

Wildlife Habitat Planting Transplanting Live Herbaceous Plant Plugs

Conservation Practice - Implementation Requirements

NH-420

Producer: _____
Address: _____
Farm Name: _____

Planner: _____
County: _____
Date: _____



Photo: Don Keirstead

Purpose. To establish and maintain permanent pollinator/beneficial insect habitat to address the resource concern of **Terrestrial Habitat for Wildlife and Invertebrates**.

- ☐ Increase nectar and pollen supply for pollinators and beneficial insects.
- ☐ Provide habitat for ground nesting bees and overwintering larvae.
- ☐ Provide wildlife food and cover.

Where Used. This practice can be used on any eligible lands where implementation will result in a significant overall improvement in the quality of the habitat for pollinators and beneficial insects. Consider Farmstead or Associated Ag for land use if using Brush Management (314) or Herbaceous Weed Treatment (315) to prepare the site.

Risk of insecticide, fungicide and herbicide use or drift on site.

10 foot no spray zone for hand sprayer, 40 feet for ground applied booms sprayer, 60 feet for airblast, 120 feet for neonicotinoid treated seeds. (Must be low or none except herbicide use as required for site preparation or carefully applied during establishment)

- ☐ No pesticides used nearby site
- ☐ Low risk of pesticide drift

Sun Exposure. (Sunny sites are preferred)

- ☐ Full sun
- ☐ Partial Sun

Current Dominant Plant Species on Site. (i.e. cool season grasses / warm season grasses, sod forming grasses / bunch forming grasses)

Wildlife Habitat Assessment Score. Benchmark score

Planned score

Site Preparation. Site preparation is critical for project success. It may require a season or more to eliminate weeds. For adequate site preparation, there should be no more than 5% vegetation coverage on the soil prior to planting. Recently cropped fields or regularly mowed turf grass tend to have the lowest weed pressure. Avoid areas with a high density of invasive species within or nearby the site. Consider selecting another site with lower weed pressure, or delaying wildlife habitat planting until invasive species have been eradicated. **Site preparation is site dependent.** The following are the most successful options for sites with different characteristics in New England. Select one, or attach an alternative plan that has been created or reviewed by Biologist or Pollinator Specialist. For further instructions and detailed timelines of methods, see pages 7, 8, 9 and 10 of this document.

- ☐ **Using Plastic (U.V. stabilized; 4 to 6 mil thick).** Examples: silage tarp (opaque tarp that is black on one side, and white on the other), black plastic, landscape fabric.

WHEN TO USE:

- Can be used on organic land; check with certifier regarding specific plastics.
- If purchasing tarp new, it can be expensive and is typically unrealistic to convert into a wildflower meadow larger than 0.5 ac using this method.
- If purchasing plastic new, it is recommended to use opaque plastic.
- On sites where regular monitoring for damage (rips, holes) to tarp can be repaired immediately. Special attention is needed on sites with high deer pressure.

AVOID:

- Clear plastic (solarization) has potential to be successful on hot years in sites with adequate sun, but is not as reliable as opaque plastic in the Northeast.

- ☐ **Herbicide** (Typically 3 – 6 applications)

WHEN TO USE:

- Sites that are flat to sloping; sunny or partly shady sites.
- Sites where cultivation is impractical, i.e. rocky or other conservation concerns.

AVOID:

- Sites where water pollution concerns are high.
- Sites that are certified organic, or use organic practices. Exceptions are made for organically approved herbicides.
- Sites that may be exposed to invasive weed seeds during site preparation.

- ☐ **Stale Seed Bedding + Smother Cropping** (No Herbicide)

WHEN TO USE:

- Can be used on conventional or organic land; if organic, cover crop seed must also be organic.
- Previously tilled land with relatively low weed pressure.
- Sites that are flat or gently sloping, sunny, and well drained.
- Has access to irrigation to establish and maintain cover crop if needed, or has had successful cover crops in the past without irrigation.

AVOID:

- Sites with high weed pressure (i.e. converting from sod, old hayfield or fallow field)
- Sites with high erosion potential or poor drainage.
- Sites/management where timelines cannot be strictly followed (details below).
- Sites that may be exposed to invasive weed seeds during site preparation.

