USDA United States Department of Agriculture
Natural Resources Conservation Service

Wildlife Habitat Planting (420) Implementation Requirements (IR) Establishing Wildflowers and Native Grasses

Customer:	Project/Contract:
Farm Name/No.:	County:
Tract No.:	Field(s) No. & Land Use:
Description of work:	

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

☐ 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 as 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 that will be seeded. 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.

☐ **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, or greenhouse plastic.

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.

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. *If a customer has old greenhouse plastic, they may use it, with the understanding that it may require an additional full season of site preparation if the soil is not adequately prepared.*
- Not recommended for sites with high deer pressure, as deer puncture the plastic.

☐ **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 organic land; 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:			
Site Preparation and General Planting Information			
Soils Type and Drainage i.e. fine sandy loam; well drained		**Acres to Plant =**	
Site Preparation Option Herbicide, Stale Seed Bedding, Solarization/Black Plastic, or Other			
Desired Seed Density (seeds/ft^2) should be 40-60 bulk seeds/ft2 **=**			
Seeding Method Broadcast, native seed drill			

Seed Mix. Wildflower seed mixes should emphasize native grasses and forbs that are perennial. Mixes should provide a diversified, continuous bloom period for wildlife forage throughout the warm months and provide nesting habitat throughout the entire year. The seed mix and associated information should be provided in consultation with a Biologist or Pollinator Conservationist for site-specific recommendations. Instead of completing this table, planners can attach a separate seed mix document. Use the search function of https://gobotany.nativeplanttrust.org/ for native or naturalized plant status.

Minimum of Nine Species	Bloom Period	Plant Species	% of mix	PLS seeds/ft^2	PLS lbs/ac
	Early (Spring) Bloom				
	Mid (Summer) Bloom				
	Late (Fall) Bloom				
		Totals			

Operation and Maintenance *(required)*:
☐ Once established, high-mow 1/3 of the planting per year late in the fall (after the first hard frost but before snow cover). Once contract life has expired, this maintenance can continue under Brush Management (314).
Additional Specifications:

NRCS Review Only

Designed By:		**Date**	
Checked By:		**Date**	
Approved By:		**Date**	

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

Figure 1. Two silage tarps that have been overlapped and weighted down. Photo: Xerces Society/ Eric Venturini.

Step	When	Description
Mow existing vegetation	Spring, Year 1	Mow down existing vegetation as close to the ground as possible. Remove the thatch (vegetation). If sod is present, consider plowing to invert grass rhizomes within the soil.
Dig perimeter trench*	Spring, Year 1	Dig shallow trench around the perimeter of the plot, placing all soil to the outside edge. *If using opaque plastic rather than clear plastic, this step can be replaced with installing many sandbags around the edges of the tarp to weigh down.
Lay plastic (Silage tarp black side up)	Spring, Year 1	Lay plastic tightly over plot. Minimize air space between plastic and soil. Tape any rips or holes with greenhouse repair tape. Bury edges of plastic in trenches with soil. Add sandbags as additional anchors. If there are multiple pieces of tarp, overlap the edges of tarp by approximately a yard and weigh down with sandbags. **Avoid using bricks or cement cinderblocks, as they may damage the tarp.**
Monitor	Spring through Fall, Year 1	Check plastic frequently for punctures and rips caused by animal hooves, etc. and repair with greenhouse tape as needed. If animal traffic is high (i.e. deer), electric fencing may be needed to maintain the integrity of the plastic.
Pull back plastic to 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. If in doubt, replace tarp for another season of site preparation.
Remove plastic	Fall, Year 1	Remove plastic after at least one hard frost. Gently remove/rake any dead plant debris from the plot **if needed**. Minimize soil disturbance. **DO NOT CULTIVATE**.
Seed	Same day as removing plastic	Broadcast wildflower mix during the Fall. Avoid seeding during wet conditions. Delay seeding until Spring after snow melt (before June 1) if wet conditions do not allow to seed during the fall.
Roll / compact for seed to soil contact	Same day as removing plastic and seeding	Roll site the same day it is seeded. Use a weighted lawn roller, cultipacker, or roller attached to drill seeder. Roll over entire seeded area to press seed into the soil. If none are available, use tractor tires to compact seeds into the soil.

