



MASSWILDLIFE

Fire Influenced Communities in the Ware River and Quabbin Watersheds

Chris Buelow, Restoration Ecologist



Natural Heritage
& Endangered Species
Program

Massachusetts Division of Fisheries & Wildlife



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The overall goal of the Program is the protection of the state's wide range of native biological diversity.

The Program's highest priority is protecting the vertebrate, invertebrate, and native plants that are officially listed as Endangered, Threatened or of Special Concern in Massachusetts.

Restoration Ecologist

Identify and Manage the Landscapes that support the most vulnerable species and natural communities in the Commonwealth.



The Watersheds



Fire-Influenced Communities: Barrens



The Ecological Significance

of

Pyrogenic Communities

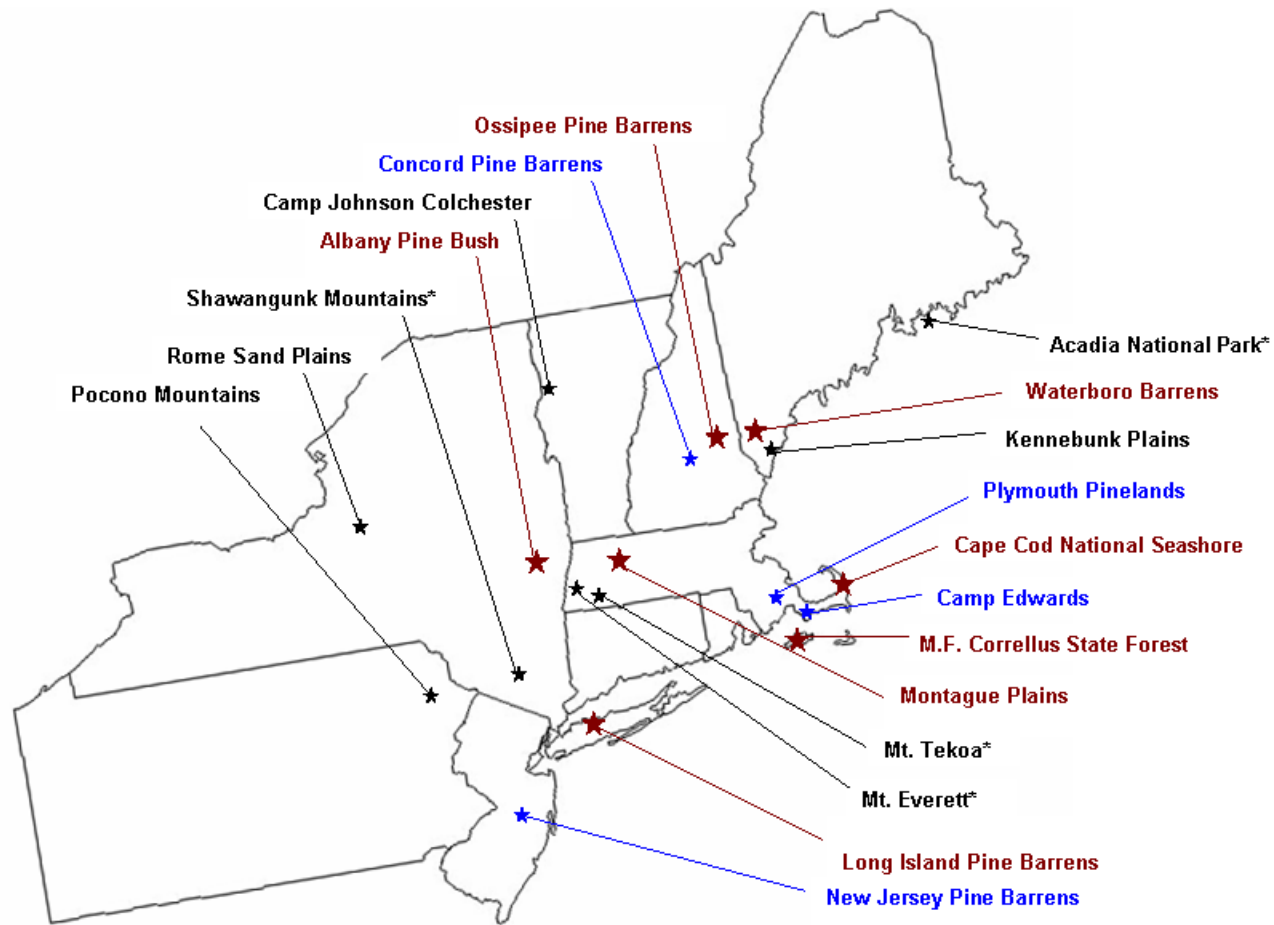
- Globally Rare Natural Communities of the Highest DFW Conservation Priority
- Supporting a long list of rare, endangered and highly specialized plants and animals

