Forest Health Impacts of White-tailed Deer Overabundance

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Deer…

Vegetation…

and people.

Outline

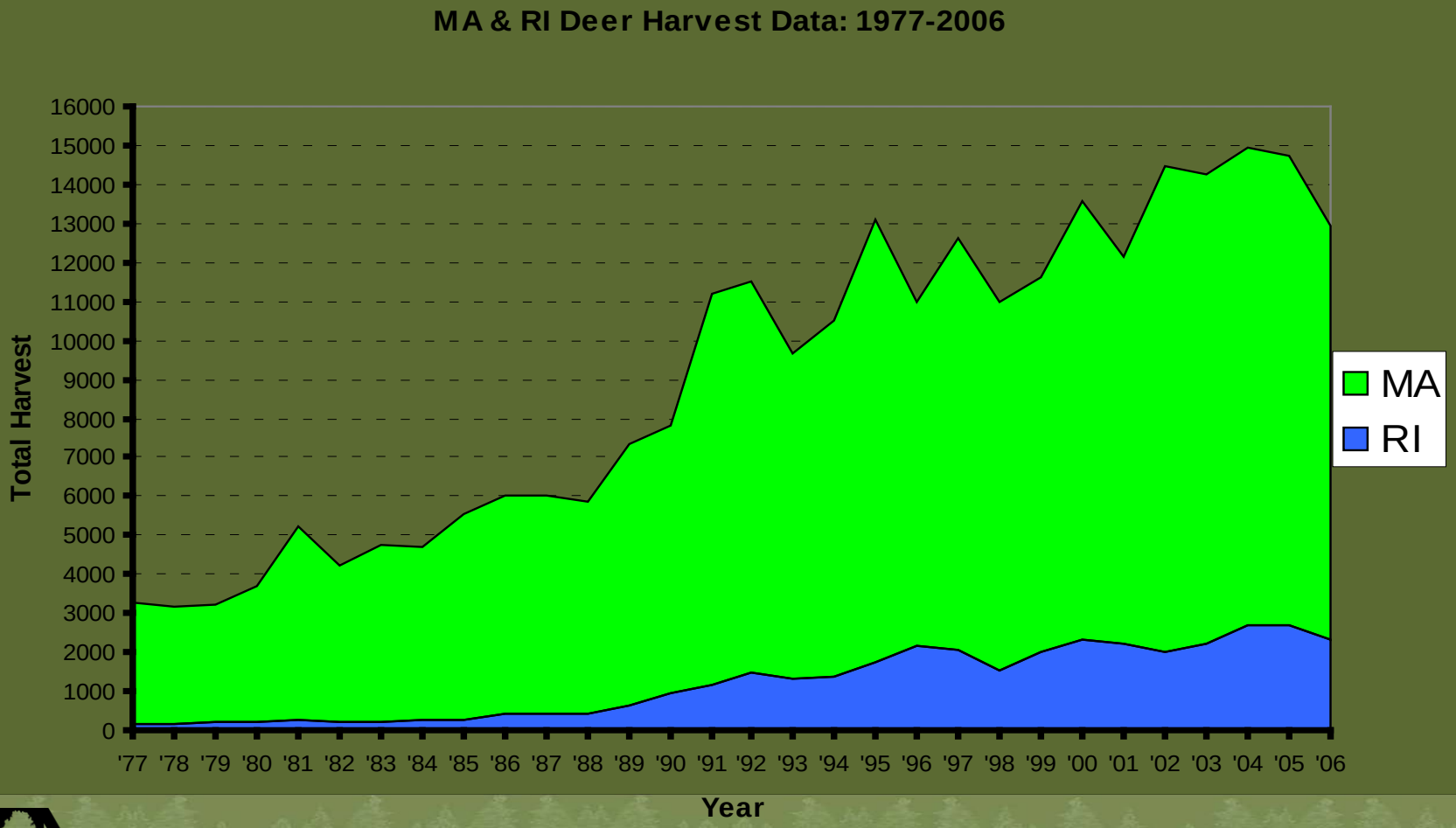
- 1. How we got here
- 2. White-tailed deer biology and ecology
- 3. Recognizing and understanding impacts
- 4. Challenges

