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Natural Resources Conservation Service

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Coastal Maritime and Cool Season Grassland Management Recommendations for Henry L. Ferguson Museum and Land Trust Matty Matthiessen Wildlife Sanctuary & Grassland

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This report prescribes scientific and economical management recommendations for Matty Matthiessen Wildlife Sanctuary in an effort to ensure effective and economical grassland/meadow restoration, to facilitate the continued preservation and management of a functional grassland habitat and the associated wildlife species. These recommendations are based on the site and vegetation inventories conducted in September 2011, a review of historic management (historic aerials photos) and soil maps, as well the hydrological and coastal influences. As invasive species are one of the greatest threats to preserved grasslands, technical prescriptions for the control of invasive species are also provided.

Management and Restoration Considerations:

Grasslands are disturbance dependent ecosystems requiring grazing, mowing or prescribed burning to persist. In order to maintain these culturally iconic and biologically rich landscapes in an efficient and effective manner, management prescriptions must be developed reflective of the ecological importance, long term goals, grassland area, current species composition, and available resources. The following inventories and considerations are addressed within this report:

- **Current State of Grasslands-** Ecology and dependent species grasslands
- **Need for Management –**The status and threats to grasslands
- **Goal:** The vision and the focal species benefited or impacted by projected management.
- **Size of potential restoration**: Wildlife benefits and grassland function is directly influenced by the available area.
- **Site & Soil inventory:** Evaluation of the soils of a site is a critical component to any management plan as edaphic factors (soil texture, structure, porosity, etc.) directly influence grassland diversity and structure.
- **Vegetation Inventory:** Identification of desirable and invasive species is critical to determine the degree of effort, time commitment, and resources necessary to achieve desired composition and level of restoration. The recruitment potential from the seed bank should also be evaluated to identify if seeding will be necessary for restoration.
- **Historical Aerials:** A comparison of historic aerial photos can identify past management practices, changes in plant composition to guide future management.
- **Management Recommendations:** Incorporates above inventories and considerations.
- **Resources:** An evaluation of your financial, volunteer, and equipment resources/commitments is necessary to select the appropriate level of management.

Current State of Grasslands: Critical Habitats in Decline.

Coastal maritime grasslands, Sand plains, Hempstead plains, and Old fields are grassland types found across Long Island and Connecticut and their associated islands such as Fishers Island. Each grassland type has unique plant communities and physical structure as influenced by past glaciation, edaphic conditions, hydrology, coastal proximity and historic and current management practices.

The Coastal maritime grasslands and Sand and Hempstead plains are native grasslands of this region that have been maintained by the grazing and burning activities of colonists and Native Americans which prevented grasslands from naturally succeeding. Natural wildfires had limited contributions in preserving/sustaining such grasslands. Numerous rare and endangered plant species inhabit these communities which also provide critical habitat, shelter, and food for a diverse array of wildlife species including raptors (hawks, owls and falcons), mammals (deer, fox, rabbits, groundhogs, voles, field mice and bats), insects (moths, butterflies and bees), and songbirds (Meadowlark, Grasshopper sparrow, Field sparrow, and Bobwhite quail).

Old fields are abandoned agricultural lands dominated by agricultural grasses and weeds such as cool season grasses, Clovers, Barnyard grass, Quackgrass, Mugwort, Canada thistle, and Kimsonweed. Due to regular ground disturbance, these fields contain little, to no native seed bank and have high minerals and nutrient levels from the remnant agricultural activities. Combined, these factors stifle natural native plant recruitment and

facilitates dominance by weedy species. Broomsedge (*Andropogon virginicus*), a native grass serves as an old field indicator being the first native that pioneers and can dominate this novel community. Eastern red cedars (Juniperus virginiana) and goldenrods (Solidago spp) are also species commonly found in old fields.

Abandoned pastures and haylands are cool season grasslands being dominated by residual species such as Orchardgrass (*Dactylis glomerata*), Tall fescue (*Schedonorus phoenix*), Smooth bromegrass (*Bromus inermis*), and Kentucky bluegrass (*Poa pratensis*) from grazing and haying activities These grasslands have low densities of warm season grasses (typically only Broom sedge) due to the highly competitive nature of cool seasons.

The Need:

Development, agriculture, natural succession, invasive plant species and suppression of prescribed fire have reduced and continue to reduce these historical grassland communities to a small fraction of their original area. The Hempstead Plains in Nassau County, New York, covered over 32,000 acres historically, but has been reduced to only a small percentage of its original range due to development. The 19 acre remnant of the Plains, although now preserved and protected from further development, remains threatened by invasive species encroachment and natural succession. These trends are witnessed across New York State and the United States. The direct impact is the loss of flora and fauna species that create and depend on these habitats and ecosystems. Species such as the Eastern meadowlark, Grasshopper sparrow, Short-eared owl, Karner blue butterfly, and Sand plain gerardia, have reached such low populations that they are listed as endangered, threatened, or species of concern by Federal and/or New York State government.