Common Name	Species Name	Status	Habitat Type	Link to Factsheet
New England Buck Moth	<i>Hemioice maia</i>	SC	Pitch Pine Scrub Oak Woodland	NHESP FACTSHEET
Pink Sallow Moth ¹	<i>Pectroglypta cornosa</i>	SC	Sandplain Heathland	NHESP FACTSHEET
Melbourne's Sack Bearer ¹	<i>Cinnus melbournei</i>	T	Pitch Pine Scrub Oak Woodland	NHESP FACTSHEET
Slender Clearwing Sphinx ¹	<i>Hemaris gracilis</i>	SC	Sandplain Heathland	NHESP FACTSHEET
Twelve-spotted Tiger Beetle	<i>Cicindela duodecimguttata</i>	SC	Outwash	NHESP FACTSHEET
Purple Tiger Beetle ¹	<i>Cicindela purpurata</i>	SC	Sandplain Grassland/Heathland	NHESP FACTSHEET
Two-striped Owllet Moth	<i>Microschloa bivittata</i>	WL	Acidic Sedge Marsh	-
Widow Underwing Moth ¹	<i>Catocala niktai</i>	WL	Upland Forest	-
Fingered Lemneria ¹	<i>Lemneria digitalis</i>	WL	Wetlands	-
Three-lined Flower Moth ¹	<i>Schinia trifascia</i>	WL	Sandplain Grassland	-
Red-humped Caterpillar Moth ¹	<i>Schizura concinna</i>	WL	Barrens	-
Coneflower Borer Moth ¹	<i>Papipema nitida</i>	WL	Wet Meadows	-
Pine Tussock Moth ¹	<i>Dasyochra pinicola</i>	WL	Barrens	-
Zabulon Skipper ¹	<i>Poanes zabulon</i>	WL	Grassland	-
Broad-winged Skipper ¹	<i>Poanes viator</i>	WL	Marshes	-
Silvery Blue ¹	<i>Glaucopsyche lygdamus</i>	WL	-	-
Black Dash ¹	<i>Euphyes conspicuus</i>	WL	Sedge Meadows	-
Maine Snaketail ¹	<i>Ophiogomphus mainensis</i>	WL	Flowing Gravel Streams	-
Triangle Floater ¹	<i>Akamolonta umbulata</i>	WL	Flowing Gravel Streams	NHESP FACTSHEET
Bottlebrush Borer Moth ¹	<i>Papaipema cerina</i>	CI	Talus (Lymus)	-
Common Checkered Skipper ¹	<i>Fyrus communis</i>	CI	Meadows	-
Fairy Skipper ¹	<i>Hylephila phylus</i>	CI	-	-
Giant Swallowtail	<i>Papilio cresphantes</i>	CI	-	-
Common Checkered Skipper ¹	<i>Fyrus communis</i>	CI	-	-
Variegated Fritillary ¹	<i>Euploete cabailla</i>	CI	-	-
Gold-spotted Ghost Moth ¹	<i>Sthenopsis auratus</i>	CI	-	-
Say's Cicada	<i>Climagaga rimoso</i>	CI	Barrens	-
Eastern Whip-poor-Will ¹	<i>Caprimulgus vociferus</i>	SC	Pitch Pine Scrub Oak Woodland	NHESP FACTSHEET
Grasshopper Sparrow ¹	<i>Ammodramus saviannus</i>	T	Sandplain Grassland	NHESP FACTSHEET
Least Bittern	<i>Icthyophaga exilis</i>	E	Emergent Marsh/Shrub Marsh	NHESP FACTSHEET
New England Blazing Star ¹	<i>Liatris scariosa</i> var. novae-angliae	SC	Sandplain Grassland	NHESP FACTSHEET
Purple Milkweed ¹	<i>Asclepias purpurata</i>	E	Sandplain Grassland	NHESP FACTSHEET
Wild Lupine ¹	<i>Lupinus perennis</i>	WL	Sandplain Grassland	-
Arctostaphylos	<i>Arctostaphylos bulbosa</i>	T	Peat Bog	NHESP FACTSHEET
Large Whorled Pogonia	<i>Austria verticillata</i>	WL	Open Oak Woodland	-
Narrow-leaved Spring Beauty ¹	<i>Claytonia virginica</i>	E	Rich Alluvial	NHESP FACTSHEET
Butternut	<i>Juglans cinerea</i>	WL	Talus and Rich Pastureland	-
Maple-leaved Goosefoot	<i>Chenopodium simplex</i>	WL	Talus	-
Wood Turtle	<i>Glyptemys insculpta</i>	SC	Riparian	NHESP FACTSHEET
Eastern Box Turtle	<i>Terrapene carolina</i>	SC	Outwash (heating)	NHESP FACTSHEET
Bridle Shiner	<i>Notropis agrenatus</i>	SWAP	Soil Waters	NHESP FACTSHEET
Four-toed Salamander	<i>Hemibaetis scutatum</i>	SWAP	Wetlands with Sphagnum	NHESP FACTSHEET
Spotted Turtle	<i>Clemmys guttata</i>	SWAP	Wetland	-
Black Racer	<i>Coluber constrictor</i>	SWAP	Landscape Mosaic	-
Eastern Hognose Snake ¹	<i>Heterodon platirhinos</i>	SWAP	Sandplain	-
Ruffed Grouse	<i>Bonasa umbellus</i>	SWAP	Woodland/Shrubland	-
American Kestrel	<i>Falco sparverius</i>	SWAP	Grassland/Shrubland	-
Prarie Warbler	<i>Dendroica discolor</i>	SWAP	Dry Shrubland	-
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	SWAP	Shrubland	-
American Woodcock	<i>Scolopax minor</i>	SWAP	Shrubland	-
Field Sparrow	<i>Spizella pusillo</i>	SWAP	Dry Shrubland	-
Eastern Meadowlark	<i>Sturnella magna</i>	SWAP	Grassland	-
Brown Thrasher	<i>Toxostoma rufum</i>	SWAP	Dry Shrubland	-
Blue-winged Warbler	<i>Vermivora cyaneoptera</i>	SWAP	Shrubland	-