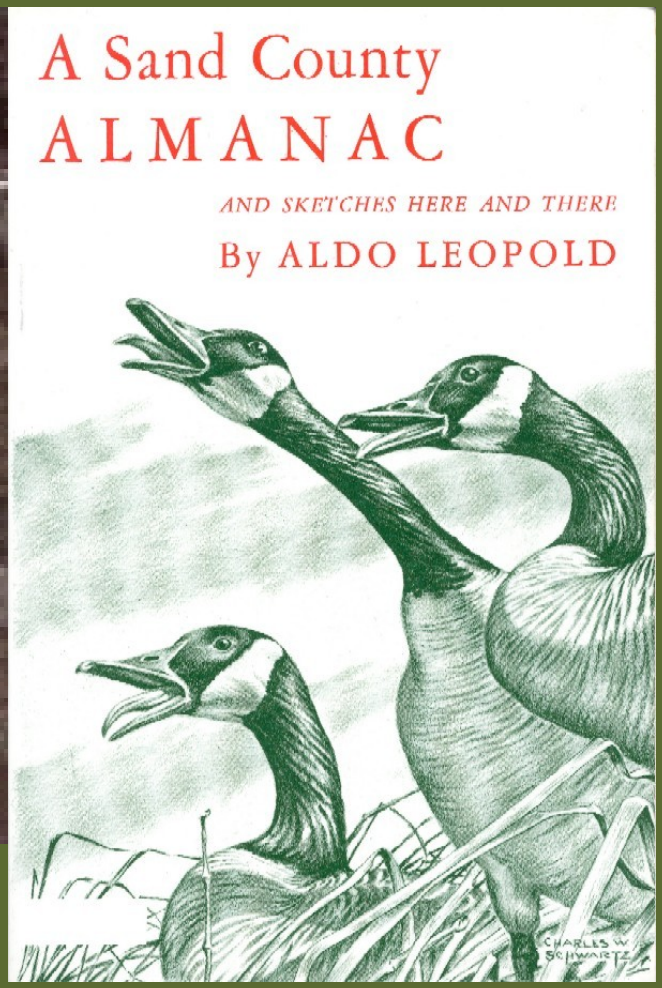
How we got here…

"There is a widespread impulse to blame recent policies and management actions, or inaction, for the current deer situation, but the ultimate causes run much deeper and have been around for a very long time. Profound changes to landscape and to interactions among wildlife species brought about by humans are responsible for the current high densities of white-tailed deer and their pervasive effects on the rest of the ecosystem."

Latham et al. 2005

Deer populations in southern New England, and elsewhere, have increased dramatically in the last 20 years.