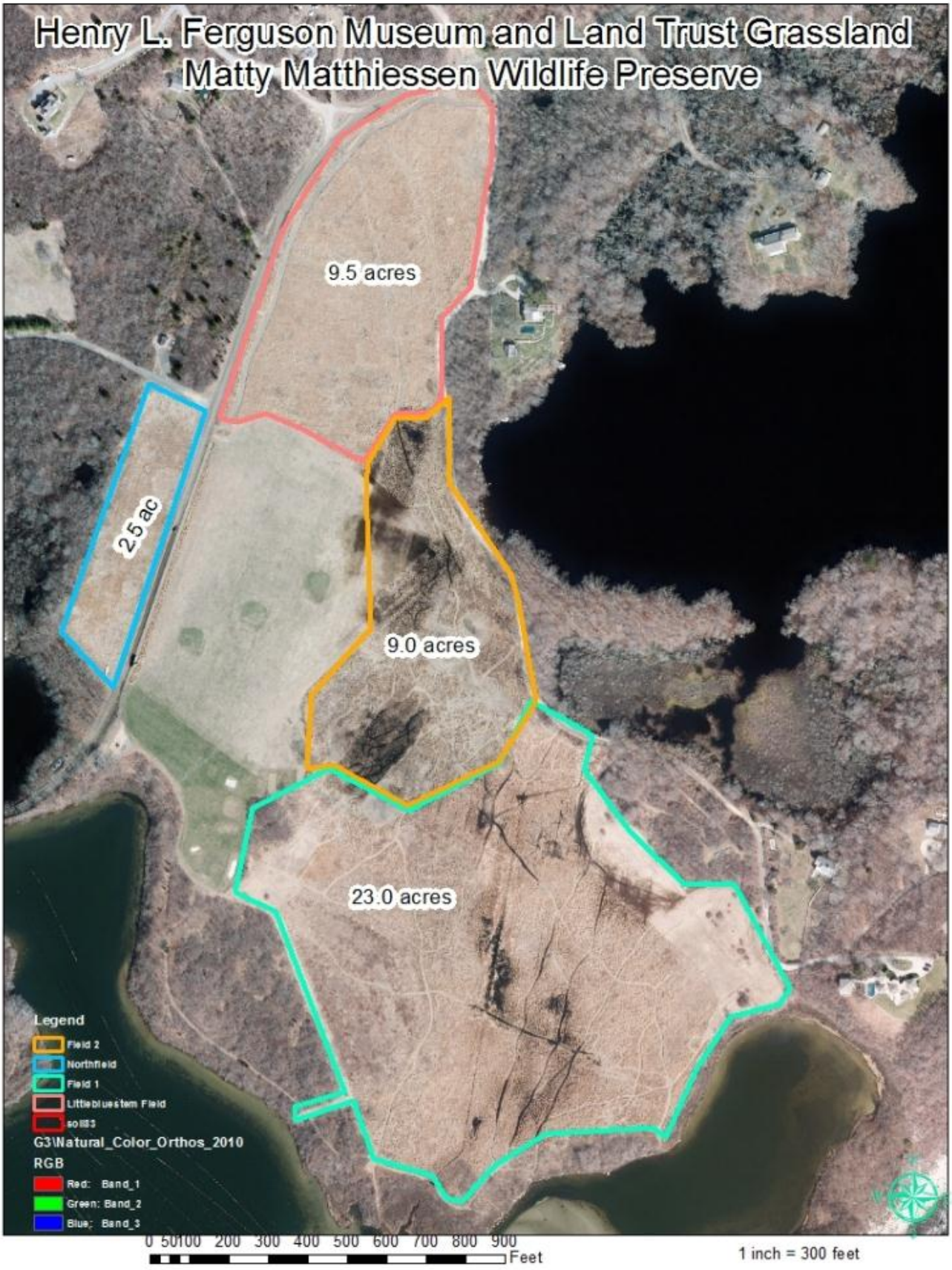
Goal:

Control invasive plant species, suppress succession, evaluate current species composition by field, and advance prescribed fire to maintain functional and ecologically diverse grasslands.

Size:

A minimum acreage of 10 upwards to 28 acres are required to provide an ecologically functional grassland supporting nesting of grassland dependent birds, In the Long Island region, such areas desirable areas do not occur however the lower acreage remain critical to by providing refugia for flora and fauna as well as providing connectivity to larger regional grasslands.

This grassland is ideal being over 40 acres in size. For management and identification purposes, the fields have been divided as noted in the aerial map below. Field 1: (Blue Outline – Switchgrass, Calamagrostis) 23 acres, Field 2 (Orange Outline- Mixed Species) 9.0 acres, Little Bluestem Field (Peach outline - Little Bluestem dominated field) 9.0 acres and the North Field: 4.0 acres.


Henry L. Ferguson Museum and Land Trust Grassland
Matty Matthiessen Wildlife Preserve
9.5 acres
2.5 ac
9.0 acres
23.0 acres
Legend
Field 2
Northfield
Field 1
Littlebluestem Field
soil83
G3\Natural_Color_Orthos_2010
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
0 50100 200 300 400 500 600 700 800 900
Feet
1 inch = 300 feet

Soils Inventory:

2010 Soils and Aerial Photography~ Current Condition

Evaluation of the soils of a site is a critical component to any management plan as edaphic factors (soil texture, structure, porosity, etc.) directly influence plant persistence and diversity, and the structure of the plant community. Advancing management activities without regard for edaphic conditions can squander resource investments due to the strong influences these conditions have on plant species.

Field 1's soil type is Deerfield sand (De), which is defined by the Suffolk County Soil Survey as "a deep, nearly level, moderately well drained, sandy loam soil formed in outwash. The available water capacity is very low.

Permeability is rapid. The well drained soils are found at higher elevation existing between areas of somewhat poorly drained. Slopes are 3% or less, and are slightly concave in places. Interspersed wet soils are identified as Atison soils". The water table at this location is high (elevation low), due to close proximity to the surface waters. Mosquito ditches have been cut through the center of this grassland and continue to convey surface waters, exposing the water table. Wet patches of soil are identified by the dark areas in the south to north in the center of the field.