NATURAL COMMUNITIES				
Sandplain Grassland	-	S1	-	NHESP FACTSHEET
Sandplain Heathland	-	S1	-	NHESP FACTSHEET
Pitch Pine Scrub Oak Shrubland	-	S2	-	NHESP FACTSHEET
Scrub Oak Shrubland	-	S1	-	NHESP FACTSHEET
Circumneutral Talus Woodland	-	S3	-	NHESP FACTSHEET
Black Oak-Scarlet Oak Woodland	-	S3-S4	-	NHESP FACTSHEET
Black Ash-Tamarack Swamp	-	S2	-	NHESP FACTSHEET
Spruce-Tamarack Bog	-	S2	-	NHESP FACTSHEET
Kettlehole Wet Meadow	-	S3	-	NHESP FACTSHEET



Most are Globally Rare Natural Communities that only occur on the Northeast Coastal Plain



* denotes Rock Outcrop Barrens; all other sites are Sand Plain Barrens

The Foundation of a Barrens Community



Barrens Communities Establish on the Landscape



Sandplain Grassland



Heathlands



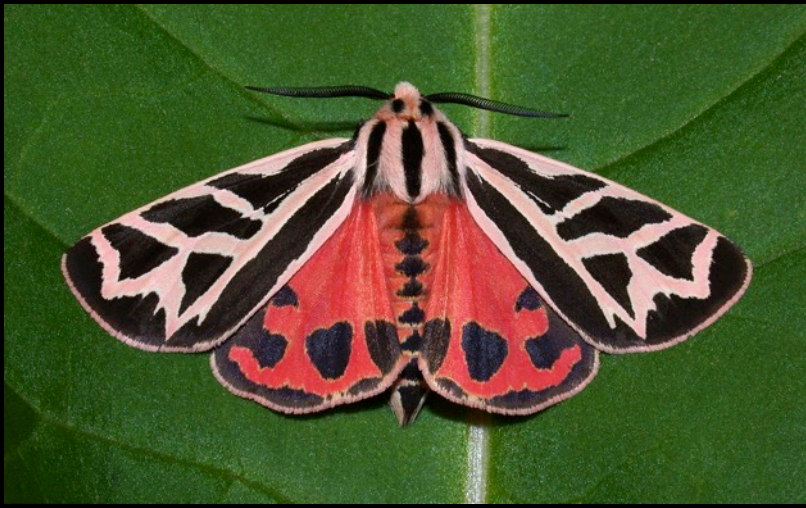
Pitch Pine – Scrub Oak Barrens (Pine Barrens)



Oak Glade Community



Presettlement tree density was largely a function of fire frequency and severity. Presettlement oaks tended to be large on average, but stand basal areas were low-to-moderate as a result of tree sparseness.