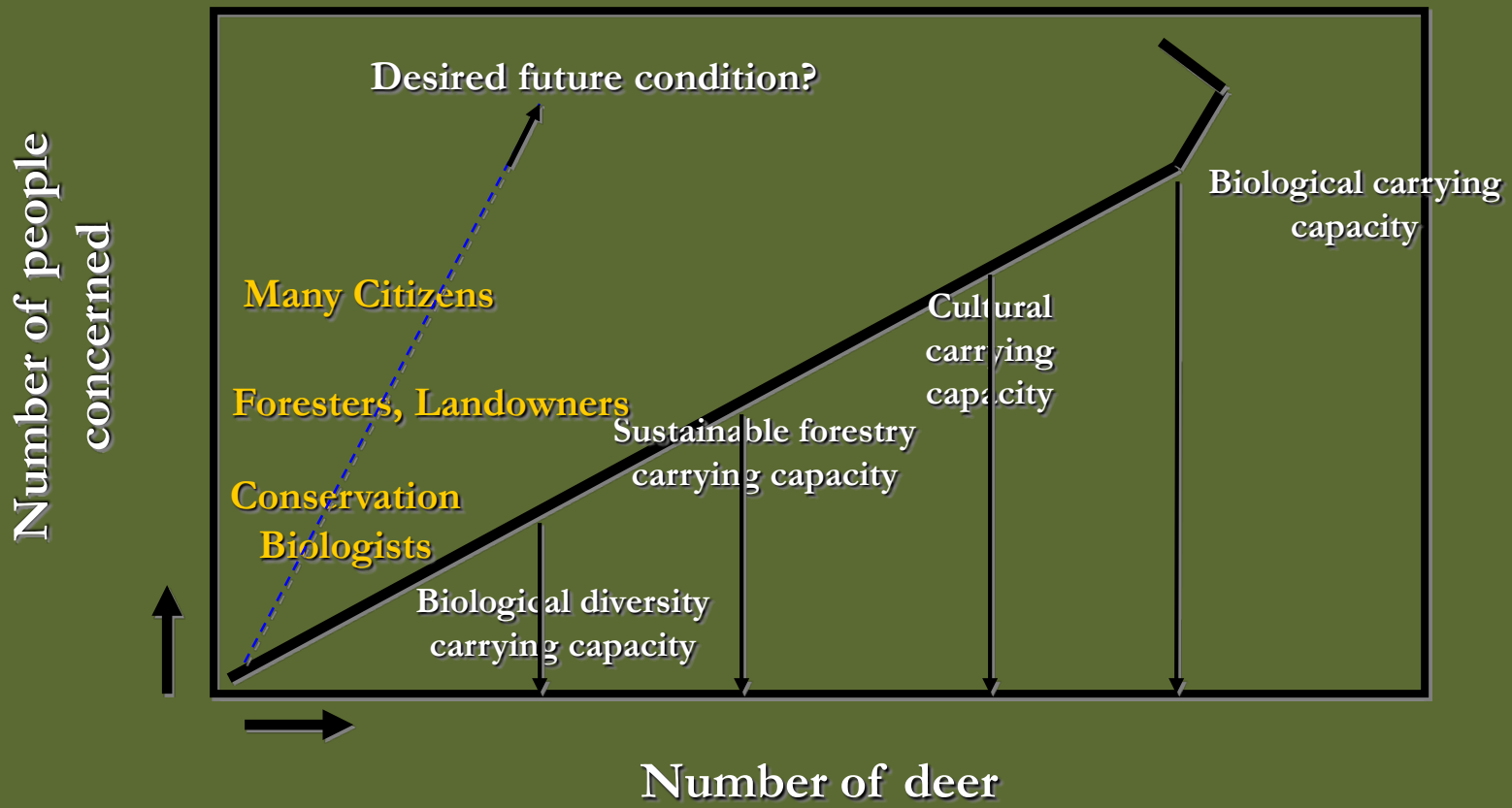
Aldo Leopold – joined the US Forest Service in 1909