Management Goals/Objectives:	
Soils, Site Preparation and Acres Planned	
Soils Type and Drainage i.e. fine sandy loam; well drained	
Description of Site Preparation Option (Black plastic, herbicide, Stale Seed Bedding + Buckwheat smother, or a combination)	
Acres Planned =	
Year of Planting (Spring recommended)	

Size, planting density, and number of herbaceous plant plugs. Reasonable size of plugs are 2" deep x 2" diameter in a 50 plug tray. Larger, more robust plant plugs are preferred if possible. To cover 0.1 acre (4,356 square feet) there will be a minimum of 2,250 plant plugs, transplanted using 18 inch staggered ("triangle") spacing, which results in approximately 0.5 plants per square foot. It is not required, but landowners may opt for a denser planting rate with approximately 4,330 transplants at 13 inch spacing, which results in approximately 1 plant per square foot to cover 0.1 acre.

Acres	^a Approximate size of square site	Square feet	^b Minimum # of total plugs required (18" triangle spacing)
0.1 acre	66' x 66'	4,356 ft ²	2,250 plugs
0.2 acre	93' x 93'	8,712 ft ²	4,500 plugs
0.3 acre	114' x 114'	13,068ft ²	6,700 plugs
0.4 acre	132' x 132'	17,424ft ²	9,000 plugs

^a Square site measurements are approximate, calculated by the square root and rounded to whole numbers.

^b Plant plugs requirements are rounded up or down, using increments of 50, since most suppliers will sell trays of 50 plug plants. For different configurations, consider using [Plant Space Calculator](https://gobotany.nativeplanttrust.org/) using triangle spacing. Minimum total number of plug requirements must still be met.

Species Selection. Pollinator and beneficial insect habitat should emphasize native grasses and forbs that are perennial. Planned plant community should provide a diversified, continuous bloom period for wildlife forage throughout the warm months and provide nesting habitat throughout the entire year. Use the search function of <https://gobotany.nativeplanttrust.org/> for native or naturalized plant status. Each planting will have a minimum of 3 species blooming during a given season (3 early, 3 mid-season, and 3 late season) and a minimum of 1 species of native grass, for a total minimum of 10 species planted to fulfill practice standard. Choose from species lists on page 4 and 5. More than 10 species can be used. There are limited early plants available in New England, so "Early-Mid" bloom periods are satisfactory.

Dry-Average Well-Drained Soils, Full-Part Sun

Select a minimum of 10 species total. These species consist of perennial, biennial, annual, native, and naturalized species. Wherever possible, select native plants that are locally adapted. Look for “ecotypes” near region. Other custom lists can be created, particularly for natural areas where 100% native plants are used. Check with NRCS for approval. For plant selection, first start with determining the supplier to see which species are available. ^b These species tend to aggressively colonize and can out compete other species.

Number of plugs Planned	^b Limit to 100 plugs per 0.1 acre (or 5% of total)	Bloom Period	Species Name Common Name / Scientific Name
	Limit	Grass	Little Bluestem Schizachyrium scoparium
	Limit	Grass	Canada Wildrye Elymus canadensis
		Early	Golden Alexanders Zizia aurea
		Early-Mid	Eastern Columbine Aquilegia canadensis
	Limit	Early-Mid	Annual Blanketflower Gaillardia pulchella
		Early-Mid	Perennial Blanketflower Gaillardia aristata
		Early-Mid	Tall white beardtongue Penstemon digitalis
		Early-Mid	Hairy Northeastern Beardtongue Penstemon hirsutus
		Early-Mid	Black-eyed Susan Rudbeckia hirta
		Early-Mid	Virginia spiderwort Tradescantia virginiana
		Early-Mid	Butterfly milkweed Asclepias tuberosa
		Early-Mid	Sundrops Evening-Primrose Oenothera fruticosa
	Limit	Mid	Ox-eye sunflower- Heliopsis helianthoides
	Limit	Mid	Wild bergamot Monarda fistulosa
		Mid	Common milkweed Asclepias syriaca
	Limit	Mid-Late	Early goldenrod Solidago juncea
	Limit	Mid-Late	Mountain mint species Pycnanthemum species
		Mid-Late	Common Yarrow Achillea millefolium
		Mid-Late	Purple coneflower Echinacea purpurea
		Mid-Late	Dense blazing star Liatris spicata
		Mid-Late	Showy tick-trefoil Desmodium canadense
		Late	Smooth blue aster Symphyotrichum laeve
		Late	New England Aster Symphyotrichum novae-angliae

Total plant plugs: _____

(must be greater than or equal to the minimum number of plugs required by acreage)

Total of _____ flowering species, _____ grass species

Please attach receipt of plant plug purchase.

