SUNY ESF

Quad Meadow

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2024

State University of New York
College of Environmental Science and Forestry

Restoration Science Center

CONTENT




TERMS

COMPANION CROP — a plant sown at the same time as meadow seeds that helps facilitate meadow growth, such as reducing soil erosion, providing partial shade and hiding seeds from herbivores.

ECOTYPE — a genetically distinct population of a species. The most site appropriate ecotypes were selected for this restoration effort.

GRAMINOID — plants with grass-like morphology, including grasses, sedges and rushes.

FORB — non-graminoid herbaceous flowering plants, i.e., wildflowers.

SEED MIX

graminoids

LATIN	%	COMMON
Agrostis perennans	3	autumn bentgrass
Andropogon gerardii	0.3	big bluestem
Bouteloua curtipendula	18	sideoats gramma
Elymus canadensis	4	Canada wildrye
Elymus virginicus	8	Virginia wildrye
Eragrostis spectabilis	1.5	purple love grass
Schizachyrium scoparium	30.5	little bluestem
Sorghastrum nutans	0.2	Indiangrass

forbs

LATIN	%	COMMON
Agastache foeniculum	0.1	anise hyssop
Allium cernuum	0.1	nodding onion
Anemone virginiana	0.1	tall thimbleweed
**Aquilegia canadensis*	0.07	red columbine
Asclepias syriaca	0.5	common milkweed
Asclepias tuberosa	2	butterfly milkweed
Baptisia alba	0.6	white false indigo
Baptisia australis	0.5	blue false indigo
Chamaecrista fasciculata	4	partridge pea
Coreopsis lanceolata	1.5	lanceleaf coreopsis
**Dalea purpurea*	0.08	purple prairie clover
Echinacea pallida	2	pale coneflower
Echinacea purpurea	4.5	purple coneflower
Eryngium yuccifolium	1	rattlesnake master
**Eupatorium altissimum*	0.01	tall thoroughwort
Heliopsis helianthoides	1	smooth oxeye
Lespedeza capitata	1.5	roundhead lespedeza
Lespedeza virginica	0.8	slender lespedeza
**Liatris aspera*	0.01	rough blazing star
Liatris pycnostachya	0.5	prairie blazing star
Monarda fistulosa	0.1	wild bergamot
Monarda punctata	1.5	dotted mint
Penstemon digitalis	1.5	foxglove beardtongue
Penstemon hirsutus	0.4	hairy beardtongue
Pycnanthemum incanum	0.2	hoary mountainmint
Pycnanthemum tenuifolium	0.3	narrowleaf mountain mint
Pycnanthemum virginianum	0.2	Virginia mountain mint
Rudbeckia hirta	3	black-eyed Susan
Senna hebecarpa	0.5	wild senna
Solidago bicolor	0.3	silverrod
Solidago juncea	0.3	early goldenrod
Solidago nemoralis	0.3	gray goldenrod
Symphyotrichum laeve	0.3	smooth aster
Symphyotrichum lateriflorum	0.2	calico aster
Symphyotrichum novae-angliae	0.2	New England aster
Symphyotrichum oblongifolius	0.6	aromatic aster
Symphyotrichum pilosum	0.2	heath aster
Tradescantia ohiensis	1.5	Ohio spiderwort
Veronicastrum virginicum	0.1	Culver's root
Zizia aurea	2	golden alexanders

*Collected and contributed by Molly Jacobson, Restoration Science Center pollinator ecologist

A mature meadow in Central New York established by the Restoration Science Center

LAWNS TO MEADOWS

Lawns take up a lot of space in the US, rivaling the total area of our national parks. These sterile landscapes are wastelands to most biodiversity, representing an enormous loss of habitat. Lawns also require ongoing and expensive management like regular mowing and irrigation that drain our wallets while contributing significantly to greenhouse gas emissions. Meadows represent an alternative low-growing cover that can support diverse ecological communities and enhance ecosystem services such as carbon sequestration. These complex plant communities also require far less energy to maintain than lawns.