The soils found in the Field 2, Little Bluestem field, and North Field are Plymouth loamy sands (PlA, 0-3 % slope), and (PlB 3-8% slope) Suffolk County Soil Survey identifies "Plymouth soils (PlA, PlB, PlC, PmB3, PmC3, PsA, PsB) consist of deep, excessively drained, coarse-textured soils that formed in a layer of loamy sand or sand over thick layers of stratified coarse sand and gravel. The texture from 0 to 27 inches is loamy sand, loamy fine sand, gravelly loamy sand and sand. From 27 to 58 inches, the texture is sand and gravel, coarse sand and gravelly coarse sand. The permeability of these soils is rapid. Available moisture capacity of these soils ranges from low to very low. These soils are droughty during periods of low rainfall, permeability is high. The organic matter content and natural fertility of these soils is low. Crop response to lime and fertilizer is fair. Maintenance of fertility is difficult because of the sandy texture. Historically and currently utilized for cropping and development." Like Field 1, wet soils are found in Field 2 from the south to north on the western aspect of the fields. The Little bluestem field and North field contains no obvious wet soils.

September 2011 - Vegetation Inventory:

A vegetation inventory is conducted in order to identify the common and rare plants that create the grassland as well as those that threaten its structure and integrity. Early successional native species such as birches, bayberries, cedars and cherries naturally transition grasslands shrublands and forest communities. Although they are native species, their suppression is critical to protect the grasslands from succeeding.

As defined by Federal Executive Order-13112 in 1999 and legally recognized by Suffolk County, an invasive species is "a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health." Invasive plants equally contribute to grassland habitat loss. Autumn olive (*Elaeagnus umbellata*) is a dominate invasive shrub that readily invades grasslands, reducing diversity by out-competing native plants and creating mono-specific stands that suppress succession. This species and many other invasives require specific management recommendations. For example, Mugwort requires different cultural practices and herbicide control as compared to perennial grasses. Tree-of-Heaven, Black locust, Autumn olive, and Mugwort can unintentionally be spread if appropriate control techniques are not applied, thereby increasing the density of the infestation. Therefore, a vegetation inventory helps determine the degree of invasion and identify encroaching species of concern so that appropriate management recommendations are prescribed.

Field 1. (Switchgrass and Calamagrostis Dominant):

Switchgrass (*Panicum virgatum*)

Canada blue joint Grass (*Calamagrostis canadensis*)

Joe Pyeweed Species (*Eupatorium spp*)

Late Flowering Thoroughwort (*Eupatorium serotinum*)

Field 1 is the largest field of this preserve and is bordered by the south by coastal waters. It is dominated by dense patches of Switchgrass (*Panicum virgatum*) and Canada blue joint grass (*Calamagrostis canadensis*) as noted on the **Dominant Plant Inventory Aerial** (p.7). This patchy pattern of Switchgrass and Canada blue joint follows the moisture regimen and indications described by the Suffolk County Soil Survey for Deerfield sands. On the eastern boundary, an array of facultative wetland forbs inhabit the field including Joe-Pye weed (*Eupatorium fistulosum* (species not keyed out)?) and Late flowering thoroughwort (*Eupatorium serotinum).* A complete vegetation inventory was not conducted for this site but a wonderful and unique diversity of plants exist at this site. Such an inventory is suggested to provide a diversity benchmark allowing more rigorous scientific evaluation of future management practices.

Reflective of grassland definitions listed in the Long Island Study's "*Long Island Sound Habitat Restoration-Section 4 Coastal Grassland*", Field 1 would be characterized as a Coastal maritime grassland due to the soils, species composition and coastal influences. The dominance of the Switchgrass, mixed with upland forbs (*Asclepias tuberosa*) and the facultative forbs (*Eupatorium fistulosum*) is due to the matrix of xeric and mesic soils, Switchgrass' aggressive habit and tolerances of mesic and droughty soils. Switchgrass' is deep rooted mesic species that moderately tolerates droughty soils due to its root system. Therefore, it is not surprising that it is dominating Field 1 amongst facultative species but is not found as readily in the droughty Little bluestem field. Switchgrass, however is not tolerant of persistently saturated soils as found adjacent to the mosquito

ditches; hence Canada blue joint grass dominates these wetter areas. Vegetative patterns are also being influenced by management. The defined boundary on the eastern portion of this property (fire break?) and lack of dominant Switchgrass on the lighter area suggests the timing of past prescribed burning activities is expected to be a driving force contributing to the Switchgrass densities.

Field 1 Invasive Plant Inventory:

Porcelain berry (*Ampelopsis brevipedunculata),*

Oriental bittersweet *(Celastrus orbiculatus*)
Japanese Honeysuckle (*Lonicera japonica*)
Multiflora rose *(Rosa multiflora)*

Smooth Sumac? (Rhus glabra)

On the western portion of the field, invasive species are encroaching from the tree line (edge effect) into the grassland and are further being conveyed through natural dispersal as well as by humans meandering along the paths and birds that utilize this habitat. The tenacious, deciduous, woody invasive vines include Porcelain berry (*Ampelopsis brevipedunculata),* Oriental bittersweet *(Celastrus orbiculatus*) and Multiflora rose *(Rosa multiflora).* Native shrubs and trees are also invading the fields and include Smooth sumac (*Rhus glabra*), bayberry (Morella pensylvanica), and Black cherry *(Prunus serotina).* This area is denoted by the blue polygon on the **Dominant Plant Inventory aerial** (p. 7). Unless control measures are applied, these species will continue to encroach upon the grassland. The numerous recreational paths transect the field providing accessibility to bird and plant enthusiasts and recreationalists and serving means of early detection for invasive and successional species. However, it should be noted that so many paths especially cutting through the core of the grassland can unintentionally spread invasives through by increasing conveyance and disturbance.