Historic Fire



Fire as a Tool

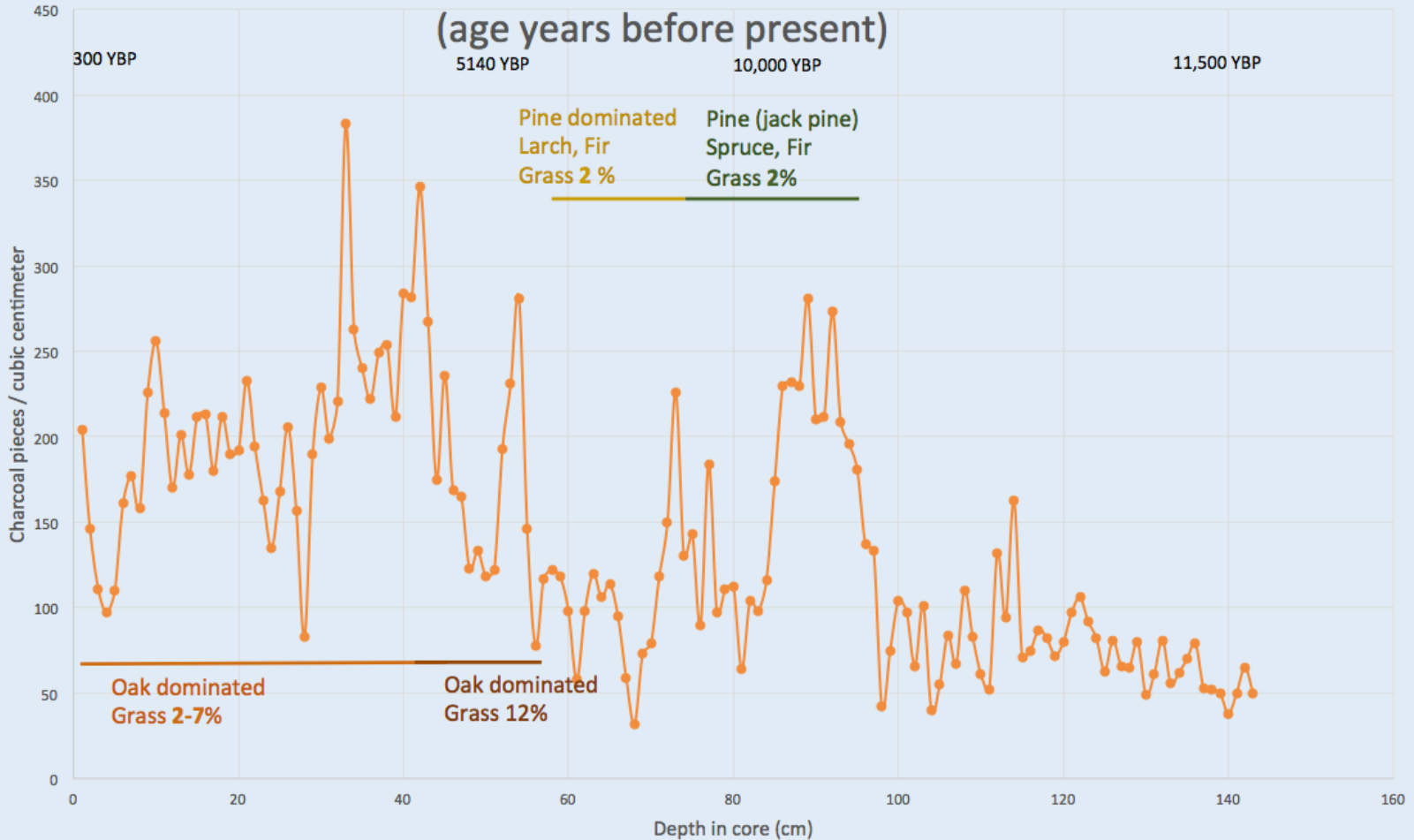


Anthropogenic Fire was widespread and frequent throughout much of the eastern United States before First Contact.

- Land Clearing for Agriculture
- Maintenance of open areas (fallow fields)
- Hunting
- Invigorate berry production
- Pest Management
- Create habitat

- Soil profiles
- Written accounts
- Charcoal/Pollen analysis
- Fire Scars
- Witness Trees

Macro-Charcoal Record and Pollen Summary Pond 2, Hardwick, MA



Basic Function of Fire-Adapted Communities in 4 Steps



Step 1: A High Integrity Fire-Influenced Community

Basic Function of Fire-Adapted Communities in 4 Steps



Step 2: Over time fuel builds in the community. This fuel begins to retain water, collect nutrients and regulate temperatures.

Basic Function of Fire-Adapted Communities in 4 Steps



Step 3: The new fuel load creates conditions for fast-growing, non-fire adapted species such as white pine to establish

Basic Function of Fire-Adapted Communities in 4 Steps



Step 4: A fire event occurs, killing the non-fire adapted species and removing the built-up fuel. The process starts over again.

Basic Function of Fire-Adapted Communities in 4 Steps



Alternative Step 4: No fire occurs, and community is lost to generalist species

Conservation Status of Fire Adapted Communities



Fire Suppression is now greatest threat

Land Conservation is not Enough

- Disturbance Dependent (Primarily Fire)
- Need Active Management
- Fire Influenced Communities on Protected Land have 1 of 2 fates: be managed and continue as barrens, or, without management succeed into generalist forests

How do we Restore and/or manage these Communities?



“An Ordinary Forest”



Returning structure to State of Regular Disturbance



Restoration Tools



Restoration in Process



Maintenance



The Significance of Swift River-Ware River Barrens

Total Potential Acreage on Protected Lands across Central System:

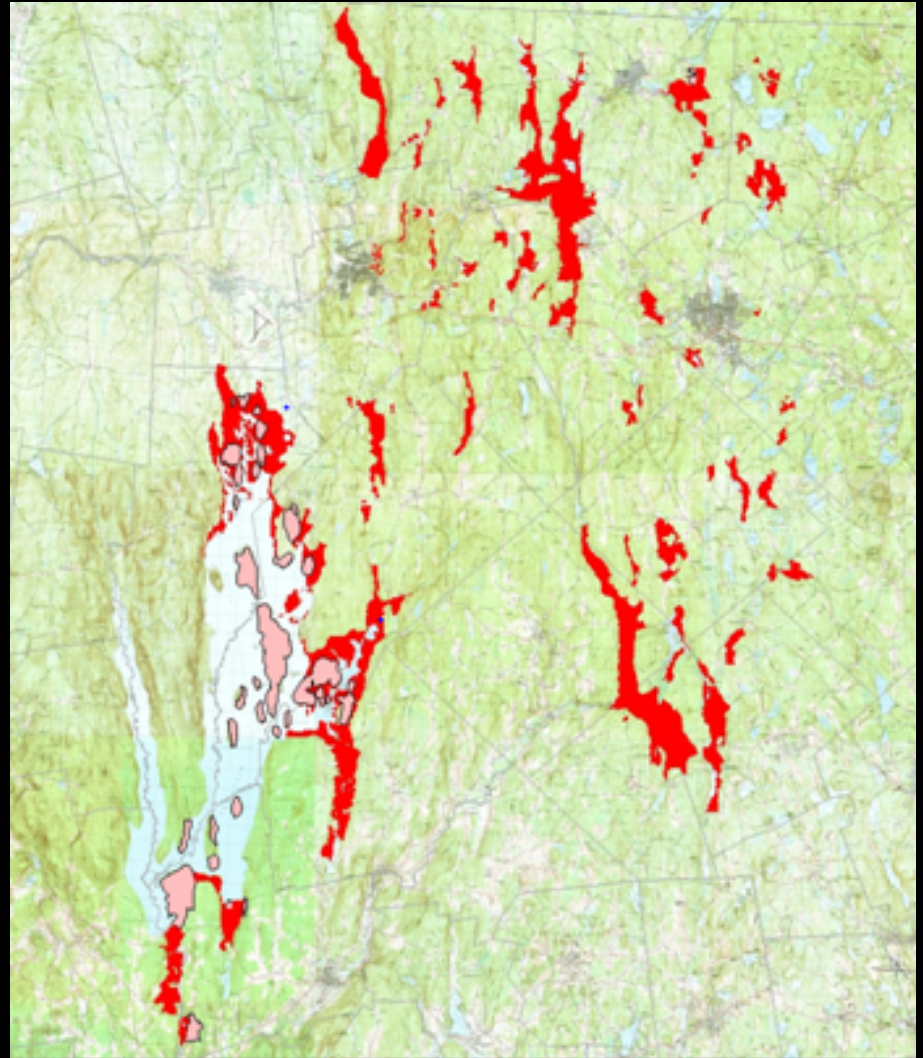
Quabbin Watershed (DCRW): 13,500 ac
Ware River Watershed (DCRW): 6,500 ac
Muddy Brook Complex (DFW): 1000 ac
Birch Hill/Otter River (ACOE/DCR): 4,000 ac
Herm Covey WMA (DFW): 1,000 ac