The ESF Quad Meadow represents a more thoughtful approach to land management that emphasizes wise use of space, balancing our needs with those of biodiversity.

This meadow is not a restored ecosystem in the traditional sense. The Quad Meadow is not designed to replicate a historic Central New York plant community. Instead, we used plants native to the northeastern US in novel combinations to address the biodiversity needs of today and the future as our world rapidly changes. In fact, upland meadows are not truly “natural” in our forest-dominated region to begin with, and if not for the actions of Native Peoples to create and maintain these plant communities, very few meadows would exist in the humid Northeast.

ESF’s Restoration Science Center (RSC) designed this restoration planting to be used for education and research. We also hope our students, faculty and visitors enjoy the beauty of this site and the biodiversity it will support.

A sterile landscape unable to support diverse ecological communities, yet needing expensive management to maintain. Much like food crops, lawns require ongoing, expensive energy inputs like cutting, irrigation and even pesticides. Viewed this way, lawns are actually America's most extensive crop... that no one can eat.

LAWN

MEADOW

Meadows, also called grasslands, are plant communities dominated by wildflowers and graminoids with few to no woody plants. Nearly half of the historic grasslands in the US have been lost. This decline is part of why ESF and its RSC prioritized restoring this important plant community on campus. It is literally conservation in our own backyard.

SITE CONDITIONS

Previous conditions at the northeast side of the quad slope where the meadow was established

Before meadow conversion

Historic Bray Hall

CHALLENGES TO MEADOW ESTABLISHMENT

Soil analyses conducted by ESF's Soil Lab revealed the pH of the site to be 7.84, a higher than expected value. Some of the species we introduced will struggle in these basic conditions while others should thrive. Monitoring these interactions is part of our research goals and additional soil testing is planned.

Soil conditions vary throughout the site, with the soil at either end being more rich and "fluffy" following the disturbance of uprooting old plantings, while the soil of the central portion is thin, compacted and gravelly. We expect plant distribution and size to vary depending on these soil conditions.

The thin, rocky soils of the site are no problem to meadow plants long-term, but they will be slower to establish in these poor conditions, so extra steps were taken to reduce soil erosion until the plants mature enough to perform this function.

PREPARING THE SITE

TOP Taking a chemical free approach, ESF's Physical Plant scoured away the turf and some surface soil laden with weed seeds to prepare the slope for meadow establishment.

MIDDLE & BOTTOM Volunteers finish preparing the slope for meadow establishment by removing remaining debris, packing down fluffy soil disturbed by removing the old landscaping and hand-pulling weeds.

RESTORING THE MEADOW

THE EFFORT TO ESTABLISH THIS MEADOW REPRESENTS A NEW BEGINNING FOR THE CAMPUS QUAD. IT MARKS NOT ONLY A VISUAL CHANGE IN ESF'S CLASSIC QUAD, BUT A SHIFT THAT DEMONSTRATES A RESTORATION-BASED ADAPTATION TO OUR CHANGING LANDSCAPES.

MEADOW SEEDED: MAY 30, 2024

1 COMBINING

We enhanced the custom seed mix we developed with seeds harvested from local sources. We then mixed the seeds with cat litter to help ensure even distribution of these variably sized and shaped seeds while sowing. We also added grain oats as a companion crop to aid in establishment.

2 MIXING

Hand-mixing is used to combine the meadow seeds with the companion crop and cat litter bulking material. The seeds must be properly interspersed in the mixture for there to be an even distribution of seeds and ultimately plants throughout the meadow.

3 SOWING

Though there are many means of distributing the seeds, including mechanical methods. Casting seeds by hand is a not only a useful technique but an enjoyable one for volunteers.

4 ROLLING

It is import for seeds to properly contact the soil for best germination. A roller is used to press seeds into the prepared soil. Other methods include using one's feet, a board, tractor implement like a culti-packer, or slowly driving over the site as conditions allow.