Moist-Wet, Full-Part Sun

Select a minimum of 10 species total. These species consist of perennial, biennial, annual, native, and naturalized species. Wherever possible, select native plants that are locally adapted. Look for “ecotypes” near region. Other custom lists can be created, particularly for natural areas where 100% native plants are used. Check with NRCS for approval. For plant selection, first start with determining the supplier to see which species are available. ^bThese species tend to aggressively colonize and can out compete other species.

Number of plugs Planned	Limit to 100 plugs per 0.1 acre (or 5% of total)	Bloom Period	Species
	Limit	Grass	Riverbank wild rye Elymus virginicus
		Grass	Fowl Bluegrass Poa palustris
		Early	Golden Alexanders Zizia aurea
		Early-Mid	Tall white beardtongue Penstemon digitalis
		Early-Mid	Sundrops Evening-Primrose Oenothera fruticosa
	Limit	Early-Mid	Canada anemone Anemone canadensis
	Limit	Mid	Ox-eye sunflower- Heliopsis helianthoides
	Limit	Mid	Wild bergamot Monarda fistulosa
		Mid	Common milkweed Asclepias syriaca
		Mi-Late	Great Blue Lobelia Lobelia siphilitica
		Mid-Late	Swamp Milkweed Asclepias incarnata
		Mid-Late	Dense blazing star Liatris spicata
		Mid-Late	Showy tick-trefoil Desmodium canadense
	Limit	Mid-Late	Boneset Eupatorium perfoliatum
	Limit	Mid-Late	Spotted Joe-pye weed Eupatorium maculatum
		Mid-Late	White Turtlehead Chelone glabra
		Mid-Late	Cardinal Flower Lobelia cardinalis
	Limit	Mid-Late	Mountain mint species Pycnanthemum species
	Limit	Mid-Late	Blue Vervain Verbena hastata
		Late	Meadow Bottle Gentian Gentiana clausa

Total plant plugs: _____
(must be greater than or equal to the minimum number of plugs required by acreage)

Total of _____ flowering species, _____ grass species

Please attach receipt of plant plug purchase.

SOURCES FOR NATIVE and NATURALIZED PLANT MATERIALS

Company	Location	Contact	Seeds	Plants
Vermont Wildflower Farm	Vermont	www.vermontwildflowerfarm.com	x	x
Prairie Moon Nursery	Minnesota	www.prairiemoon.com	x	x
Prairie Nursery	Newton, WI	www.prairienursery.com	x	x
Native Haunts	Alfred, ME	www.nativehaunts.com	x	x
New England Wetland Plants	Amherst, MA	www.newp.com	x	x
FEDCO Trees and Shrubs	Clinton, ME	www.fedcoseeds.com	x	x
Pinelands Nursery	Columbus, NJ	www.pinelandsnursery.com	x	x
Bowman's Hill Wildflower Preserve	New Hope, PA	https://bhwp.org/		x
Toadshade Wildflower Farm	Frenchtown, NJ	https://www.toadshade.com/SpeciesList.html		x
Bagley Pond Perennials	Warner, NH	www.bagleypondperennials.com		x
Native Plant Trust (2 locations)	Massachusetts	www.nativeplanttrust.org		x
NH State Nursery	Concord, NH	www.nh.gov/nhnursery		x
Found Well Farm	Pembroke, NH	www.foundwellfarm.com		x
NHACD Plant Sales	New Hampshire	www.nhacd.net/nh-s-county-conservation-districts-1		x
Burnt Meadow Nursery	Brownfield, ME	www.burntmeadow.com		x
Grow Native Massachusetts	Waltham, MA	www.grownativemass.org/programs/plantsale		x
Vermont Wetland Plants	Orwell, VT	www.vermontwetlandplants.com		x
Fernwood	Montville, ME	www.fernwoodnursery.com		x
Rebel Hill	Liberty, ME	https://rebelhillfarm.com		x
Northeast Pollinator Plants	Fairfax, VT	www.northeastpollinator.com		x
Van Berkum Nursery	Deerfield, NH	www.vanberkumnursery.com		x
Pierson Nurseries	Biddeford, ME	www.piersonnurseries.com		x
O'donal's Nursery	Gorham, ME	https://odonals.com		x
Coastal Landscaping	York, ME	www.coastallandscaping.com/outdoor-plants		x
Estabrook's (2 locations)	Maine	www.estabrookonline.com		x
Fieldstone Gardens	Vassalboro, ME	www.fieldstonegardens.com/index.cfm?		x
ACParson's	Tremont, ME	www.acparsons.com		x
Provencher's	Lewiston, ME	https://provencherlandscape.net/nursery-garden-center		x
Gammon's Garden Center	Auburn, ME	http://gammonlandscapenursery.com		x
Longfellow's Greenhouses	Manchester, ME	https://longfellowsgreenhouses.com		x
Cold Stream Farm	Michigan	https://www.coldstreamfarm.net		x
North Creek Nurseries	Ladenberg, PA	https://www.northcreeknurseries.com/Native-Plants		x

