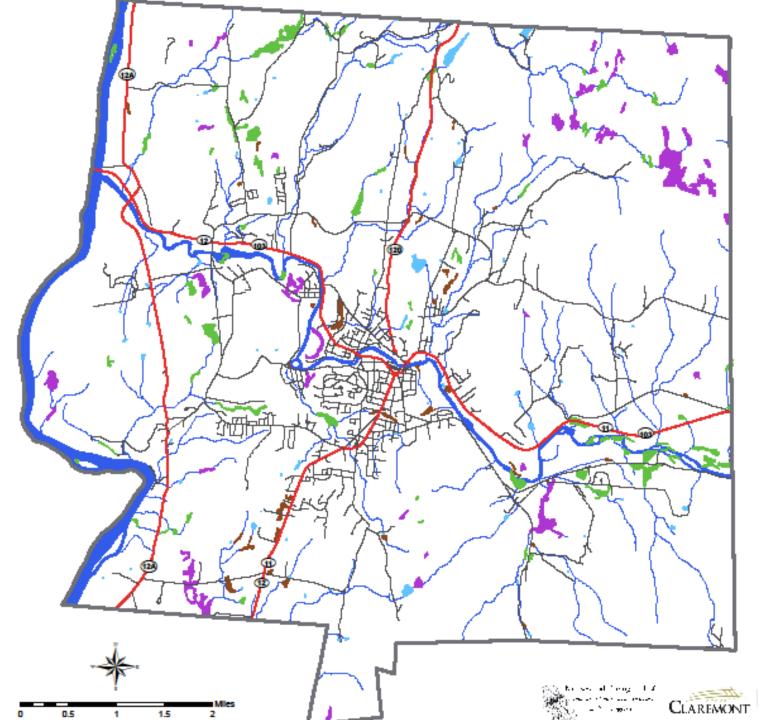
Many new records for the Town, County, or State

- Wetlands Comparative Evaluation
  - ID sites for restoration
  - ID sites for mitigation to implement within the community
  - Prioritize for conservation/protection
  - Develop wetlands zoning ordinance
  - ID Prime Wetlands
  - Habitat management (beavers, waterfowl, invasive species)
  - Grants and Cost Share Programs (ARM, NRCS, NH F&G)
  - Education for Community and Government Officials
  - nhmethod.org for more details



Map prepared by: Moosewood Ecological LLC December 16, 2019 603-831-1980

not a legal survey. Wetlands data developed by Moosewood Ecological LLC from aerial photography interpretation.





#### Data Sources:

Wetiands ranking and refined wetiands, ponds and reservoirs developed by Moosewood Ecological, 2013, based on 2010 aerial photography, distributed by NH GRANIT. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

Disclaimer: Map to be used for planning purposes only. Map not intended for survey purposes. Accuracy of data to be verified by end user. UVLSRPC, Moosewood Ecological, the City of Claremont, NH GRANIT and other data originators or distributors make no claim as to the validity or reliability or to any implied uses of these data.

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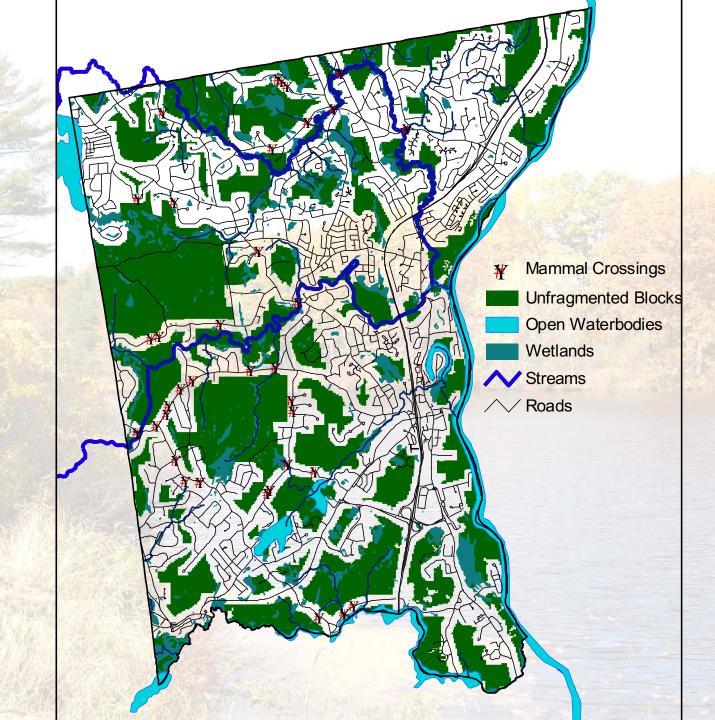
- Wetlands Comparative Evaluation
- Refined Habitat Mapping and WAP Ground-truthing
  - Better sense of the location and types of actual habitats
  - Better habitat representation within community
  - Confirm WAP habitats
  - ID fine-scale habitats
  - ID rare/unique natural communities
  - Inform stewardship and land management