5 EROSION CONTROL

Straw mats held together with biodegradable plastic netting protect seeds from erosion and herbivory as they germinate. Mats also reduce weeds and retain soil moisture. This step is vital due to the high slope of the meadow.

6 SECURING

Erosion mats are lightweight, making them ideal for erosion control, but are therefore susceptible to damage from high wind and heavy rain. The mats were pinned tightly to the ground using landscape pins. The material used on the quad will breakdown as plants germinate.





MANAGEMENT PRACTICES

UNLIKE LAWNS, MEADOWS ARE COMPLEX PLANT COMMUNITIES THAT TAKE YEARS TO MATURE. WHILE THEY REQUIRE FAR LESS ONGOING MAINTENANCE THAN TRADITIONAL LAWNS AND GARDENS, THEY DO NEED SOME HELP, ESPECIALLY IN THE FIRST YEAR.

COMPANION CROP

A companion crop was included with the meadow seeds, in this case grain oats (*Avena sativa*). This species germinates quickly, helping reduce erosion and facilitating meadow seedling growth by creating dappled shade and hiding meadow seeds from herbivores.

CUTTING

Plants grow at different rates, with some germinating immediately, some in a few weeks, and other seeds needing months of cold stratification. Cutting a few times the first year ensures the small, slow to mature plants receive adequate sunlight.

WEED REMOVAL

Herbicides are not being used to manage the Quad Meadow. Instead, we carefully cut or pull unwanted plants by hand, allowing adjacent meadow plants to thrive. Over time, these unwanted weeds will disappear with continuous management.

PLANT MONITORING

Periodic surveys of new germinants allow us to determine if meadow development is on track or requires intervention. These data also help us better understand plant succession patterns in these novel restored ecosystems.

BIODIVERSITY SURVEYS

A primary reason for establishing the Quad Meadow was to enhance biodiversity, primarily of pollinators and wildlife like songbirds that eat these invertebrates. Regular monitoring of these taxa ensures the meadow is benefitting biodiversity as intended.

TIMELINE OF MEADOW ESTABLISHMENT

Meadows take 3-7 years to mature and can look "messy" in the first few growing seasons. The following photos show the same meadow at another CNY location at different ages.

YEAR 1

Many people assume meadows have failed in the first year given their patchy appearance. This "messiness" is normal. Long-term, these hardy plants will thrive, but in the sensitive first growing season weeds must be carefully managed to ensure meadow seedlings succeed.

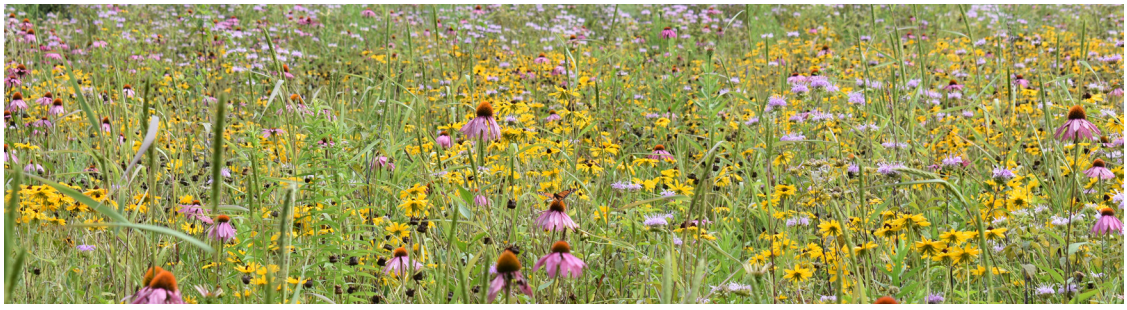
YEAR 2

In year two, nearly all species included in the seed mix should appear following cold stratification of seeds during winter. Fast-maturing plants like black-eyed Susan will bloom en masse, creating a bright display of flowers. Grasses also become more prominent and some may flower and set seed this year.