Little Bluestem Field:

The north field, titled "Little bluestem field" is dominated by Little bluestem (Schizachyrium scoparium) with Hyssoped-leaved thoroughwort, (*Eupatorium hyssopifolium*) and Switchgrass interspersed. This is a healthy grassland but is showing signs of natural succession through the encroachment of natives, Black cherry (*Prunus serotina*), and Bayberry (*Morella pensylvanica*). Only a few walking paths are cut through this field by the mower. Due to soils and species dominance, it is expected that this grassland is a sand plain.

Little bluestem and Hyssoped-Leaved Thoroughwort (foreground)
Switchgrass in background

Little Bluestem and Switchgrass with Swallow-wort vine

Little bluestem with woodies encroaching

Two aggressive invasive species are invading the field as identified in the aerial photo on page 11: Black locust (*Robina pseudoacacia*) and Black swallowort (*Cynanchum louiseae*). A dense population of Black swallowwort (*Cynanchum louiseae*) is dominating the vegetation along the north side of the paved walking path as well as into the field along the mowed walking path (as indicated in invasive species inventory). Within the field, the species is expanding as indicated by the patchy populations dispersed on each side of the walking path. Black locust is encroaching along the paved path and the tree line.

Established and seed producing populations of Swallow-wort in field along mowed walking path.

Swallow-wort Seed and Pods

Swallow-wort Flowers

Swallow-wort vines


Henry L. Ferguson Museum and Land Trust Grassland
Little Bluestem Field Invasive Species Inventory
CEDAR
IDLE FARM POND
UNNAMED
EAST END
UNNAMED
N
W
E
S
0
50
100
200
300
Feet
1 inch = 100 feet

Field 2:


Henry L. Ferguson Museum and Land Trust Grassland
Field 2 Soils Inventory
UNNAMED
ReB
W
PlA
CpE
W
De
0 50 100 200 300
Feet
1 inch = 100 feet


This field is a mix in plant community between the north and south fields of mixed of Switchgrass (*Panicum virgatum*) and Little Bluestem (*Schyizachryium scoparium*) and various forbs. It has limited invasive species infestations but does have some native woodies that are popping up within the field. There are intermittent saturated soils in the field as identified by the dark patches in the aerial above. Numerous walking paths and mowed areas cut through the field.

Historical Aerials/Management:

A comparison of historic aerial photos can identify changes in plant composition and help guide management recommendations. The 1962 aerial of the entire preserve reveals that burning of the part of the Little Bluestem field and the western corner of Field 1 was burned. The dark areas along the mosquito ditches in the southern fields are attributed flooding rather than fire. It would be expected that the higher ground areas of dryer conditions would be burned rather than the lower areas along the mosquito ditch and shorelines and be more geometric in shape as it the Little bluestem field. The northern Little Bluestem field has been mowed with little woody growth. Woody growth is evident in the southern fields with the dark colors as compared to the lighter greys being the grasses species.

Seventeen years later in 1978, identifies woody encroachment in both fields as well as in the central northern and southern sections of Field 2, and connecting western sections of Field 1. The southwestern section of the field identifies patches of dark (woodies?) amongst what is suspected grassy plant community represented by the light colors. This pattern of woody encroachment is indicative of no recent burning or burning in the fall or winter which impose the lowest degree of mortality on woody vegetation. In the core, two distinct fields appear to be mowed as indicated by the mowing lines and geometric form of the fields; one to the immediate left of the mosquito ditch and the second on the eastern edge of the field. Along the length of the mosquito ditch a homogenous stand of vegetation exists which is projected as being the Canada blue joint grass and Switchgrass. The darker area to the north which encroaches into Field 2 is an expansive wet area with woodies rather than native grasses as seen in the 2010 aerial.

To date, these fields are regularly burned, as indicated by the enclosed undated photo. Fields 1-4 were proposed for a prescribed burned in 2010 while the area highlighted in red (the northern section of Field 1) was slated for burn on 2011. At the conclusion of 2011/12, the entire Field 1 and 2 and potentially Field 3 were proposed for a prescribed burn.


Henry L. Ferguson Museum and Land Trust Grassland
1962 Aerial Photography
Mattv Matthiessen Wildlife Preserve
CEDAR
CLAY POINT
UNNAMED
WINDSHIELD
BARLOW POND
UNNAMED
EAST END
UNNAMED


Henry L. Ferguson Museum and Land Trust Grassland
1978 Aerial Photography Fields 1-3
BARLOW POND
EAST ENG
UNNAMED
Legend
0 50 100 200 300 400 500 600 700 800 900
Feet
1 inch = 300 feet

1 – 4 = prepared 2010 winter burn plots
— = proposed 2011 " " "
— = proposed 2012 " " "

Management Considerations and Recommendations:

As mentioned above, grasslands ecosystems are experiencing the greatest rates of decline across the country and in the Long Island region due to development, agriculture, invasive species encroachment, suppression of wildfire, and subsequently natural succession. From an ecological perspective, a large contiguous grassland area of at least 10 – 25 acres is ideal on order to provide habitat for grassland dependent birds and invertebrates. Habitats which are smaller than ten acres generally can serve as refugia for grassland dependent species but do not serve as the best habitat. The small sized grasslands have increased levels of invasive species, and high rates of predation, do not provide nesting habitat for birds, are not able to support a wide diversity of native species or large populations, due to edge effects and competition for resources.

The Matty Matthiessen Wildlife Sanctuary preserves over 40 acres of grassland habitat which serves as excellent habitat for an array of grassland dependent flora and fauna. No supplemental seeding especially from outside sources is advised as a diverse array of grassland species exist at this site and any needed recruitment will occur naturally from the established seed bank. Seeding would effectively introduce non-native genetic (ecotypes) compromise the genetic integrity of this historic grassland through outbreeding depression (introducing new genes which are not adapted to the unique site conditions), increase the already high densities of grasses to levels that further smother native flowering plants and provide the opportunity for invasion by non-native species (through ground disturbance from seeding). Rather than focusing on over or reseeding these grasslands, management should be focused on 1) controlling invasive species, 2) suppressing natural succession, and 3) drafting and implementing a prescribed fire plan.