Pulling back plastic (Silage Tarp) to evaluate prior to seeding

Figure 2. Silage tarp has been pulled back in August to show that the site is ready for seeding in the fall. Silage tarp has been laid with the white side facing downwards. The sod has been terminated, and there were many spiders that scuttled away when the tarp was pulled back.

Photo of Chad Cochrane (NRCS) at Scooters Farm of Woodmont in Hollis, NH.
Photo by Alina Harris (Xerces Society)

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 seeding. Inadequate site preparation leads to practice failure.

Herbicide Site Preparation Timeline

Note *– this option does not require tillage at any point. In fact, cultivation will reduce establishment success if used with this option. Avoid using herbicides with residual effects. Refer to Xerces "Establishing Native Wildflowers from Seed" for more information. Consider supplying these Xerces guides to the producer.*

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; not green. If in doubt, continue site preparation for another season.
Monitor	Fall, Year 1	If adequate weed control is achieved, prepare a clean seed 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**.
Broadcast Seed	Fall, Year 1, After at least one hard frost	Broadcast wildflower mix during the Fall. Avoid seeding during wet conditions. Delay seeding until Spring after snow melt (before June 1) if wet conditions do not allow to seed during the Fall.
Roll / Compact for seed to soil contact	Day of seeding	Roll site the same day it is seeded. Use a weighted lawn roller, cultipacker, or roller attached to drill seeder. Roll over entire seeded area to press seed into the soil. If none are available, use tractor tires to compact seeds into the soil.

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 (≤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 ½''-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 ½'' to 1 ½'' 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 reseeding, 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 (≤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	Late Fall, Year 1	Mow, and remove all residue to expose the soil.
Seed	Fall, Year 1, After at least one hard frost	Broadcast wildflower mix during the Fall. Avoid seeding during wet conditions. Delay seeding until Spring after snow melt (before June) if wetness do not allow to seed during the fall.
Roll / Compact for seed to soil contact	Day of seeding	Roll site the same day it is seeded. Use a weighted lawn roller, cultipacker, or roller attached to drill seeder. Roll over entire seeded area to press seed into the soil. If none are available, use tractor tires to compact seeds into the soil.

BROADCAST SEEDING INSTRUCTIONS

Photo of Eric Venturini using a water-filled lawn roller to press the seed into the soil after broadcasting wildflower seed.

1. Sow seed in fall after a few hard frosts, but before snow cover. Fall seed is preferred in the Northeast if moisture conditions allow. Avoid seeding during wet conditions, as seeds will stick to rolling equipment and be displaced. If wet conditions prevent from seeding in the Fall, sow on a warm early spring day, while there are still frosts in the forecast, absolutely no later than June 1. The freeze and thawing will help stratify the seeds for germination and also work them into the ground.
2. Create a smooth, lightly packed seedbed. Remove all stubble and residue from seedbed prior to seeding. The soil surface can be lightly hand-raked or harrowed to break-up crusted surfaces, but **do not cultivate the site at this phase** (cultivation will bring up additional weed seed).
3. Mix seeds of similar size together in separate batches and bulk up with an inert carrier ingredient. (i.e. sand, fine-grained vermiculite, clay-based kitty litter, or gypsum). Use a 3:1 ratio of inert carrier to seed by volume. Using inert carriers ensures even seed distribution, provides visual feedback on where seed has been thrown, and makes equipment calibration easier.
4. For small sites (less than 1 acre), seed can be hand broadcast as if scattering poultry feed. If using a seeder, use equipment with a small flow gate for slow, steady flow of small wildflower seed. Models with internal agitators are preferred. Calibrate seeders accordingly to ensure proper seeding rate and coverage.
5. Fill with flow gates closed. Begin seeding with flow gates set to narrowest opening to allow at least two perpendicular passes over the seed bed for even distribution. Very large seed should be seeded separately with the flow gate set to a wider opening.
6. Ensure seed-soil contact by rolling seed with a cultipacker or turf roller after seeding. Good seed-soil contact is essential for germination. Do not bury or incorporate seed.