YEAR 3

By year three, meadows begin looking true to their mature composition and structure as most species flower and achieve their full height. The meadow will continue to evolve as rhizomatous species spread and short-lived plants fade from dominance as grasses and longer-lived wildflowers mature.

MATURITY



WEEDS

WHAT IS A WEED?

A weed is simply a “plant out of place.” We expect wild plants to colonize the meadow, growing alongside species we intentionally established. Many of these species will add biodiversity value to the meadow, even if they are exotic!

Some plants, even natives, are so aggressive in the context of this plant community that they must be controlled. Below are photographs from the Quad Meadow of some of its known weed species:

CANADA THISTLE
Cirsium arvense

Seedling; can form dense colonies.

FIELD BINDWEED
Convolvulus arvensis

Vines smother meadow plants, even at maturity.

FOXTAILS
***Setaria* spp.**

Foxtails form dense stands.

TREE-OF-HEAVEN
Ailanthus altissima

Seedling; will shade meadow as it grows.

FAQs

WILL THERE BE TICKS?

Meadows very rarely support black-legged ticks, also known as deer ticks, i.e., the species that vectors Lyme disease and other malladies. Finding this or another tick species in the Quad Meadow would be a surprise due to the site’s small size and distance from the habitats where these ticks are normally found. While we expect the Quad Meadow to support a high diversity of invertebrates, the ticks that parasitize humans are not among them.

WILL THE MEADOW ATTRACT “PESTS?”

Given its small size, we designed the Quad Meadow for invertebrates like pollinators, making it rich with wildflowers. The only wildlife we expect to use this meadow as primary habitat are small mammals and songbirds. Birds of prey may stop by to hunt these animals, and what a delight it would be to manage ESF’s quad as a raptor hunting ground!

A lucky few students may spot the occasional garter snake hunting slugs in the Quad Meadow, but otherwise this site is too small and isolated to support larger animals. We do expect to see rodents such as voles and chipmunks, as well as insectivores like shrews and moles.

There is space at the end of this guide for students, faculty and staff to record the biodiversity they observe using ESF’s meadow. Help us grow our biological inventory of this restoration site!

WILL THE BEES WE ATTRACT ATTACK US?

No. Bees on flowers are busy searching for nectar and pollen. They will not attack unless provoked.

MEADOW MIX

Graminoids

Ernst Conservation Seeds

AUTUMN BENTGRASS
Agrostis perennans

Height: 1-3’

Habitat: mesic to dry and rocky soils; sun to part shade.

Biodiversity benefit: provides winter forage and shelter for wildlife.

Ecology in a meadow: This species of bentgrass develops a fibrous root system that can rapidly cover bare ground. It was included in the Quad Meadow in part to reduce erosion on this steep slope. The dense cover it can provide also serves as shelter for wildlife and is used as nesting material by songbirds.

BIG BLUESTEM
Andropogon gerardii

Height: 2-6’

Habitat: widely adaptable on moist to dry soils in full sun.

Biodiversity benefit: cover for invertebrates and small animals like songbirds.

Ecology in a meadow: Big bluestem can grow in a wide range of conditions from moist, rich sites to poor, dry sites. In richer soils this species can dominate, but in the harsh soils of the Quad Meadow, it will remain relatively sparse and short while it helps control soil erosion and create cover for invertebrates. Notably, this grass can live for over a century.

SIDEOATS GRAMMA
Bouteloua curtipendula

Height: 1-3’

Habitat: typically occurring in dry, poor sites in full sun.

Biodiversity benefit: this bunchgrass, which has S2 rarity status in NYS, is shelter for invertebrates.

Ecology in a meadow: Sideoats grama grows well in poor, thin soils, including mine tailings. Its ability to thrive in such harsh conditions makes it an exceptional species for use in erosion management, which partly why we included it in the Quad Meadow. While an artificial planting, the Quad now represents a new population of this state-listed (endangered) species.