### **Significant Wildlife Habitats**

- Vernal Pools
- Den Sites
- Caves/Mines
- Turtle Nesting Areas
- Deer Wintering Areas
- Rare/Declining Habitat Types
- Rare/Endangered Species Habitats

- Floodplain Forests
- Mast Forests
- Talus Slopes
- Heron Rookeries
- Wildlife Corridors
- Amphibian Migration
- Migratory waterfowl
   Stopover Areas

- Wetlands Comparative Evaluation
- Refined Habitat Mapping and WAP Ground-truthing
- Natural Community Mapping and Rare Species Surveys
- Wildlife Corridors Assessment



NH Fish and Game Corridor Modelling https://nh-wildlife-corridorsnhgranithub.hub.arcgis.com/

- Wetlands Comparative Evaluation
- Refined Habitat Mapping and WAP Ground-truthing
- Natural Community Mapping and Rare Species Surveys
- Wildlife Corridors Assessment
- Grasslands and Active Farmlands
  - ID diversity of grasslands and fields
  - Better understand wildlife communities
  - Map locations of a declining habitat type

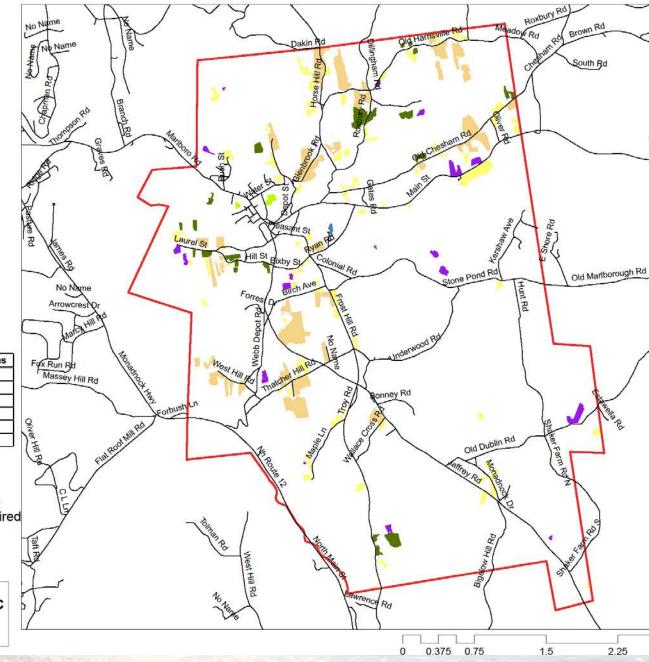
#### Legend Marlborough Grasslands Land Use Categories Meadow Meadow Pasture Hay field Hay or Pasture Cemetery

