

Baseline GIS Mapping of Invasive Plant Species in a Parcel Cockaponset State Forest to Allow for Adaptive Management Practices



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ABSTRACT

The purpose of this project was to inform the community on how management of invasive plant species is beneficial to an ecosystem. In this project I documented the distribution of native and invasive plant species within a 50-acre parcel of Cockaponset State Forest in Middletown, Connecticut in an effort to see which species are predominant. Patches were mapped using ArcGIS to provide a baseline survey of the property for the Department of Energy and Environmental Protection to further plan invasive plant management practices. Previous maintenance included mowing the field within the property and planting native species.. I attempted to further this study by live trapping small mammals to get an inventory of the small mammal community and better understand how they may be affecting seed dispersal I found that the management of the property has controlled invasives drastically, but not eradicated them fully. The study showed how management of the field has resulted in significantly lower invasive plant populations compared to parts of the property that were left alone, and how it is important that properties are managed and maintained.



INTRODUCTION

Invasive plant species are an ongoing problem throughout Connecticut. An invasive species is defined as an organism (plant, animal, fungus, or bacterium) that is non-native and has negative effects on the environment in which it is introduced. Not all introduced species are invasive. Invasive plants are the second greatest threat to biodiversity after habitat loss, which makes it important to monitor and find ways to eradicate these species. Some common invasive plant species in Connecticut are Japanese Barberry (*Berberis thunbergii*), Multiflora Rose (*Rosa multiflora*), Autumn Olive (*Elaeagnus umbellata*), and Oriental Bittersweet (*Celastrus orbiculatus*).

The aim of my project was to document the distribution of invasive and native plant species throughout a portion of Cockaponset State Forest in Middletown, Connecticut. This parcel of land has been extensively managed by the Connecticut Department of Energy and Environmental Protection (DEEP) in hopes of strengthening the native plant community through regular mowing, herbicide treatments and a native species planting completed in 2009 through a Wildlife Habitat Incentive Program grant awarded by the United States Department of Agriculture. In partnership with DEEP, I documented the presence of beneficial native species and areas of significant invasion on the property in an effort to better understand the current species composition and distribution of the plant community. This study will provide a baseline assessment that can be used to discern community changes on the property and allow DEEP to adapt future management strategies to best fit the property.

Small mammal trapping was also conducted in hopes of gaining insight into habitat choices of mammal species in order to consider how their movement might have an effect on seed dispersal of invasive plant species.