Photo of a tractor pulled weighted roller pressing seed into the soil after broadcasting seed. Photo by Eric Venturini.

FOLLOW UP MANAGEMENT DURING ESTABLISHMENT :

1st and 2nd Year After Planting

High mowing (~8") for weed management in a newly established pollinator meadow (first year after planting). Photo: Dave Williams

Annual weeds creating excessive shade on Illinois bundleflower (Desmanthus illinoensis).

Weed control is critical in the second year after planting. Management practices must be adequate to control noxious and invasive species and may involve mowing, hoeing, flame-weeding, hand removal, or targeted string-triming. **Weeds should be prevented from going to seed in, or adjacent to, the project area to help ensure long-term success.** Perennial wildflower species will not bloom in the first year, as seedlings are putting most of their energy into underground root growth. During this time, it is essential to control weeds that can shade out and out-compete the desired wildflower and grass seedlings.

What to Expect During the Establishment Period

Wildflower mixes planted from seed are slow to establish. In the first year after seeding, perennial wildflowers devote most of their energy to root growth and do not grow much aboveground. Many species will not bloom until Year 2 or 3 after seeding. Newly planted sites often look patchy or weedy and the presence of annual or biennial weeds is common in Year 1 (e.g., foxtail, crabgrass, wild mustards). During this time, weeds grow faster and taller than the slow-growing wildflowers. If left unmanaged, weeds can choke or shade out wildflower seedlings, which results in poor wildflower establishment.

- Year 1 after planting: whenever overall vegetation height reaches 12-18", use a brush hog, mower, or string trimmer to cut the meadow to 8". This will reduce competition by fast-growing weeds. Adjust mowing time as needed to prevent weeds from going to seed. Mowing should cease by mid-September, unless additional late-season mowing is needed to prevent weed seed production. Problem weeds can be removed by hand-pulling, string-trimming, flame-weeding or other preferred methods.
- Year 2 after planting: Monitor weed pressure. Repeat high mowing in spring as needed, raising mower blade to 10" if wildflower growth is taller than 8". Cease mowing after spring if weed pressure is low and wildflowers are dominant cover. Continue to prevent weeds from going to seed with more targeted methods such as hand-pulling/clipping weeds, string-trimming, or targeted herbicide spot-treatment.

IMPORTANT: A few annual species may bloom in the first year of establishment, which can make clients hesitant to mow during the first year of establishment. Even if annual flowers are mowed in the first year of establishment, they will likely continue to come back in the following years. The annuals included in this mix are self-seeding, and will likely re-seed themselves the following years. These early annual flowers are worth sacrificing for the long-term success of the perennial planting. Wildflower diversity and abundance of blooms will increase as the planting matures, as long as weed pressure is controlled.

WILDFLOWER MEADOW: LONGTERM ONGOING MAINTENANCE

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.