CANADA WILDRYE
Elymus canadensis

Height: 2-4’

Habitat: floodplains and riparian areas; sun to part shade.

Biodiversity benefit: large, nutritious seeds eaten by birds.

Ecology in a meadow: Canada wildrye matures quickly compared to many of the grasses used in the Quad Meadow. By the second growth year, this species typically begins producing large seeds preferred by songbirds and small mammals. The seedheads also have an attractive nodding form and persist all winter.

VIRGINIA WILDRYE
Elymus virginicus

Height: 2-4’

Habitat: floodplains and riparian areas; sun to part shade.

Biodiversity benefit: large, nutritious seeds eaten by birds.

Ecology in a meadow: like Canada wildrye, Virginia wildrye is a cool season grass, i.e., it does most of its growing in spring and fall. Most of the grasses in the Quad meadow are warm season species that grow most prolifically during hottest times of summer. It is easily distinguished from its Canadian cousin by its upright seed heads.

PURPLE LOVE GRASS
Eragrostis spectabilis

Height: 1-1.5’

Habitat: dry, rocky, thin soils like roadsides in full sun.

Biodiversity benefit: hosts skipper butterfly caterpillars and is shelter for pollinators.

Ecology in a meadow: an inconsipicuous grass until its seed heads emerge, swaths of purple love grass can create an effect like purple smoke in a meadow. Many caterpillars use this species as a host plant, its seeds provide food for a variety of bird species, and it can grow in very poor soils, making this a great species to introduce to the Quad Meadow.

Forbs

LITTLE BLUESTEM
Schizachyrium scoparium

Height: 1-3’

Habitat: open, dry sites and barrens in full sun.

Biodiversity benefit: used as cover by many ground nesting pollinators.

Ecology in a meadow: little bluestem will be a dominant species in the Quad Meadow. It performs very well in dry, rocky areas like this site where it will help control erosion and provide shelter for numerous invertebrate species, including ground nesting bees. In the fall this bunchgrass turns a golden bronze with purple, tan and brown highlights.

INDIAN GRASS
Sorghastrum nutans

Height: 2-6’

Habitat: mesic to dry sites including barrens in full sun.

Biodiversity benefit: used as forage by many wildlife species and as shelter by pollinators.

Ecology in a meadow: Indian grass grows well in sites ranging from moist shorelines to dry, rocky slopes. It was included at a low rate in the quad meadow because while it will aid in erosion control and provide habitat for wildlife, it can become aggressive. The harsh growing conditions of the Quad Meadow will help keep it in check.

ANISE HYSSOP
Agastache foeniculum

Height: 2-3’

Habitat: drier sites in fields and open woods; sun to part shade.

Biodiversity benefit: a favorite of bees, hummingbirds and lepidopterans.

Ecology in a meadow: considered naturalized in NY, anise hyssop is still widely used by our locally native pollinators when planted in the state. Being a mint, it is more resistant to mammal herbivores like deer. The leaves are highly fragrant when crushed and the brightly colored floral displays add highlights to a meadow.

NODDING ONION
Allium cernuum

Height: 1-1.5’

Habitat: dry, rocky slopes and woods; sun to part shade.

Biodiversity benefit: an S2 species in NY preferred by pollinators.

Ecology in a meadow: nodding onion is considered threatened in NY with only a portion of its historic natural populations remaining. This hardy allium should perform well in the harsh conditions of the Quad Meadow where its flowers will attract numerous pollinator species and wildlife may forage its bulbs.

Taylor Creek Restoation Nurseries

TALL THIMBLEWEED
Anemone virginiana

Height: 1-2.5’

Habitat: dry to mesic soils in open woods and edges; sun to part shade.

Biodiversity benefit: an early bloomer important to spring pollinators.