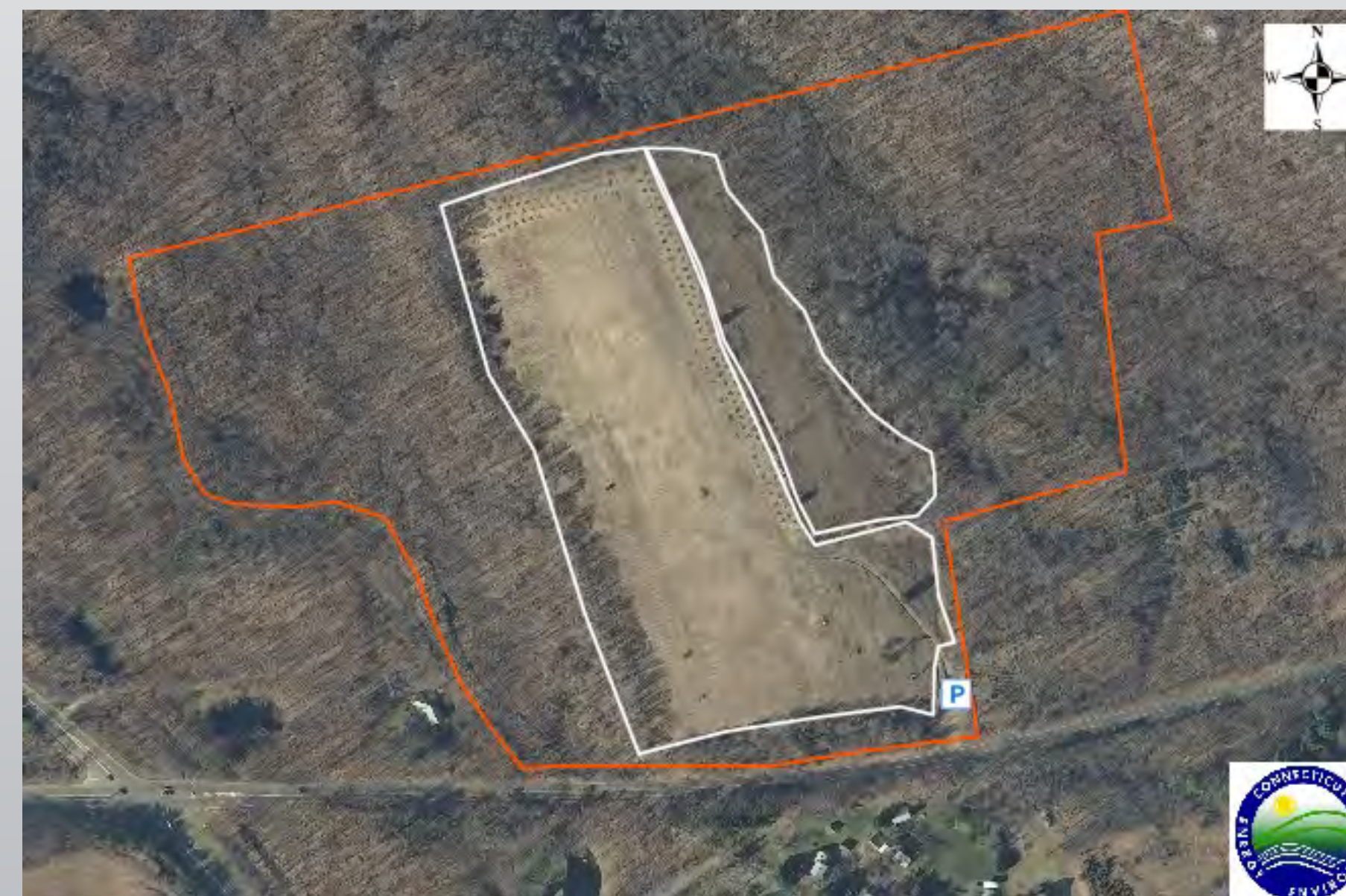
MATERIAL AND METHODS

Study Area

This study was conducted at the Aircraft Road parcel of Cockaponset State Forest in Middletown, Connecticut during November and December 2014.

Longitude 41.513775, Latitude 72.588932, Elevation 892 feet). Cockaponset State Forest is the second largest state-owned forest in Connecticut encompassing over 16,000 acres in Middlesex and New Haven Counties. The Aircraft Road parcel is located directly off of Exit 10 on Route 9 and is surrounded by residential properties. Cockaponset State Forest is a popular site for hiking, wildlife observation and hunting.

The 50-acre parcel contains a 20-acre old field habitat bordered by mixed hardwoods. An old rock wall borders the field to the north; several small streams run through the property and neighboring Spiderweed Preserve, owned by The Nature Conservancy. Cockaponset State Forest is managed to promote healthy and sustainable forest, control invasive plants, encourage native plant diversity, and improve habitat conditions for wildlife.



Data Collection Protocol

Plant Species Mapping (November 2014)

- Mapped invasive and native plant species in the Cockaponset field using a Garmin GPS map 76CSx and arcGIS online.
- Plants were recorded by walking the property and creating waypoints for large individuals and particularly dense patches of both native and invasive species.
- We surveyed for the following invasive plant species: Japanese Barberry (*Berberis thunbergii*), Multiflora rose (*Rosa multiflora*), Autumn Olive (*Elaeagnus umbellata*), Oriental Bittersweet (*Celastrus orbiculatus*), Japanese Stiltgrass (*Microstegium vimineum*), Chinese Silvergrass (*Miscanthus sinensis*), etc.