If you choose in the future to conduct seeding, the most ecologically appropriate means of conducting restoration with ecotypic seed/plant materials by using seed from the site which could be facilitated by collecting seed and dispersing it throughout the restoration area. Additionally, being a historic grassland, if you are interested in having seed banked for future plant production/restoration activities, the Long Island Native Plant Initiative (LINPI) would be willing work with you to conduct seed collections and banking of seed from your sites. The second alternative to achieve restoration through seeding which is the most economical is to seed with the Long Island Ecotype of Little bluestem, Big Bluestem (I), Indiangrass (*Sorghastrum nutans*), and Switch grass produced in cooperation by LINPI and Ernst Conservation Seed (from whom this seed can be purchased). This option however does not provide the option of restoring forbs (as LI ecotype forb seed is not currently available) necessary to provide a critical habitat for an array of wildlife. The last option, is the utilization of seed from cultivars and/or populations from other eco-regions of the United States is not supported as the LI ecotype seed is currently available and most genetically appropriate for restorations.

Species of Concern and Abating Natural Succession:

Control of invasive species is critical in the grassland as the unavoidable consequence of being a disturbance regimen, is that invasive species (and natives too) which thrive in disturbance, readily monopolize newly created niches caused by mowing, grazing or prescribed fire. Therefore, the process which maintains the ecosystem can also compromise its integrity. Dually, if disturbance is removed, natural succession ensues and aggressive invasive species can still invade due to natural (wind and wildlife, esp. birds) and unintentional anthropogenic dispersal. An abbreviated list of invasive grassland species that should be controlled includes (but is not limited to): Mugwort (*Artemisia vulgaris*), Canadian thistle (*Cirsium arvense*)*****, Black swallow-wort (*Cynanchum louiseae*)*****, Tansy (*Tanacetum vulgare*), Porcelain berry (*Ampelopsis brevipedunculata*), Multiflora rose (*Rosa multiflora*), Autumn olive (*Elaeagnus umbellata*), Tree of heaven (*Ailanthus altissima*), and Black locust***** (*Robina pseudoacacia*). Some of these invasives have specialized physiological adaptations (i.e. allelopathy, high seed production, long lived seed, positive responses to disturbance, nitrogen fixation). These traits drive invasion, out-compete native plants, change soil chemistry and increase erosion, preventing natural succession and degrading natural ecosystems.

*****These species are the most tenacious invasives plants of grasslands. Suppression and containment critical to prevent spread. The combined use of herbicides and mechanical treatments is strongly encouraged!!!).

The ***greatest species of concern*** is the dense population of Black swallowwort (*Cynanchum louiseae*) found in the Little Bluestem field along the north side of the paved walking path as well as into the field along the mowed walking path. This highly invasive twining vine spreads rapidly by wind dispersed seed. Locally it forms dense patches from its extensive root system which readily regenerates the plant from its crown and root system. Also known as dog strangling vine, this species readily out-competes native plants and changes the species compositions of grassland plant communities. It is also highly toxic to all fauna which graze on its leaves. Unfortunately, the Monarch butterfly is drawn to this toxic member of the milkweed family, where it lays its eggs. Upon grazing, the newly hatched larvae fall victim to the toxins found within Swallow-worts vegetation. This species was found not only at this site but along many of the roadsides of Fishers Island which will make eradication impossible. However efforts to **suppress and contain** the species is **strongly advised due to the difficulty in control** of this species and the **high degree of ecological harm this species poses**.

Herbicides are strongly encouraged as the line of defense for this species, due to the difficulty in achieving eradication from only mechanical methods. The use of herbicides will also limit soil disturbance that may expose the seed bed and cause further spread of this species. It is recognized that herbicides are not a preferred tool for use on your properties. However, in addressing control of Black Swallow-wort it should be recognized that herbicides can serve as a necessary tool in combination with mechanical treatment to try to control this species. Dr. Andy Senesac, Weed Specialist of Cornell Cooperative Extension has provided the appropriate recommendations in Appendix 1 and should be contacted at (631) 727-3595, for any questions related to his herbicide prescriptions. Mechanical treatment guidelines for containing and suppressing this species are also provided for your reference and application. Mike Scheibel (631)749-1001 of The Nature Conservancy's Mashomack Preserve is an excellent resource in addressing Swallow-wort having tried for many years to suppress it in their grasslands.

The next step is to control and eradicate as much as possible the woody species (Porcelain berry, Locust, Sumac, Rose, Bittersweet). Although Black Swallow-wort tops Porcelain berry and Black Locust as far as "rapid response", these species impacts and aggressiveness should not be dismissed. Like Swallow-wort, Porcelain berry eradication will be difficult due to its extensive root system and prolific seed production by dispersal by birds. The mechanical control efforts provided in the enclosed mechanical control document should be applied to target the removal in the field. Small plants less than 5 years old, should be targeted for "Early Detection and Rapid Response" removal as the root system has not fully developed making eradication easier. Similarly, Multiflora rose and Oriental bittersweet should be targeted for control by the same means as Porcelain berry.

Along the perimeters of the field, Black locust (tree) and Autumn olive (shrub) should be scouted for control due to their aggressive invasion of grasslands. They have a symbiotic relationship with bacteria which fix nitrogen which thereby changes soil chemistry and enriching nutrient poor soils to preferred levels which grassland species are unable to tolerate. Additionally, both these species have positive physiological responses to cutting by regenerating shoots along the stump and root system effectively increasing the density of the original stand. Therefore, targeted approach to putting and cutting and herbicides should be applied to larger trees over 2 inch in caliper.