"The last wolf and lion must be shot." - 1920

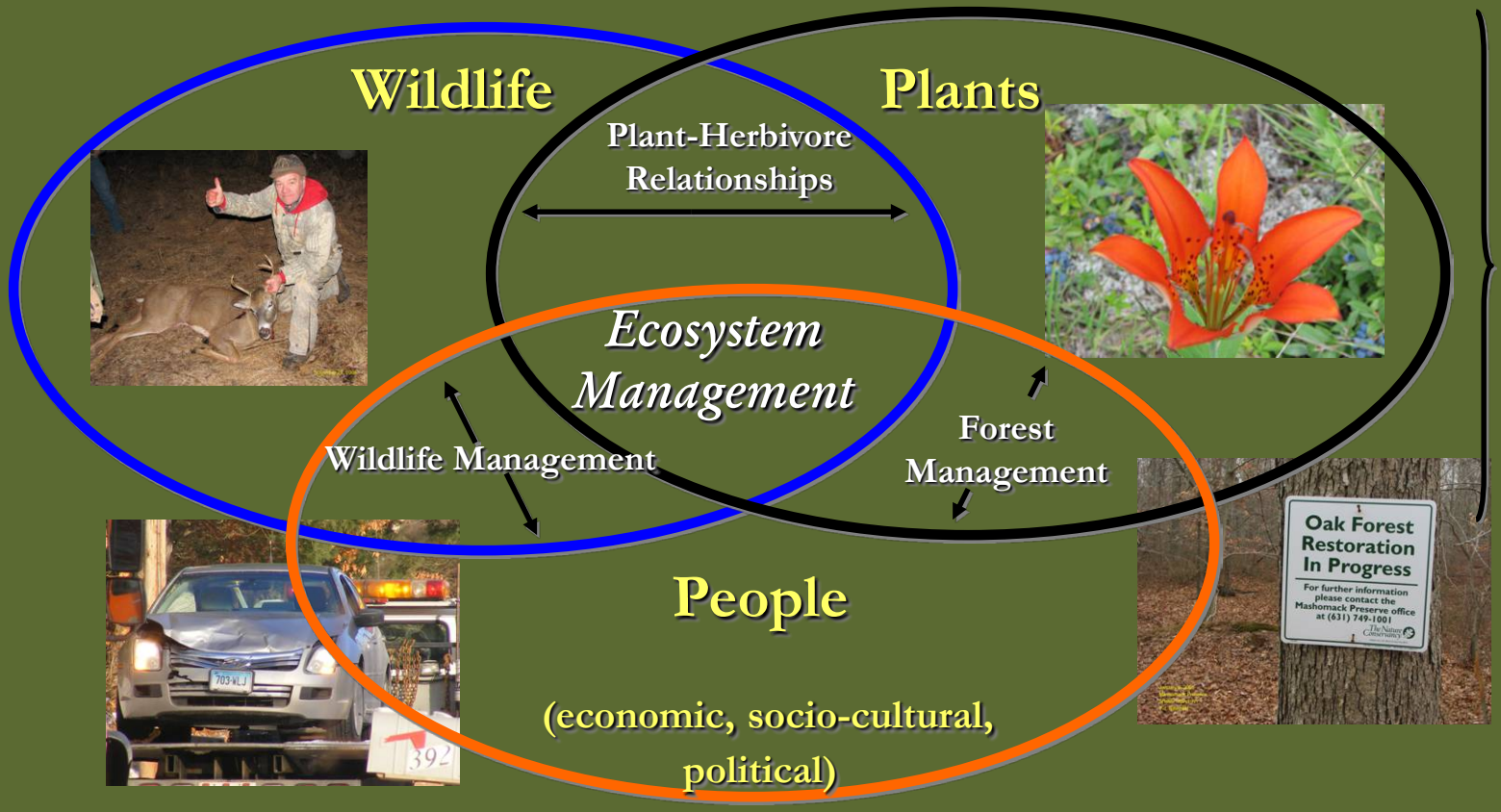
In 1944, Leopold wrote:

"Conservation is a state of health in the land. The land consists of soil, water, plants, and animals, but health is more than a sufficiency of these components. It is a state of vigorous self-renewal in each of them, and in all collectively. Such collective functioning of interdependent parts for the maintenance of the whole is characteristic of an organism. In this sense land is an organism, and conservation deals with its functional integrity, or health."

Carrying capacity & thresholds of tolerance.



Socio-ecological System



Deer biology and ecology

- White-tailed deer are adaptable and prolific animals equipped with keen survival instincts.
- Seven deer introduced to Block Island, RI in 1967 grew to a herd of 700 deer by 1994.
- Deer are ‘generalist’ herbivores; herbivory impacts vary spatially, temporally, and among plant species, in relation to the population density of the herd.

Natural predators include bobcat, coyote, and black bear.

Winter mortality can be severe in northern New England.

In many instances, regulated hunting can control deer populations.

Deer-vehicle collision mortality can surpass hunting mortality.

- CT: 1,967 deer reported killed by autos in 2007; actual number estimated to be 11,802.
- CT: hunter harvest was 11,062 in 2007.
- In North Kingstown, RI, 115 deer reported killed by autos in 2006; hunters harvested 57 in that town that year.

Recognizing Impacts:

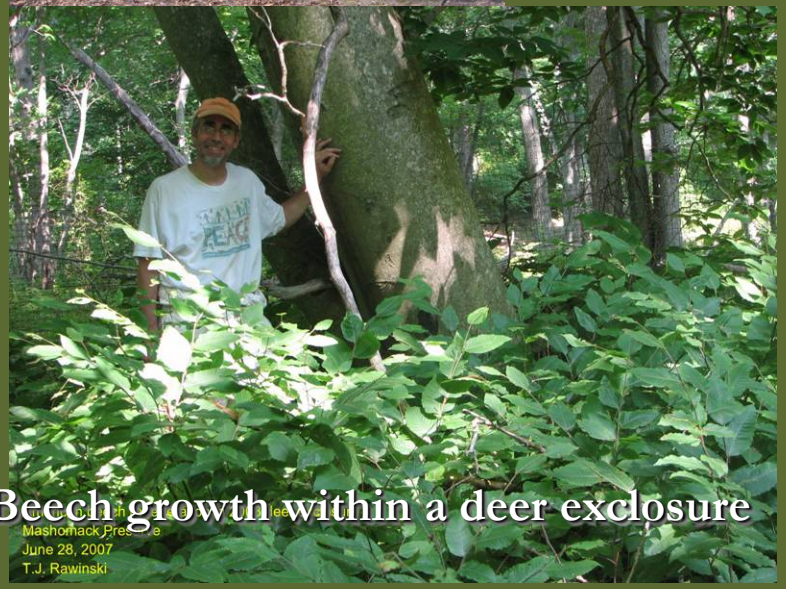
It takes a trained eye to see what's missing.