DISCLAIMER: The above list of plant material vendors is not exhaustive and does not imply approval to the exclusion of other vendors that also may be suitable. Seek out vendors that with locally adapted seeds and plants. Avoid purchasing plant materials that have been treated with pesticides, with special attention to systemic pesticides. For more information, read Buying Bee Safe Plants by the Xerces Society <https://xerces.org/publications/fact-sheets/buying-bee-safe-plants>

Transplanting Live Herbaceous Plant Plugs: Operations and Maintenance

- ☐ Irrigate at a minimum for the first two years as necessary, ideally using drip irrigation
- ☐ Protect from wildlife (e.g. deer)
- ☐ Hand weed or spot treat to remove unwanted species, particularly in years 2 and 3
- ☐ Leave residue over the winter for overwintering habitat for insects

Wildflower plantings will require ongoing maintenance to maintain plant health, diversity, function, and longevity. Wildflower plantings also need to be managed over time to maintain open, early successional characteristics. Maintenance measures must be adequate to control noxious weeds and other invasive species. The following actions shall be carried out to ensure that this practice functions as intended throughout its expected lifetime.

- After plants are established, the site will be mown in patches (mowing only 1/3 of the area in a given year) to slow or stop growth of woody plants that may be encroaching on the site and encourage growth of wildflowers.
- Rotate areas being mown each year. Adjust rotation to address weed problems as needed.
- Do not mow or burn during critical wildlife nesting season (once established).
- Occasional removal of thatch/mower clippings by raking or drag implements to expose understory will help plants reseed.

Certification:

Plans Meet NRCS Standards and Specs.

Designer Signature:

Date _____

Participant Agrees to the outlined plan:

Participant Signature:

Date _____

Certification Statement: I certify that implementation of this conservation practice is complete, meets criteria for the stated purpose(s), and meets the NRCS conservation practice standard and specifications.

Yes

No

Planner Signature:

Date _____

Using Plastic (U.V. stabilized; 4 to 6 mil thick) Timeline



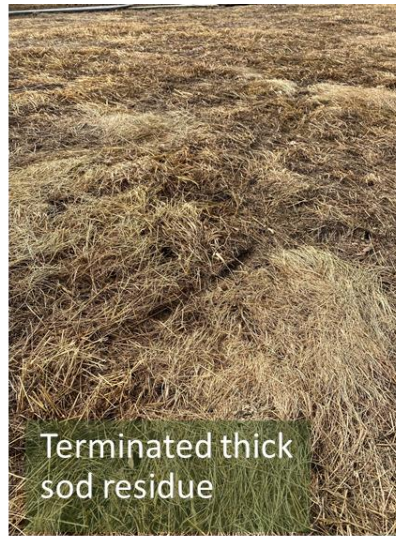
Photo: Xerces Society/Eric Venturini

Step	When	Description
Mow and remove existing vegetation	Spring, Year 1	Mow down existing vegetation as close to the ground as possible. Rake and remove vegetative grassy residue from mowing. Residue can be bailed up with hay equipment if available. Consider plowing or rototilling to invert grass rhizomes. For a no till method tarp is lifted mid summer and York raked.
Lay plastic	Spring, Year 1	On a calm day free of wind, lay plastic tightly over plot. If using silage tarp, lay the white side against the ground with the black side facing the sky. Minimize air space between plastic and soil. If multiple tarps are used, overlap abutting edges with approximately a yard.
Anchor with weights	Spring, Year 1	Anchor with weights around perimeter edges, and along overlapped pieces of plastic. Many sandbags are recommended. Avoid using rough objects as weights (bricks, cement cinderblocks) as they may damage the plastic. Tape any rips or holes with greenhouse repair tape. If wildlife traffic around the site is high (i.e. deer), electric fencing may be needed to maintain the integrity of the plastic. Fencing is also recommended during the first establishment years.
Monitor	Spring through Fall, Year 1	Check plastic frequently to assure wind hasn't blown the tarp to an unwated position. Continuously check for punctures and rips caused by animal hooves, and repair with greenhouse tape as needed.
Temporarily remove plastic	July or August, Year 1	Rake away grass roots, vegetation, or residue to expose soil. Try only to remove residue while not disturbing soil. A York rake tractor attachment is ideal, but may be done by hand. Weedy sites may take 4-5 passes with the York rake to expose soil. Lay tarp back down and secure with anchors.
Remove Plastic to Evaluate	Spring, Year 2	Evaluate the soil and plant residue for signs of living roots or plants. No more than 5% residue should be left. If in doubt, replace tarp for another season of site preparation. Spring planting recommended. Remove plastic. Gently remove/rake any dead plant debris from the plot if needed . Minimize soil disturbance. DO NOT CULTIVATE .
Transplant plugs	Spring, Year 2,	Stage plugs and dig holes 2-3 times larger than root balls. Pre-irrigate holes. Transplant plugs into holes. Install irrigation; drip is best to avoid disease.
Irrigate, Protect, Weed	Years 2 and 3	Install irrigation; drip is best to avoid disease. Protect plantings from larger wildlife. Hand weed or use spot treatment of herbicide to remove weeds.

Adequate site preparation requires the removal of residue to expose bare soil



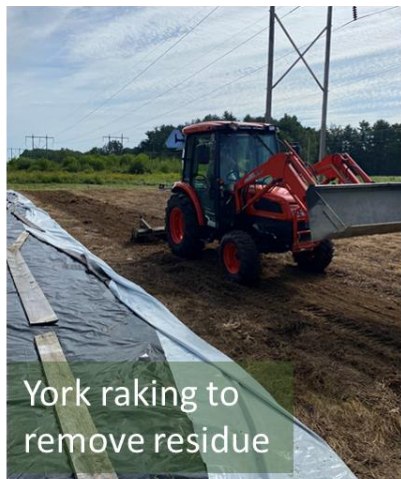
Very weedy
"old field"



Terminated thick
sod residue



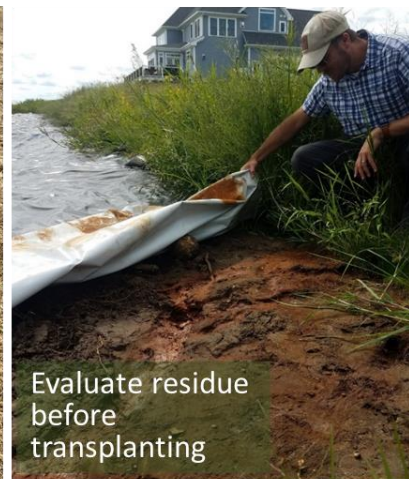
Pull back tarp
mid summer



York raking to
remove residue



Bare soil after 3-4
passes with York
Rake; Replace tarp
until frost



Evaluate residue
before
transplanting

First five photos display site preparation status at the end of August in Southern NH on a very weedy field with lots of residue and thatch. In the spring, the field was mowed closely to the ground and the tarp was installed and weighted down against wind. Mid-August, the tarp was pulled back to show terminated thatch and residue. Using 3-4 passes with a York rake the soil was exposed. Tarp was then replaced until planting. Photos courtesy of Shagbark Farm and Timothy Tucker / NRCS. Bottom right photo courtesy of Scooters Farm and Alina Harris.

CAUTION: *If plants underneath tarp are still partially alive or residue is greater than 5%, replace the tarp for an additional season of site preparation before planting. Inadequate site preparation leads to practice failure.*

Herbicide Site Preparation Timeline

IMPORTANT: As with all pesticides, apply herbicides per label instructions.