Comparable Inland Barrens Sites:

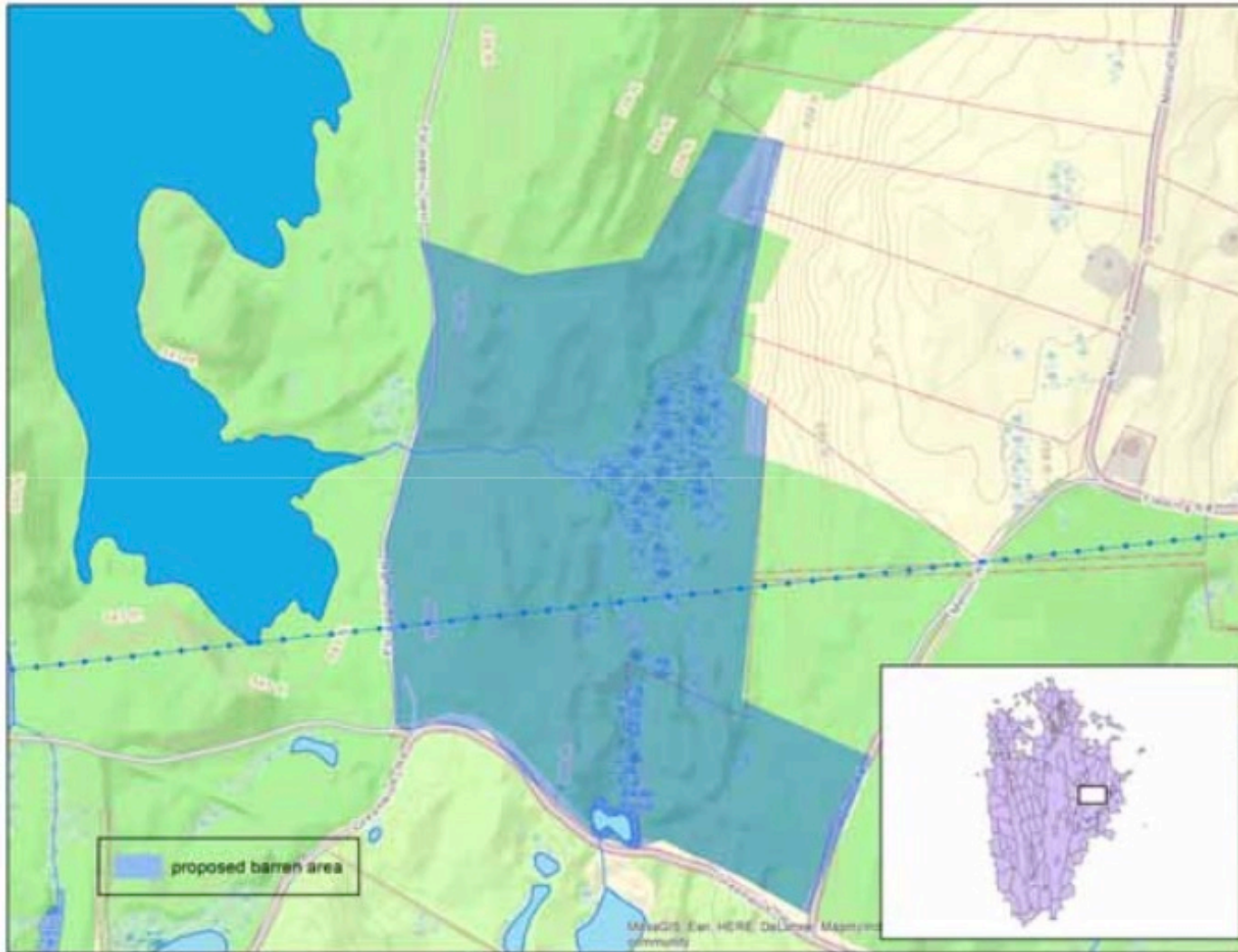
Montague Plains WMA, MA: 1,000-acres
Waterborough Barrens, ME: 2,500-acres
Albany Pine Bush, NY: 4,000-acres
Ossipee Pine Barrens, NH: 6,000-acres

Cooperative Management is Essential:

Understand other organizations goals
Show how your proposed management
supports those goals.



