CONCORD LAND CONSERVATION TRUST

BROOKS-HUDSON MEADOW:

A GUIDE TO INVASIVES MANAGEMENT AND NATIVE PLANT RESTORATION

PARTERRE ECOLOGICAL

Brooks-Hudson Meadow

General Management Techniques for Invasive Species

Manual Hand Removal Methods:

Manual methods of invasive plant management - hand-pulling and cutting - will be prioritized whenever possible. To minimize soil disturbance, only shallow-rooted invasive plants less than 1" in caliper should be hand pulled. Invasive plant species greater than 1" in diameter are best cut and treated. All invasive plant material will be disposed of off site to avoid re-rooting.

Mechanical Management:

Mechanical methods of invasive control include mowing, string-trimming, and felling of single large specimens or extensive stands of a particular plant. In a few cases repeated mowing or cutting is all that is needed to weaken a plant's resources to the point of die-off. With most invasives however, mowing and cutting are only the first step in a long-term program plan that involves selective herbicidal treatments.

Hand pulling invasives in a meadow restoration.

Mechanical mowing of a dense stand of Japanese Knotweed.

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General Management Techniques for Invasive Species

Cut and Dab Treatment:

All invasive trees, once felled by a Massachusetts Certified Arborist that have a base greater than 1" in caliper will be addressed with herbicide application. Invasive plants of this size usually have extensive fibrous root systems which provide beneficial soil stabilization and are best left in situ. Unfortunately, they also maintain the ability to resprout, which is why Parterre Ecological utilizes a cut and dab method with a triclopyr-based herbicide (Garlon™) or glyphosate-based herbicide (trade name Rodeo™) on individual cut stumps. Licensed Herbicide Applicators must complete this step in invasives control.

Recycling, Removal and Disposal:

All invasive plant debris will be disposed of off-site. For many species, especially those with prolific seeds and/or berries, proper off-site disposal is critical. Even species that chiefly propagate rhizomatically will be handled with care lest cuttings left on site re-root. However, seedless, fruitless brush piles left on site can provide valuable wildlife habitat. Wood chips may be stored to use as mulch, and limbs may be staked to reduce erosion.

Qualified applicators with necessary Personal Protective Equipment paint the stems of invasive species after cutting.

Disposing of Japanese knotweed after cutting.

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Native Restoration Techniques: Plugs and Pots

Many native herbaceous perennials and grasses are best installed as plugs, quarts, or even 1-gallon specimens for the more immediate coverage, impact, and stabilization they provide. They can be used to establish an herbaceous layer entire or overlaid in a matrix on a newly-seeded area. Container plants also allow for the creation of drifts and masses of plants in a way that simple seeding cannot. Planted correctly, their roots will quickly expand, stabilizing soils and creating an understory of healthy native vegetation.

Planting Plugs

- Plugs and container plants are small, with compact root systems, and must be kept moist at all times. Water thoroughly two to three hours before planting. This also facilitates laying out as the roots will not be as liable to dessicate.
- Determine the spacing of the plugs. Dependent on species and container size, this could range anywhere from 8" to 3' on center, in a grid formation. If massing species together, take care to put taller varieties towards the "back" of the meadow or plot; shorter plants in "front".
- Planting holes will be dug with a variety of tools - trowels, picks, soil knives, shovels, even augers, mechanical or otherwise (especially useful in highly compacted soil). The plug's or plant's crown should sit at soil level and be gently tamped down around its base. Water immediately, and continue to water on a regular basis the first year of establishment.
- Mulch helps conserve soil moisture and reduces weed pressure. We recommend 2" of shredded leaf much immediately after planting.
- Whole plants will fill in more quickly than seeded areas, but weed pressure may still be high. Be vigilant in maintenance.

Plugs and container plants will have dense root systems that must be kept moist.

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Native Restoration Techniques: Plugs and Pots

Plants suitable for for container and/or plug Planting

Planting dramatic flowering native perennials can create immediate visual impact. Wetland ferns add texture and diversity to a wetland but cannot be seeded. And planting pots and plugs allow for the creation of drifts and swaths of a single species is a way that seeding cannot.