Establishing a Perennial Wildflower Meadow from Seed on Previously Tilled Land

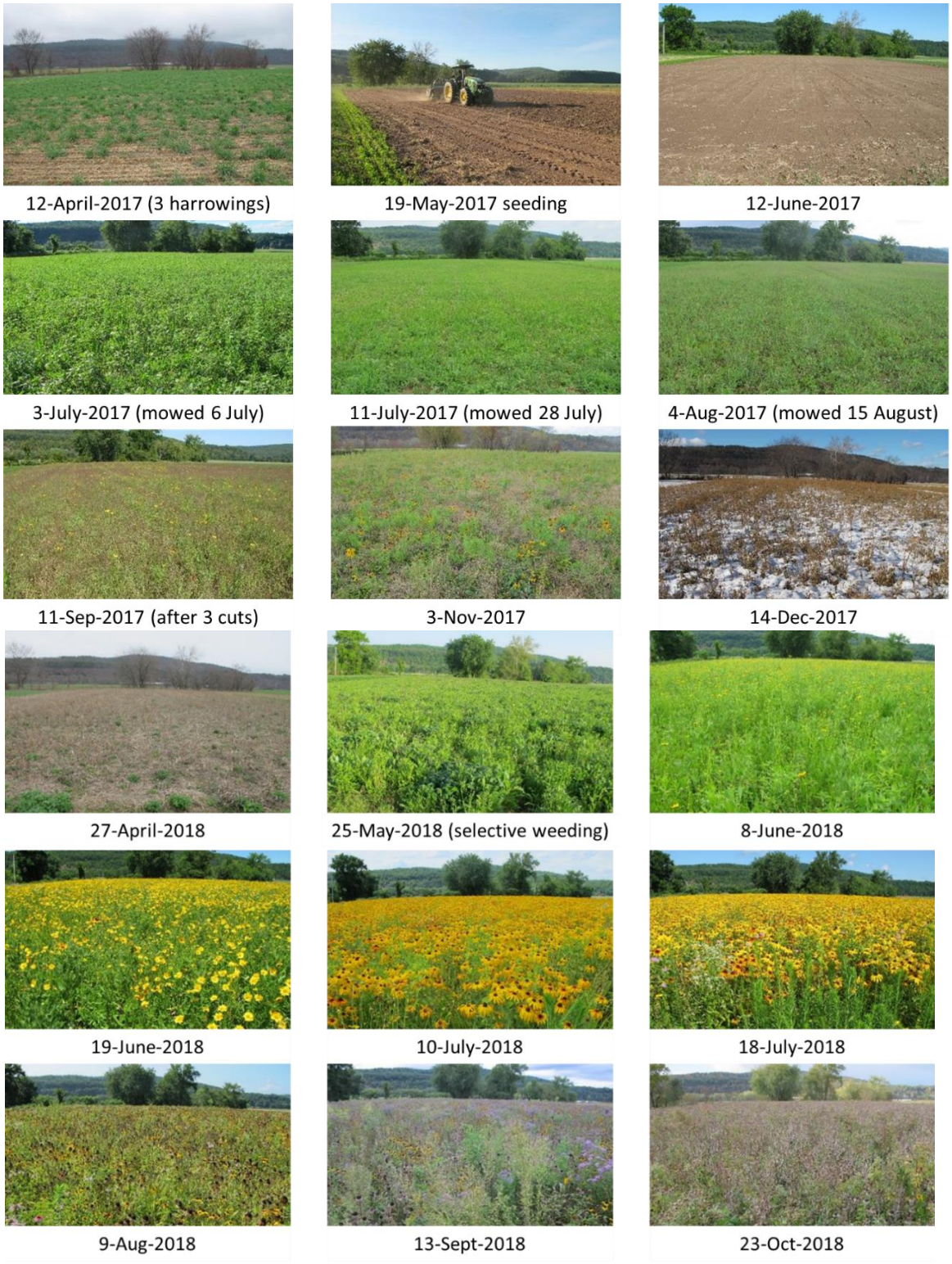

Figure 3. With lots of patience, excellent site preparation, and adequate high mowing maintenance, pollinator meadows can be established by seed. Photos: Hawthorn Valley Farmscape Ecology Program & Hudson Valley Farm.

420 – Wildlife Habitat Planting
Implementation Requirements

For NRCS Use Only:

PRACTICE CHECKOUT AND CERTIFICATION:
Certifying official completes 'Check Out information'

Recommendation: Attach digital photograph(s) to document practice installation and illustrate practice before and after effects.

CHECK OUT INFORMATION:

Crop Year: _____

CIN # (if applicable): _____

Amount Completed: Number of Fields: _____ Total Acres: _____

* Mark the completed field locations on the conservation plan map.

Remarks:

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.

This practice meets NRCS standards and specifications ☐ Yes ☐ No

Check out and Certification by: _____ Date: _____
Planner/Technical Service Provider Signature