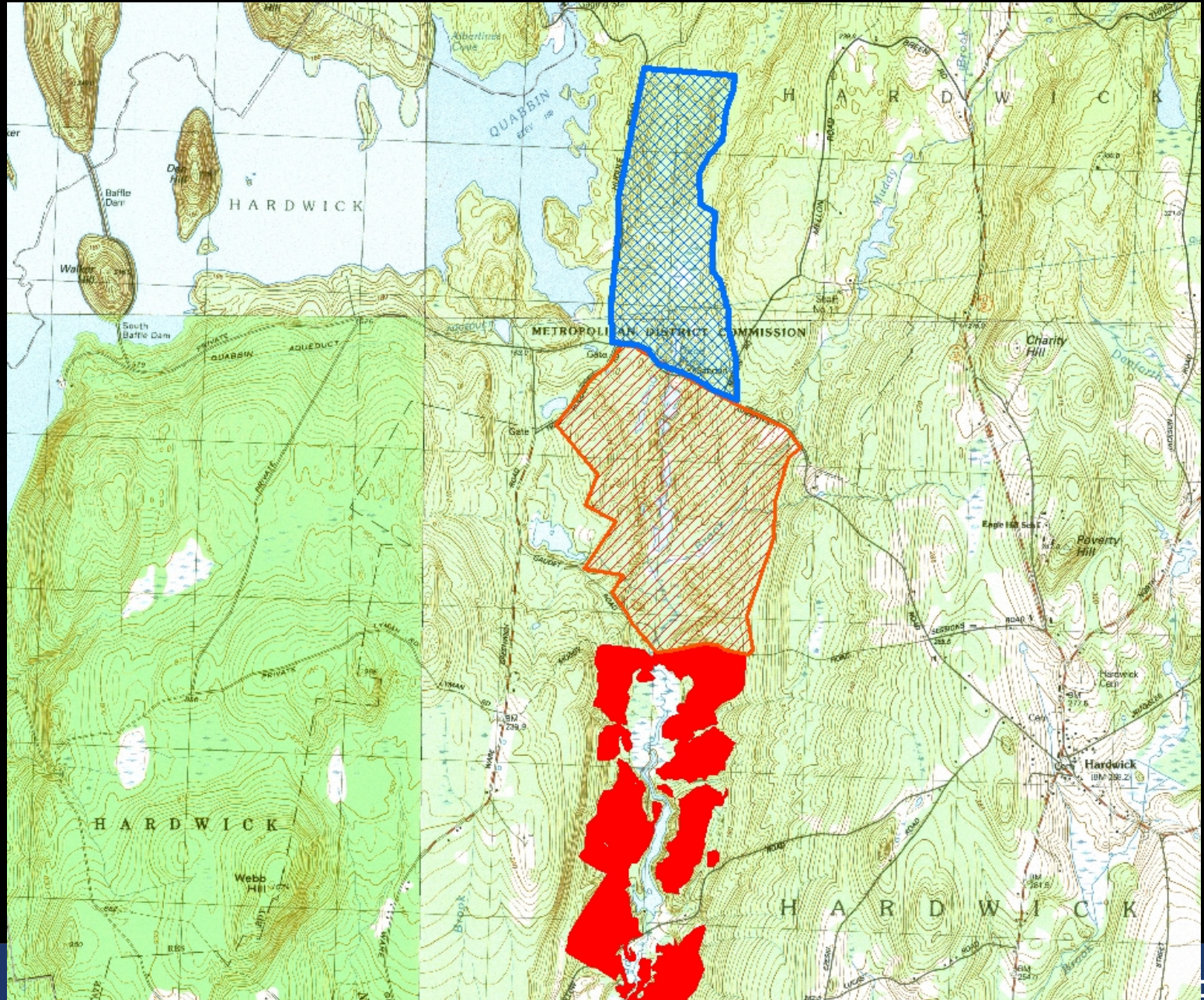
Greenwich Road/Gate 43 Area



Greenwich Road/Gate 43 Area



Greenwich Road/Gate 43 Area



Muddy Brook WMA



Monitoring



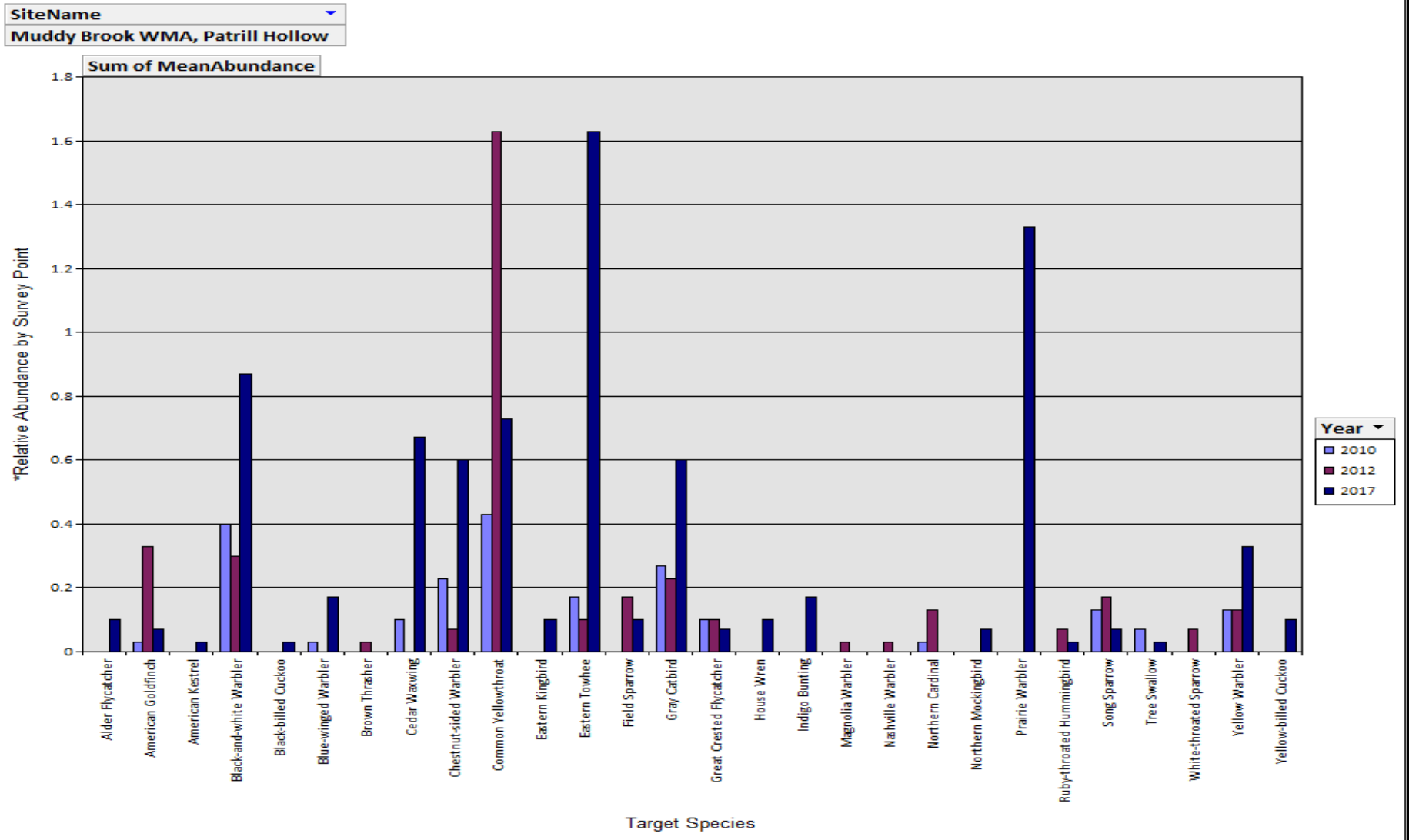
Monitoring



Monitoring