Profound impacts in this RI forest

Obvious impacts of deer herbivory.

Eastern Red-cedar

Obvious impacts: Suppression of American beech, Suffolk County, NY



Beech growth within a deer exclosure

Obvious impacts: browse line on winged euonymus, Middlesex County, CT

Dutchess County, NY

Shrub-sapling layer missing; Japanese stiltgrass abundant.

Westchester County, NY:

Deer density calculated at 67 per square mile at this site.

Fencing necessary to regenerate the forest.

Suffolk County, NY:

Pennsylvania sedge now dominates the understory. Lowbush blueberry bushes are mostly barren.

Cayuga County, NY:

Ginseng and white trillium all but extirpated. Sugar maple not regenerating. Garlic mustard flourishing.

Suffolk and Ulster Counties, NY:

Forests are beginning to disintegrate. Hurricanes and wildfires will have catastrophic consequences if deer herds remain large.

Some resistant or tolerant *native* plant species.

- Picea spp.
- Fagus grandifolia
- Sassafras albidum
- Acer pensylvanicum
- Prunus serotina
- Kalmia latifolia
- Myrica pemsylvanica
- Smilax rotundifolia
- Dennstaedtia punctilobula
- Ageratina altissima
- Veratrum viride
- Symplocarpus foetidus
- Pyrola spp.
- Chimaphila spp.
- Ranunculus spp.
- Carex spp.
- Dichanthelium spp.
- Podophyllum peltatum
- Caulophyllum thalictroides
- Asclepias spp.
- Apocynum spp.

Carex squarrosa


Podophyllum peltatum


Pyrola americana


Sassafras albidum

Some resistant or tolerant *exotic* plant species.

- Robinia pseudoacacia
- Ailanthus altissima
- Aralia elata
- Berberis thunbergii
- Frangula alnus
- Rosa multiflora
- Rubus phoenicolasius
- Lonicera morrowii
- Lonicera japonica
- Alliaria petiolata
- Cynanchum louiseae
- Hesperis matronalis
- Verbascum thapsus
- Scilla siberica
- Centaurea biebersteinii
- Arctium spp.
- Microstegium vimineum
- Solanum dulcamara
- Aegopodium podograria
- Chelidonium majus
- Cirsium spp.

Detrimental impacts of overabundant white-tailed deer include:

- Loss of biodivesrity, and cascading ecological effects.
- Simplified vegetation structure, bringing more sunlight to the forest floor.
- Proliferation of deer-resistant native and exotic plant species.
- Tree populations 'bottle-necked' at the seedling or dwarfed sapling stage.
- Forestry no longer sustainable, or yielding diminished value.
- Ecosystem function and services compromised.

Degradation of forest bird habitat

- Indigo Buntings, Hooded Warblers, and Ovenbirds responded to increased vegetation in fenced exclosures in VA.
- In PA, intermediate canopy-nesting birds were reduced 37% where deer population densities were highest.

Many rare plant populations are being decimated

- A fence protects the globally rare New England Blazing-star on Block Island, RI.
- Woodland sunflower and five other rarities seriously threatened by deer at the Grills Preserve in Westerly, RI.

Invasive Plants:

Invasive plants are disproportionately resistant to deer herbivory.

Deer are one mechanism for transportation of exotic plants into forests.

White-tailed deer herbivory can accelerate the invasion of exotic plants.

Native plants can beat many invasives if given a level playing field.

Japanese barberry is highly resistant to deer herbivory.