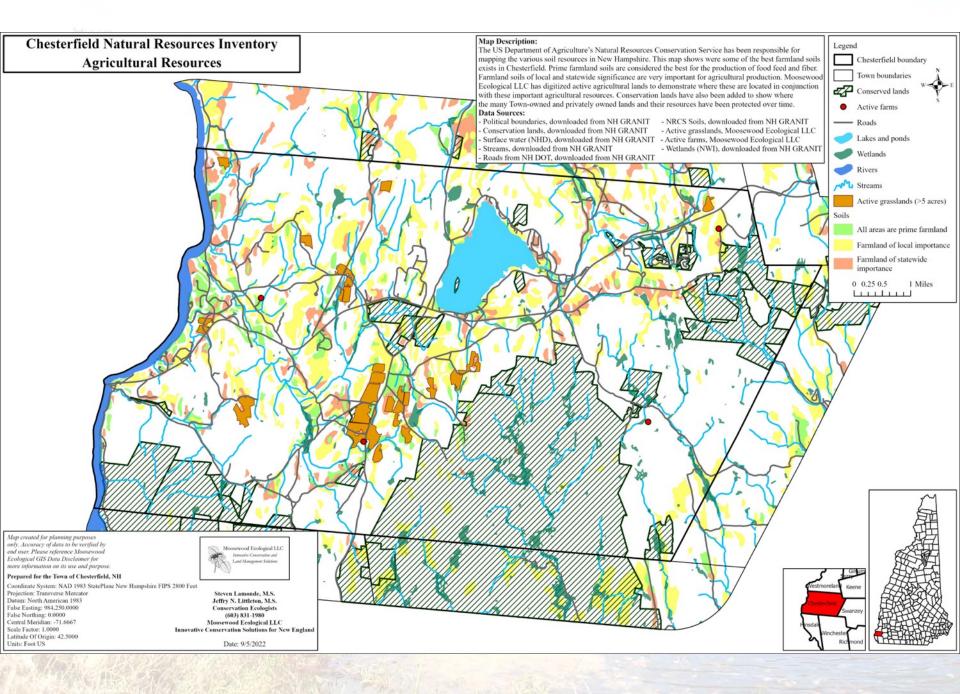
Other Cleared

Land Use Type	Area (acres)	Range (acres)	Number of Polygons
Meadow	48.4	0.3-9.5	19
Pasture	76.8	0.9-15.1	21
Hayfield	369.2	1-33.7	42
Hay or Pasture	199	0.2-23.9	101
Cemetery	6.6	1.5-5.1	2
Other Cleared	3.4	0.4-2.1	3

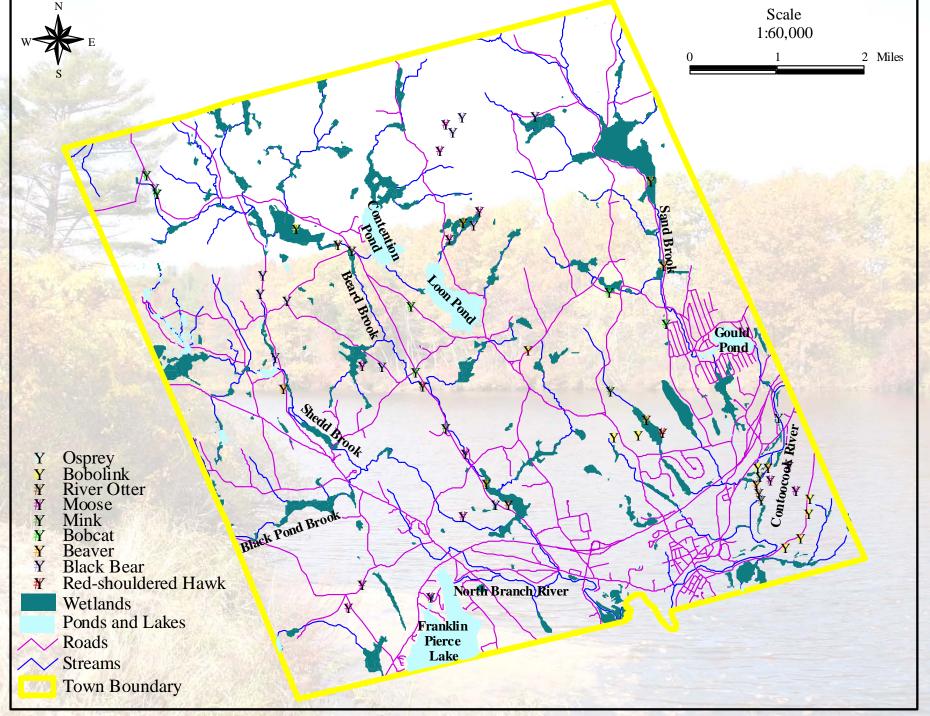
Data Sources: land use categories developed by Moosewood Ecological LLC (2015) with assistance from George Iselin; roads and town boundary acquired from GRANIT database

Map prepared by: Jeffry N. Littleton, M.S. Moosewood Ecological LLC (603) 831-1980 October 26, 2015





- Wetlands Comparative Evaluation
- Refined Habitat Mapping and WAP Ground-truthing
- Natural Community Mapping and Rare Species Surveys
- Wildlife Corridors Assessment
- Meadows and Active Farmlands
- Focal Species Assessment
  - Certain species provide clues to ecological health
  - ID rare species



- Wetlands Comparative Evaluation
- Refined Habitat Mapping and WAP Ground-truthing
- Natural Community Mapping and Rare Species Surveys
- Wildlife Corridors Assessment
- Meadows and Active Farmlands
- Focal Species Assessment
- Habitat Restoration and Enhancement