Monitoring



Fairview Hill Area



Fairview Hill Area



Fairview Hill Area



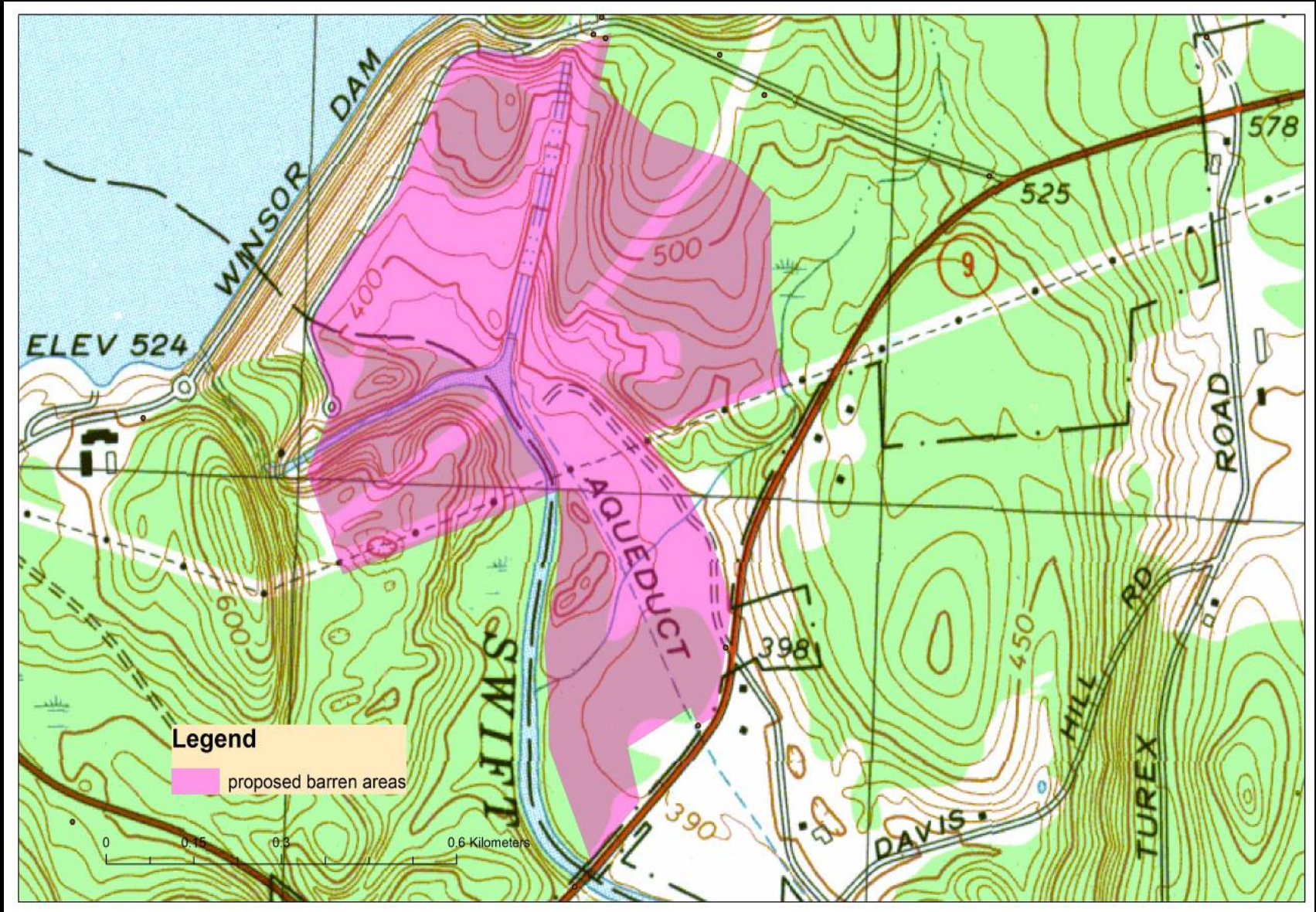
Fairview Hill Area



Gays Hill Area



Windsor Dam



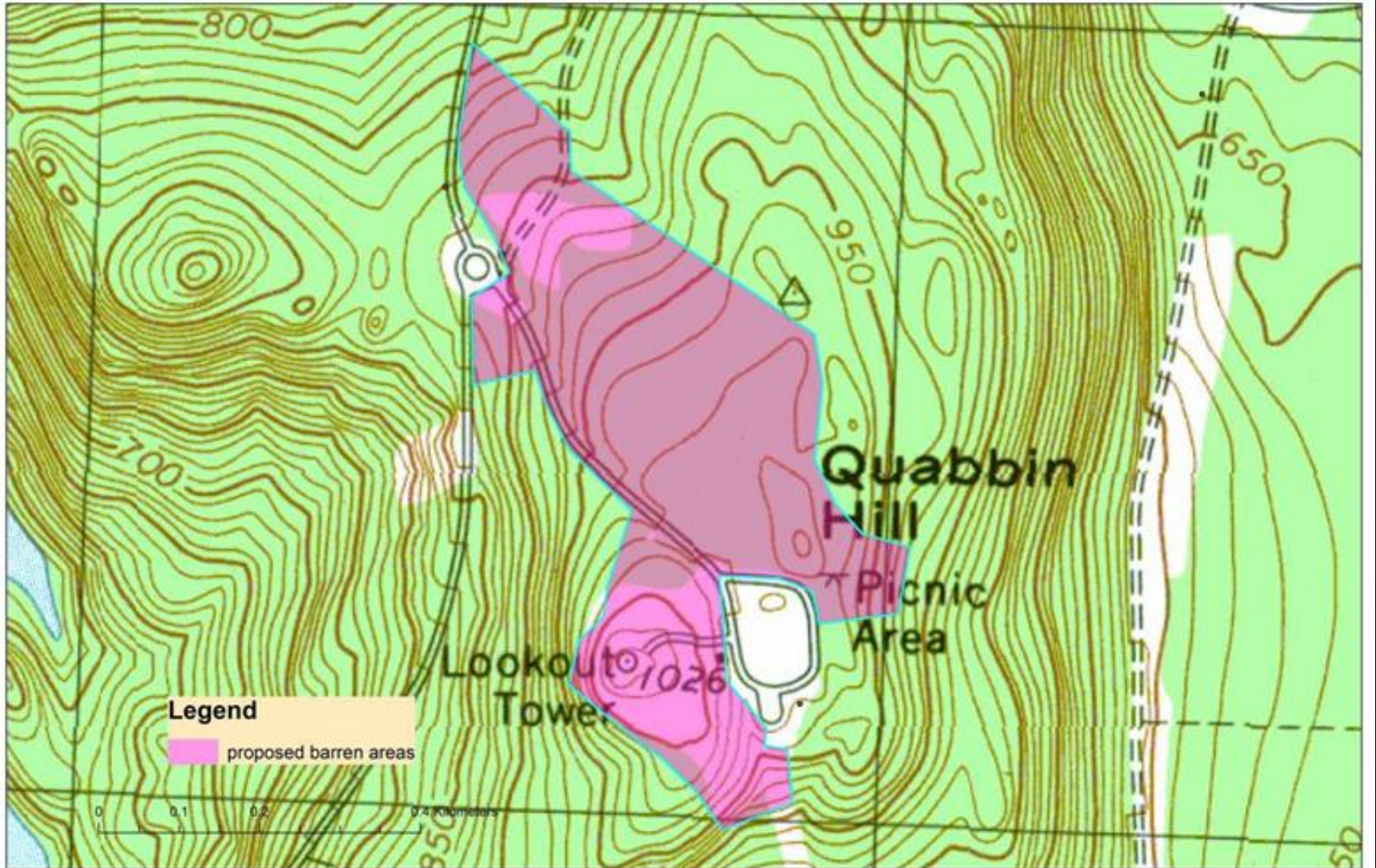
Windsor Dam



Windsor Dam



Quabbin Hill



Quabbin Hill



Quabbin Hill



Quabbin Hill



Quabbin Hill



Barre Heathland



Barre Heathland



Barre Heathland



Barre Heathland



Muddy Pond



Muddy Pond



Muddy Pond



Muddy Pond



Questions