Saplings should be removed by hand pulling or digging with the as little soil disturbance occurring as possible. Tools such as weed wrench, honeysuckle popper, or spade are effective tools for this purpose. It is critical that young trees less than 2" caliper are pulled, not mowed (density dependent); removing as much root as possible and limiting soil disturbance. This technique can be applied to all native saplings that succeeding in the fields (i.e. Cherries, Elders, Junipers, Laurels, and Sumacs) to quickly and effectively achieve removal and reduce

natural succession. An ***Autumn Olive Identification and Mechanical Control*** guide has been provided to help with the administration of appropriate control methods for both the olive and locust species.

Mowing/Prescribed Fire:
Prescribed fire and mowing have been historically applied. However, prescribed burning is the best management practice for grasslands and strongly encouraged to continue. While the invasives are being targeted for control, a formal prescribed fire management plan should be drafted. Burn plans are an asset, ensuring that burns are conducted in accordance with New York State law (6NYCRR Chapter II, Part 194 and ECL Article 46) and Town laws, and that prescriptions are conducted in a safe and ecologically appropriate manner. Additionally, a burn plan can help reduce the liability associated with fire and smoke hazards.

As per New York State Law, a burn plant should have the following details:
- Location of the burn
- Permits and approvals required
- Legal considerations
- Emergency contacts
- Public notification
- Objectives of the burn
- A description of the burn unit including the surrounding area, hazards, fire or smoke sensitive areas and other information
- Expected fire and smoke behavior
- Crew assignments and organization
- Required equipment
- Methods of undertaking the burn, including ignition
- Contingencies
- How mop-up will be handled
- A checklist for ensuring that all procedures are followed
- A post-burn evaluation

The following restoration and maintenance recommendations should be considered as part of your future management plants.

Prescribed Fire Considerations:
Currently, both Field 1 and Bluestem field have high mono-specific densities of grasses to a degree where they are reducing the forbs (flowering herbaceous plant). It should be noted that large stands of Little bluestem are ecologically appropriate as long as a health density of forbs exists). If left to their own accord, the grasses will continue to dominate, suppressing the flowering perennial species and preventing access to fauna. Birds and mammals need to be able to travel around the bunches and the dense stands prevent this access. Therefore, seeding of grasses at these locations not advised as it would be a waste of resources and further increase grass densities.

Restoration and maintenance burning are two techniques used to influence plant community's structure, density and diversity by timing the burns at critical phenological stages. This is important as grasslands burn rapidly and do not heat the soils to high enough temperatures (unless the fire intensity is very high) to damage root systems and cause mortality. By staging burning activities by phenological stage however, fire effectively suppress or selecting for particular species. Restoration burning is used to increase or decrease plant densities and is encouraged to reduce Switchgrass densities and woody species and recruiting forbs. These burns are applied in the spring and summer months. Conversely, maintenance burning is applied after the conclusion of restoration burning when the desired plant densities and plant communities are achieved. Fall and winter burns are conducted as part of maintenance burns.

Maintenance burning occurs on a three year rotation providing the required habitat during annual management and provides a build-up of vegetative matter to increase fire intensity. In this rotation, the fields should be divided into three non-geometric management units with the refugia field (noted in next paragraph) not being considered in the rotation. Specifically, it will also help maintain the density of grasses, help exclude woody and invasive species, and ensure suitable grassland habitat. On the off years of burning, the management units should be scouted for woody saplings and invasives. Species especially those noted in the "Species of Concern Section" should be removed as prescribed, to prevent increased densities and facilitate ease in removal. Care should be taken not to burn swallowwort while in seed as the convection current has the potential to spread the seed throughout the fields.

During the restoration and maintenance burning, Field 2 should be utilized as refugia for wildlife species and as a seed source for the northern and southern grasslands (if necessary) being the most diverse and least dominated by either grass species. Woodies and invasives should be readily scouted for and removed to prevent invasion. Eventually, this field will need to be included in the burn program as the grass and thatch densities increase. Prior to incorporating this field into prescribed management another suitable area should be designated to serve as the refuge that is not receiving fire treatments.

Other Timing Considerations taken from Forest Service Fire Effects Website for Switchgrass and Little bluestem:

Maintenance burn:
Burning in the winter (December – March) will remove senesced plant materials and duff, reducing the mulch layer and shading and exposing the seed bank. Cool season grasses and forbs as well as invasives are expected to benefit from this timing as they are the first to emerge. However, seeding in bare spots is not encouraged as desired plant materials may be recruited from the seed bank naturally. (Maintenance)

Restoration Burn:
A spring burn (April- May) will facilitate controlling competition from any cool season grasses by burning off the meristem of the emerging grasses, senesced plant materials, and duff. This exposes the seed bank and reduces shading from competing planting, selecting for slower emerging warm season grasses (such as Switchgrass and Little bluestem) and native flowers. Additionally, seed production at this time has been found to increase with Switchgrass and Little bluestem due to increased nitrogen inputs from the fire. However burning will temporarily interrupt nesting by birds (it is reported that most species will re-nest), burn over turtles, and reduce habitat. As many invasive plant species emerge and bud out earlier in the season (March-April), fire at this time, will also reduce their vigor.

Restoration Burn:
A Summer (June – Early September) burn will reduce the vigor of warm season grasses as their apical meristems will be burned, if they have will be preparing for flower or in flower, they will have low carbohydrate reserves. This timing will burn down the flowers and vegetation and reduce tiller density from the rhizomes. Regrowth will need to occur from new tillers, produced from the crown or the rhizome buds (Forest Service). Additionally, this will favor the encroachment of cool season grasses (not ideal) by reducing competition from warm season grasses. In drought conditions fire during this time cause mortality in Little bluestem.