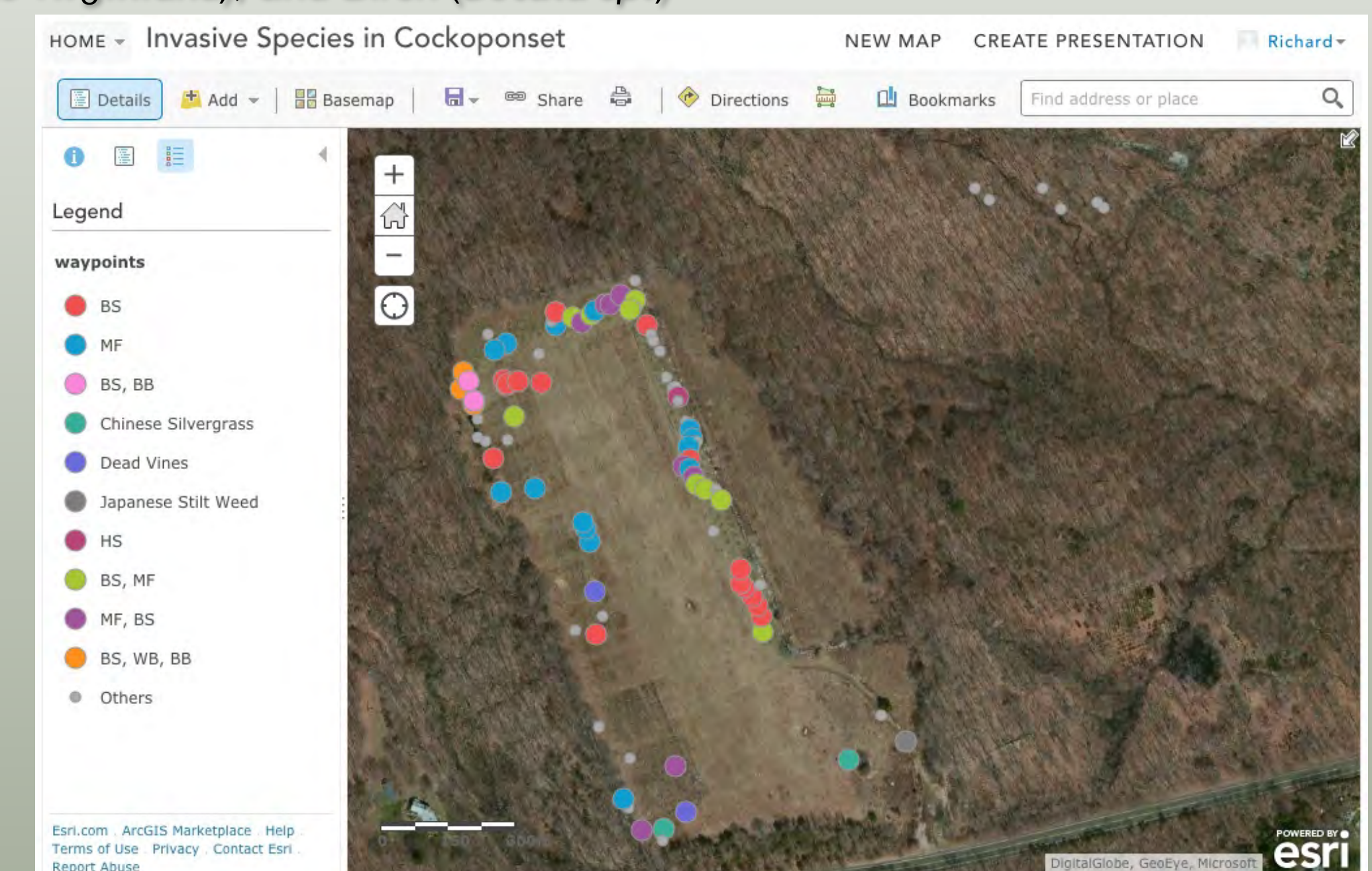
Small Mammal Trapping (December 2014)

- One transect of Sherman traps was placed in each area type (i.e. rock wall, managed field, unmanaged field, and along stream).
- Each transect comprised 612x3x3" Sherman traps spaced 10 meters apart and marked with flags.
- Traps were baited with balls of peanut butter and rolled oats with cotton balls provided in each trap for bedding material.
- Traps were set at dusk and checked at dawn.
- All small mammals and traps were handled using gloves and a face mask to minimize the risk to zoonotic disease.
- The species, sex, reproductive status, and weight of any small mammal captured was recorded.

RESULTS

Component 1 of Study: Plant Species Mapping

The distribution of invasive plant species within the study site varied greatly. Some waypoints had little to no invasives while at other, only invasives were found. We documented Oriental Bittersweet as the most abundant invasive on the property, followed by Multiflora Rose. We noticed the majority of invasives along the northern wall of the property. The managed field yielded minimal invasives along the ground. Due to uncooperative weather and seasonal changes, fully identifying native species was not possible to complete at that time of year. We managed to identify some species such as Cotton (*Gossypium hirsutum*) and Deertongue (*Dichanthelium clandestinum*), and various tree species like, Oak (*Quercus* sp.), Red Cedar (*Juniperus virginiana*), and Birch (*Betula* sp.)



(BS- Oriental Bittersweet, MF- Multiflora Rose, BB- Japanese Barberry, WB- Burning Bush, and HS- Honeysuckle)

Component 2 of Study: Small Mammal Trapping

The results from the small mammal trapping were inconclusive. We set traps the last two weekends in late December and several weekdays. We managed to catch a single White-Footed Mouse (*Peromyscus leucopus*) two times on the north side of the property along the rock wall. We identified the mouse by marking its toes with nail polish



CONCLUSIONS

Invasive species are an ongoing problem in Connecticut and are spreading at an alarming rate. This is why it is important that ongoing research is done on sites managed for invasive plants to see how management methods can be improved. It is also important that the general public learn why invasives are a problem and be taught simple methods to prevent invasives from spreading. This baseline survey shows how management of the property is benefitting the native plant populations and how DEEP can further focus management to more problematic sites that pose the greatest risk for the native plant populations. Invasive species management needs to be a community effort to find the greater good in working together as a community to help increase native plant populations.



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