Swamp milkweed

Asclepias incarnata

Great Blue Lobelia

Lobelia siphilitica

Cardinal Flower

Lobelia cardinalis

Ostrich Fern

Matteuccia struthiopteris

Native Bee Balm

Monarda fistulosa

Blue Flag Iris

Iris versicilor

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Native Restoration Techniques: Seeding Disturbed Soils

Restoration Seeding

- The first step in seeding is a thorough site evaluation. Environmental factors such as sun exposure, soil type, topography, grade, and existing vegetation must all be considered. These attributes determine the native plant community best suited for the area.
- The second very crucial task is management of existing invasive species. This can be done though manual and mechanical means, or through the targeted and elective use of herbicides.
- Prepare the site for sowing and planting. Clear off leaves and debris, pick up twigs and sticks, and scarify the soil surface in preparation for sowing.
- Hand-broadcasting seed is the preferred method in delicate wetland soils. Plugs and container plants can be installed at the same time or can be planted once the seedlings have emerged.
- Finally, mulch the area after sowing. Mainely Mulch® protects germinating seeds while providing room for them to emerge. Thick wood chips, sawdust, or other bulky mulches will not be used.
- A three-year maintenance plan is recommended to ensure greatest success. If a newly seeded installation is managed intensively and responsibly during its establishment, it will become self-regulating and require very little to no maintenance in the future.

Clear the space of debris

Seed mixes can be hand broadcast if the space is small enough to permit it.

Newly seeded meadow with straw mulch.

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Native Restoration Techniques: Seeding Disturbed Soils

Many nurseries offer seed mixes tailored to specific ecosystems. Our recommendation for the Brooks-Hudson Meadow is the 'New England Showy Wildflower Mix' from New England Wetland Plants.

On many sites, seeding is only the first step in restoring a native community. Adding plugs or container plants into a field of mixed seeds allows the planter to create drifts and clumps, as well as providing ground cover more quickly.

New England Showy Wildflower Mix

BOTANICAL NAME	COMMON NAME
Schizachyrium scoparium	Little Bluestem
Festuca rubra	Red Fescue
Sorghastrum nutans	Indian Grass
Chamaecrista fasciculata	Partridge Pea
Elymus canadensis	Canada Wild Rye
Elymus riparius	Riverbank Wild Rye
Asclepias tuberosa	Butterfly Milkweed
Rudbeckia hirta	Black Eyed Susan
Coreopsis lanceolata	Lance Coreopsis
Heliopsis helianthoides	Ox Eye Sunflower
Helenium autumnale	Sneezeweed
Verbena hastata	Marsh Blazing Star
Aster novae-angliae	New England Aster
Baptisia australis	Blue False Indigo
Eupatorium fistulosum	Joe Pye Weed
Solidago juncea	Early Goldenrod