Step	When	Description
Mow existing vegetation	Spring, Year 1	Mow down existing vegetation as close to the ground as possible. Remove the thatch (vegetation).
Apply herbicide (Typically 3-6 applications)	Spring through Fall, Year 1	Apply broad spectrum, short persistence herbicide when weed seedling regrowth reaches 4 to 6 inches and before seed set. With each flush of weed seedlings, repeat herbicide application throughout the season. Typically, 3 to 6 herbicide applications are necessary. Herbicide will work when the plants are still actively growing and the soil is greater than 50 degrees F (as late as Mid-October for most regions).
Evaluate	Fall, Year 1	Evaluate the soil and plant residue for signs of living roots or plants. No more than 5% residue should be left. Soil should be mostly bare. Any remaining plant vegetation should be yellow or brown; <u>not</u> green.
Monitor and remove residue	Spring, Year 2	If adequate weed control is achieved, prepare by gently remove/rake any dead plant debris from the plot if needed . A York rake is a common tool. Minimize soil disturbance. DO NOT CULTIVATE .
Transplant plant plugs	Spring, Year 2	Stage plugs and dig holes 2-3 times larger than root balls. Pre-irrigate holes. Transplant plugs into holes. Install irrigation; drip is best to avoid disease.
Irrigate, Protect, Weed	Years 2 and 3	Install irrigation; drip is best to avoid disease. Protect plantings from larger wildlife. Hand weed or use spot treatment of herbicide to remove weeds.

Stale Seed Bedding + Buckwheat Smother Crop		
Step	When	Description
Mow and Harrow	Spring, Year 1	In the spring or early summer, when conditions are no longer wet, mow existing residue and incorporate last year's crop.
Shallowly cultivate	2-3 weeks after initial till.	Wait 2-3 weeks after initial till to allow existing organic matter to decompose. Shallowly cultivate ($\leq 2''$) using a harrow or disk.
Assess weed pressure	Mid-late Spring, Year 1	Continue to eliminate germinating weed seedlings with shallow cultivation
Rake to remove residue	Mid-late Spring, Year 1	Rake the soil surface until there is a smooth seed bed that is mostly free of sod clods, plant residue, and free of living (or partially living) plants.
Seed	Late spring or summer, Year 1	If broadcast seeding, use a seeding rate of 90 lbs/acre. If seed drilling, use seeding rate of 60lbs/acre and drill seed at $\frac{1}{2}''$ -1'' depth in 6-8'' rows (in which case, next step is not necessary).
Lightly rake to bury seed	Same day as seeding	If broadcast seeded, lightly rake or harrow the soil surface for a seeding depth of $\frac{1}{2}''$ to 1 $\frac{1}{2}''$ below the soil surface.
Irrigate	Same day as seeding	Provide supplemental irrigation if needed
Broadcast seed any gaps	~1 week after seeding	Evaluate germination rate and establishment of seedlings. Broadcast additional seed over any gaps in the planting to minimize weed competition and growth. Do not leave any gaps. Again, provide irrigation if needed.
Mow	~ 6 weeks after seeding	Viable seeds may begin to form ~45 days after seeding. (To encourage reseed, allow buckwheat to continue to flower and set seed beyond 6 weeks.) Low mow the buckwheat vegetation to encourage decomposition.
Lightly re-harrow and prepare smooth seed bed	>60 days before average first fall frost date, Year 1	Shallowly cultivate ($\leq 2''$) using a harrow or disk and create a smooth seed bed.
Reseed	60 days before average first fall frost date	Reseed with buckwheat for a second smother crop in one season. If there is a lot of seed from the first smother crop, re-seeding rate can be lowered to a 50lbs/acre broadcast rate.
Mow and gently rake residue	Fall, Year 1 or Spring, Year 2	Mow, and remove all residue to expose the soil. DO NOT CULTIVATE.
Transplant plant plugs	Spring, Year 2	Stage plugs and dig holes 2-3 times larger than root balls. Pre-irrigate holes. Transplant plugs into holes. Install irrigation; drip is best to avoid disease.
Irrigate, Protect, Weed	Years 2 and 3	Install irrigation; drip is best to avoid disease. Protect plantings from larger wildlife. Hand weed or use spot treatment of herbicide to remove weeds.