Maintenance Burn:
A fall burn (Late September- November) will help reduce the warm season grasses by targeting the plants while they are in seed. This will reduce seed contributions to the seed bank and may increase Switchgrass and Bluestem mortality but will also select for cool season grasses.

As side note, burning in the fall, winter and spring is reported to increase the vigor of this species whereas summer can suppress and under hot dry conditions kill the species. Little bluestem most favorably responds to frequent fires, and burning in the fall however decreases were evident when burning occurred during droughts (Forest Service – Little bluestem).

As you can see timing of the burn can have many complex benefits and detriments to the species diversity and densities. Due to the high levels of Switchgrass in Field 1, perhaps a targeted control in the late spring early-summer may be useful in reducing the Switchgrass densities. A small experimental plot would be utilized to determine the response of this species as well as the level of recruitment from the seed bank. The best and most effective prescribed burn recommendations can be achieved by having a Prescribed Fire Specialist draft the burn plan, as our offices do not have the authority or expertise to draft burn plans. Brian Kurtz (Bkforester@hotmail.com), Bob Panko, Risky Business Incident Management LLC, bob_panko@yahoo.com, (305) 323-1385, and Kerry Gregg, backfire11779@yahoo.com are experienced professionals who have the authority to draft these plans.

Trails and Public Education:
The trails on this site are numerous and can contribute to the conveyance of invasive species. Due to the high degree of invasive species and high level of public use of the site reducing the number of trails is suggested. In addition, an educational display of the goals for maintaining this grassland as well as the invasive species that are threatening its integrity is encouraged. This can be beneficial to aiding suppressing the spread of invasives as well as in recruiting volunteers to assist in species removal projects.

Fallow Pasture Recommendations:

Vegetation Inventory and Historical Use:
The historical aerials indicate that this field may have been historically grassland with a wider area which due to natural succession and development has been reduced and converted to a cool season grassland due to plantings of pasture grasses. To date, the field is dominated by Orchard grass with space number of Timothy bunches. It also is being encroached upon by a few Autumn olives.

Fallow Pasture- Cool Season Grassland

Legend

- Switchgrass
- Field 2
- Fallow Pasture
- Littlebluestem Field

G3\Natural_Color_Orthos_2010

RGB

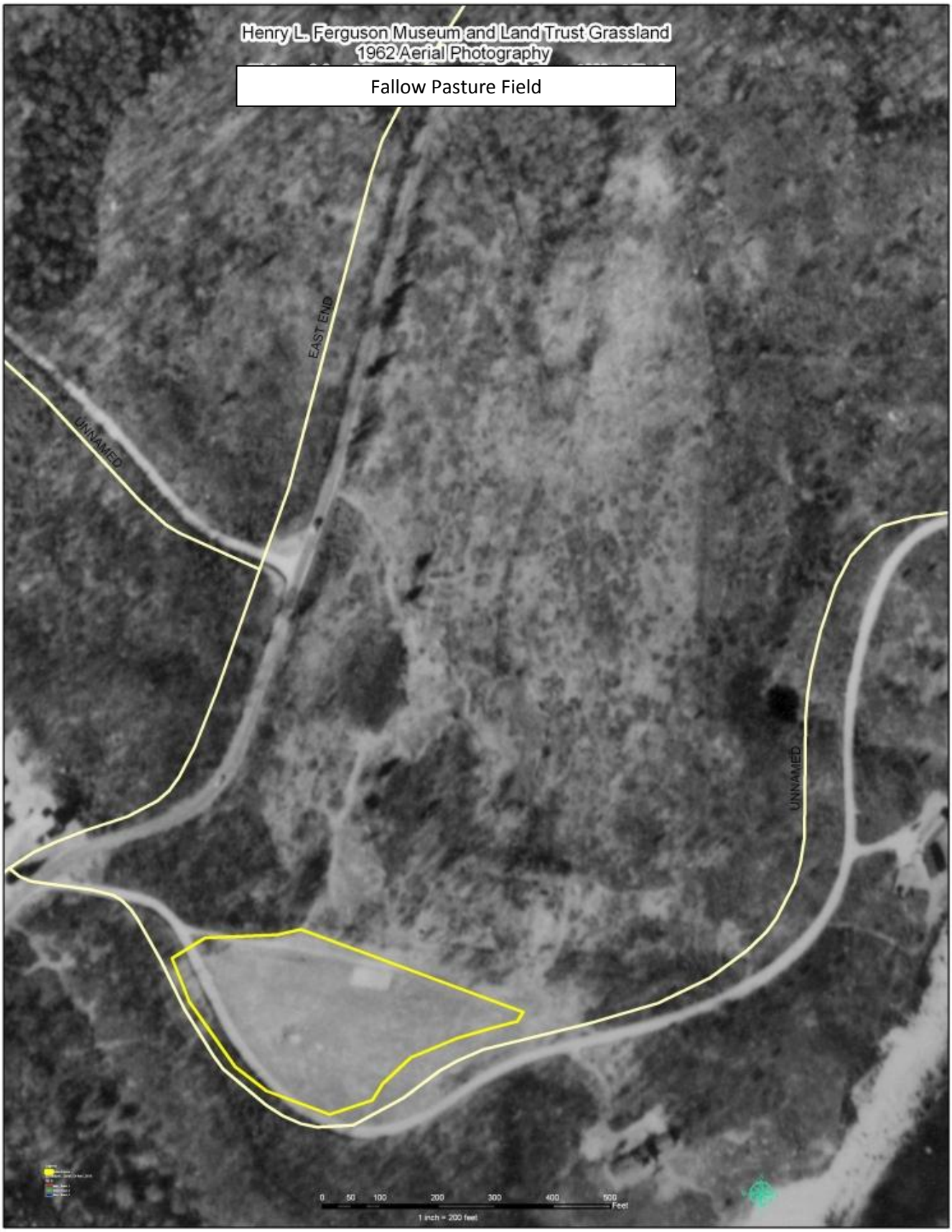
- Red: Band_1
- Green: Band_2
- Blue: Band_3