Red Fescue
Festuca rubra

Blue Vervain
Verbena hastata

Butterfly Milkweed
Asclepias tuberosa

Joe Pye Weed
Eupatorium fistulosum

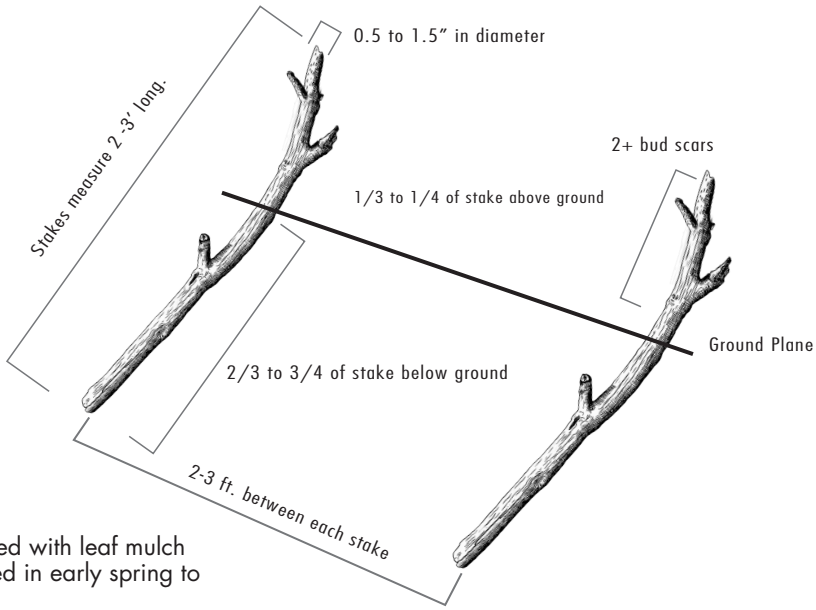
Blue False Indigo
Baptisia australis

Riverbank Wild Rye
Elymus riparius

Brooks-Hudson Meadow

Native Restoration Techniques: Live Staking

Installing Live stakes



- Live staking is most successful when the twig is fully dormant. In New England, this window is generally between late October until the end of March the following year. Stakes should be kept moist during and prior to installation.
- Stake rooting will be most effective if the stake is not positioned vertically but instead at a slight angle. Rebar or a pilot bar can be driven into the ground with a mallet to create pilot holes for the live stakes.
- Ensure at least half of the stake is below ground and 2 bud scars are exposed.
- Soil around the base of the stake must be tamped in for maximum stem-soil contact.
- If live stakes are planted in the fall, they should be covered with leaf mulch to protect from frost heaving. Leaf litter should be removed in early spring to prevent rot from occurring along the stems.
- For some species, root hormone can enhance establishment and can be added to the stem just before installing.

Species Suitable for Live Staking

BOTANICAL NAME	*COMMON NAME*
Cephalanthus	Buttonbush
Cornus amomomum	Silky Dogwood
Cornus sericea	Red Osier Dogwood
Salix Spp	Willow
Sambucus Spp	Elderberries

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Native Restoration Techniques: Live Staking

Some species are particularly amenable to being propagated through live stakes, particularly in wetlands. Not only does live staking help defray installation costs, but it is best performed in winter, when few other restoration techniques can be undertaken. Following are a catalogue of species ideal for staking at Brooks-Hudson Meadow.

Wetland plants suitable for Live Staking

Red Osier Dogwood

Cornus sericea

Red Osier Dogwood

Cornus sericea

Buttonbush

Cephalanthus occidentalis

Silky Dogwood

Cornus amomomum

Elderberries

Sambucus Spp

Elderberries

Sambucus Spp

Brooks-Hudson Meadow

Guide to Common Invasive Plants

Description:

Celastrus orbiculatus, Asiatic Bittersweet is a deciduous climbing vine common in areas of disturbance in our New England forests. It has glossy, rounded leaves that are alternate with finely toothed margins. The leaves turn yellow in the fall. The fruiting plants produce small greenish flower clusters from leaf axils that mature in fall to produce high numbers of fruiting seed. The seed are noticeably yellow, globular capsules that split open at maturity to reveal red-orange fruiting seeds. Roots are also distinctly orange.

Habitat:

Bittersweet spreads easily into forest edges, woodlands, unmanaged meadows and old fields. Most disturbed sites that are not being actively managed that receive full sun are susceptible. The vine can tolerate shade but is often found in more open, sunny areas. However, bittersweet that grows along with it's host can spread across the forest canopy.

Asiatic Bittersweet

Celastrus orbiculatus

Management:

Small seedlings can be hand pulled, but bittersweet resprouts prolifically from root fragments, so more aggressive measures need be taken on all specimens but the very smallest. For established plants, vines should be cut a the ground and again at shoulder height. Herbicide may be applied to stump to hinder resprouting. Rake any seeds present, bagging in plastic bags, tying, and disposing of correctly.

Purple Loosestrife

Lythrum salicaria

Description:

Purple loosestrife is an herbaceous perennial plant characterized by a square stems, hairy leaves, and tall spikes covered with striking and attractive bright pink to purple flowers with wrinkled petals. Flowering can begin in early summer and extend to the fall. A single plant may be comprised of many stems and reach up to 5' in diameter and 10' in height in nutrient-rich soils. The leaves are simple, triangular or lanceolate, with smooth edges, arranged oppositely or in whorls of three around the stem. One plant can produce millions of seeds annually, which are easily wind or water-born, and are the chief means by which the plant propagates.

Habitat:

Open, sunny wet or moist soils are the preferred habitat of loosestrife, and it is an aggressive colonizer of freshwater marshes and stream banks. Wetlands, lake shores and even irrigation ditches are frequently invaded by this plant. The stem tissue of loosestrife has evolved to develop air between its cells, allowing the plant to respire even when submerged in water. It is capable of spreading rapidly to form a dense homogeneous stand that excludes native species and provides little ecosystem value.