Scituate Reservoir

Deer tracks.

Japanese Stiltgrass.

Scituate Reservoir

Regeneration failure.

Forests are becoming open and park-like

Scituate Reservoir

- Hay-scented Fern dominates much of the understory.

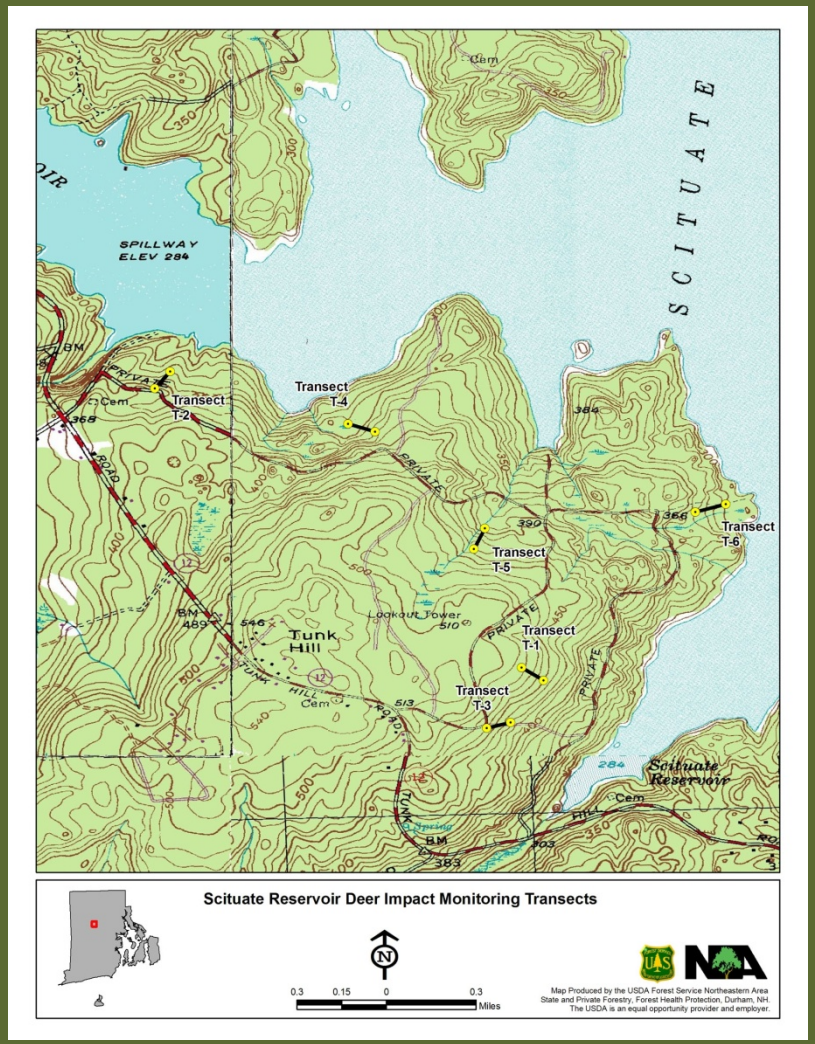
Scituate Reservoir

Pink Lady's Slipper now scarce

Dogbane flowers only within the fire tower fence

Scituate Reservoir

Detailed vegetation studies have been initiated



Challenges we face

- Most people aren't aware of the seriousness of the problem.
- People with diverse viewpoints need to find common ground.
- Declining hunter population, and increasing development.
- Solutions can be expensive, and need to be sustained indefinitely.

"We think we know our forests. But in Pennsylvania and many other parts of the Northeast, deer overabundance has changed our forests so much and for so long that we truly don't know how our forests would look without too many deer." (Susan Stout, USDA Forest Service 2004)

"It doesn't matter what forest values you want to preserve or enhance – whether deer hunting, animal rights, timber, recreation, or ecological integrity – deer are having dramatic, negative effects on all the values everyone holds dear." (Stephen Horsley, USDA Forest Service, 2004)

"Professionals from many fields concerned with ecosystem management will need to get involved in deer management. No other area of wildlife management will require more integrative thinking than that involved with crafting solutions to the dilemma of rising deer numbers and declining hunter numbers." (Riley et al. 2003)

Thank you. Questions?