0 50 100 200 300 400 500 Feet

1 inch = 150 feet

N W E S

2010 Aerial Photography
Suffolk County Soil and Water Conservation District
423 Griffing Ave.
Riverhead, NY 11901
February 22, 2012


Henry L. Ferguson Museum and Land Trust Grassland
1962 Aerial Photography
Fallow Pasture Field
EAST END
UNNAMED
UNNAMED
0 50 100 200 300 400 500
Feet
1 inch = 200 feet

Management Recommendations:
This field is a healthy stand of cool season grasses and Bromesedge (*Andropogon virginicus*) which has limited invasive species such as Autumn olive that are compromising its integrity. It is encouraged that efforts be focused on managing this field as a cool season grassland rather than converting it to a warm season grassland, as this the easement dictates that herbicides and prescribed burning are prohibited. Cool season grasses are highly competitive to warm season grasses, and cause high degree of failure if not suppressed prior to and after seeding of warm season grasses. This is a costly and time consuming effort, as the mechanical treatments (in place of herbicides and prescribed fire) would need to be repeatively applied to the field to not only suppress the cool season grasses but also their recruitment from the seed bank. This multistep and multi-year (3-5 years minimum) process is documented in the provided **Warm Season Grassland and Meadow Establishment on Long Island** to ensure the successful establishment of desired grassland.

Natives are expected to slowly expand their ranges into this grassland however the invasive species and successional species will also encroach. Therefore, regular scouting and removal of the invasives and woodies species is encouraged to maintain this as grassland. Mowing of the field should occur in non-geometric fashion between August 15 and March 15th every three years. The vegetation should be removed to prevent a mulch layer and build-up of thatch. Additionally, to allow for wildlife to escape, mowing from the core out is encouraged.

These recommendations have been drafted through a collective effort between Dr. Senesac and my office, therefore please do not hesitate to contact either one of us with any questions that you may have in regard to these recommendations. Enclosed, numerous documents and resource inventories to assist with the grassland management. Good luck with the management efforts!

Sincerely,

Polly L. Weigand
Soil District Technician

References:

http://www.fs.fed.us/database/feis/plants/graminoid/panvir/all.html

http://longislandsoundstudy.net/wp-content/uploads/2004/12/grasslands.pdf

http://www.state.nj.us/dep/fgw/pdf/mgtguide/ch04_managing_shrublands.pdf

http://www.dem.ri.gov/programs/bnatres/fishwild/grasspdf/4.pdf

National Wildfire Coordination Group- NRFS 2506, Introduction to Fire Effects- Student Text August 1995

Appendix 1:

Cornell University
Cooperative Extension
of Suffolk County

Extension Education Center

423 Griffing Avenue, Suite 100
Riverhead, New York 11901-3071
t. 631.727.7850
f. 631.727.7130

Wednesday, May 2, 2012

Sir/Madam:

I am writing to offer my suggestions for improving the quality of the grassland area that we visited last fall by enhancing your management of the several invasive weed species we observed in the area. The primary weeds of concern are: Black Cherry, Porcelain berry, Autumn Olive, Mugwort and Black Swallow-wort. The black cherry can be removed by hand with a weed wrench: (http://www.invasive.org/gist/tools/wrench.html). This website has clear instructions on the proper use of them.

Other techniques seem appropriate for autumn olive and porcelain berry. Using the most focused approach with these weeds will allow for their control or at least suppression without too much collateral damage to other nearby species. These techniques include the 'cut-stump' and the 'basal bark' applications of concentrated systemic herbicides. The 'cut-stump' method involves applying a concentrated solution of a systemic herbicide (such as glyphosate or triclopyr) to the freshly cut stump with a paintbrush. This allows the herbicide to be transported to the roots to prevent re-sprouting. Mugwort and black swallowwort are herbaceaous and more diversely populating the grassland and nearby areas. These species would need to be either carefully sprayed with a backpack sprayer or 'wiped' with a concentrated solution from a 'hockey stick' applicator. There is more information about both of these techniques at this site. (http://www.monsanto-ag.co.uk/content.output/181/181/Roundup/Application%20Information/Weed%20wipers.mspx).

As far as herbicide selection for these techniques, there are two active ingredients that labeled for this site use that can be very helpful. Glyphosate is a systemic, non-selective herbicide that will kill or damage any green plant material that it contacts. Glyphosate has a number of formulations and the proper choice depends partially on proximity to water. If wetlands are nearby than the product Rodeo is more appropriate than Roundup. (The formulation is less harsh to non-target organisms). If you desire a selective herbicide that will control broadleaf shrubs and perennials, then triclopyr (Garlon) is the herbicide available. It will not control or harm grass species. The density of the weeds and the proximity to nearby desirable organism will drive the choice of either material. One note of caution: For a number of reasons, the herbicide labels will not list all of the weeds that you are interested in controlling. This means that the company either doesn't have enough information or confidence in the product to control those species. Knowing this, you will no doubt have to make more than one return management effort to really clean up some of the more heavily infested areas. This website has copies of all the pesticides labeled for use in New York. (http://pims.psur.cornell.edu/) Any applicator should carefully read the label before treatment.

Sincerely,
Andrew Senesac