Management:

Small infestations of juvenile loosestrife can be hand-pulled, particularity when found in sandy soils, and before seed set. All specimens should be bagged and removed for disposal so as to prevent seed drop. Care must be taken to remove the root entire as any fragments left in the soil retain the ability to resprout. Larger populations of loosestrife are best manged using chemical or biological means. Leaf-eating beetles imported from Europe have proven successful in limiting the spread of loosestrife in some inundated environments, but this is a means of suppression and not eradication. The selective application of glyphosate or triclopyr can allow native plants to colonize the open spaces left once the loosestrife succumbs to the herbicide.

Glossy Buckthorn
Frangula alnus

Description:

Frangula alnus, or Glossy Buckthorn, is a deciduous shrub that grows up to 20 ft. tall. The oblong leaves are up to 2" long, arranged alternately along the stem and are dark green on the surface, glossy above and slightly pubescent beneath. The leaves turn yellow in the fall, and remain on the plant when most other species have already lost their leaves. The yellow-green flowers are arranged in 1-8 flowered sessile, glabrous umbels. This plant flowers after the leaves expand, from May to September . The fruit ripen from red to black July to August.

Habitat:

Buckthorn thrives in early successional habitat. Abandoned agricultural or pasture lands, an opening in canopy within woodland, or unmanaged meadows are common areas. Buckthorn will also tolerate wetland soils where it can form dense stands that suppress the growth of native plant species. The seed is readily dispersed by birds, and the extended productivity of the fruit into winter allows the plant to be dispersed through the entire season.

Management:

Hand cut plant approximately 6" above the ground and apply a triclopyr-based solution or perform a basal-bark painting in late fall. All fruiting plant material should be bagged and disposed of to prevent reestablishment.

Description:

Lonicera morrowii, Morrow's honeysuckles are upright, deciduous shrubs that typically have a multi-stem mounding appearance. Oval leaves are opposite along the stem with smooth edges (no teeth or lobes) and hairy on the underside. Mature stems are often hollow on the interior and peeling on the outer bark. In the spring pairs of fragrant, tubular flowers less than an inch long are borne along the stem in the leaf axils. The fruits are red to orange, and fleshy.

Morrow's Honeysuckle

Lonicera morrowii

Habitat:

Honeysuckles are relatively shade-intolerant and usually colonize forest edges, abandoned fields, and other open, upland habitats. Grazed meadows and disturbed woodlands are especially vulnerable. Woodlands and open meadows, especially those that have been grazed or otherwise disturbed and are left unmanaged are also highly susceptible. Morrow's Honeysuckle are highly adaptable and can grow in even challenging environments such as roadsides and wetland edges.

Management:

Honeysuckle management can combine mechanical mowing and manual hand pulling with cut and dab herbicide treatments. Small specimens may be removed manually as honeysuckle root systems are fairly shallow. Root resprouting can persist for a few years and several seasons of management may be required to fully control the population.

Multiflora Rose

Rosa multiflora

Description:

Rosa multiflora, Multiflora Rose is a shrub with arching canes with a mounding shape in the landscape. The leaves are divided into five to eleven sharply toothed leaflets. The base of each leaf stalk has a pair of fringed bracts which is a key identifier of the plant from other wild rose. Beginning in early summer, clusters of showy white flowers appear. The flowers are followed by developing red fruit, or hips, during the summer that remain on the plant through the winter.

Habitat:

Multiflora Rose thrives in early successional habitat. The rose has a wide tolerance for various soil, moisture, and light conditions. It occurs in dense woods, along river banks and roadsides and in open unmanaged fields. It can form a dense understory that suppresses growth of native plant species. The seed is readily dispersed by birds, and the extended productivity of the fruit into winter months allows widespread distribution of the plant.

Management:

Manual methods of hand-pulling seedlings is effective. For more established shrubs, a combination of pruning to reduce mass followed by cut & dab treatments with a triclopyr-based herbicide is recommended. Persistent root infestations may require repeat cutting over several seasons. Rake any seeds present, bagging and disposing of correctly.