Ecology in a meadow: more of a woodland and woods edge species that does best in richer soils, we will see how this plant performs in the harsh conditions of the Quad Meadow. Its early flowers are an important resource for pollinators active in spring. Given its typical habitat, we expect this species to be restricted to the sides of the meadow where soil is deeper.

RED COLUMBINE
Aquilegia canadensis

Height: 1-3’

Habitat: dry and gravelly woods, slopes, fields; sun to part shade.

Biodiversity benefit: used by a variety of early-emerging pollinators.

Ecology in a meadow: red columbine is often assocaited with calcareous soils, making it a good fit for the basic soils of the Quad Meadow. Moreover, its seeds need a sufficient gravel component in soil to sufficiently germinate, another advantage in this setting. Expect to see this plant’s vibrant red flowers in early summer.

COMMON MILKWEED
Asclepias syriaca

Height: 2-5’

Habitat: old fields, roadsides and moist, open sites in full sun.

Biodiversity benefit: a major host species for monarch butterfly caterpillars.

Ecology in a meadow: common milkweed is renown for its importance as a host plant for monarch butterfly caterpillars. Its pink globes of flowers also feed numerous pollinators. The growing conditions at the Quad Meadow are not ideal for this species, but we expect the dryness of the site to help keep this sometimes aggressive native plant in check.

BUTTERFLY MILKWEED
Asclepias tuberosa

Height: 1-2’

Habitat: dry, gravelly slopes and barrens in full sun.

Biodiversity benefit: another important host of monarch butterfly caterpillars.

Ecology in a meadow: usually this short-statured plant would not persist long in a meadow surrounded by taller species, but the harsh growing conditions of the Quad Meadow are an advantage to this tough little milkweed. We expect this species to perform well here and provide food for numerous pollinators and vibrant colors for people to enjoy.

North Carolina Extension

WHITE FALSE INDIGO
Baptisia alba

Height: 2-3’

Habitat: prairies and open woods.

Biodiversity benefit: feeds long-tongued species like butterflies and bumblebees; nitrogen fixer.

Ecology in a meadow: A bushy perennial legume with smooth and rounded trifolate leaves, white false indigo stands out in a meadow with its white pea-like flowers that dot the landscape. This species has a deep taproot and its first few years of growth are devoted to developing that underground biomass. Because of this relatively slow growth rate, it may be 4-5 years before this long-lived plant blooms in a meadow.

BLUE FALSE INDIGO
Baptisia australis

Height: 2-4’

Habitat:average to dry soils in open areas.

Biodiversity benefit: preferred by pollinators active in early summer.

Ecology in a meadow: a robust and bushy perennial, the flowers of blue false indigo are a distinct purple-blue emerging in June. These flowers eventually become ballon-like seed pods that rattle in winter winds. This legume is a favorite of bees and other beneficial insects. Like other *Baptisia* species used to establish this meadow, blue false indigo attains a shrub-like form as it matures.

PARTRIDGE PEA
Chamaecrista fasciculata

Height: 1-2’

Habitat: often in dry open areas and barrens; sun to part shade.

Biodiversity benefit: a food source for pollinators and its seeds are eaten by many birds.

Ecology in a meadow: this annual legume will readily reseed itself each year, making it a long-term component of the Quad Meadow. It’s preferred by pollinators, especially bumblebees, and its seeds are an important food for a variety of game birds and ground nesting species. It is also sensitive to touch, closing its leaves upon being disturbed.

LANCELEAF COREOPSIS
Coreopsis lanceolata

Height: 1-2.5’

Habitat: average to dry soils in full sun to part shade.

Biodiversity benefit: supports a diversity of pollinators including a specialist bee.

Ecology in a meadow: native to just west and south of NY, lanceleaf coreopsis is considered naturalized in the state despite supporting a locally native specialist bee, *Melissodes subillatus*. This fragrant wildflower matures relatively quickly and blooms early in the summer, providing floral resources for a variety of pollinators.

Missouri Wildflowers Nursery

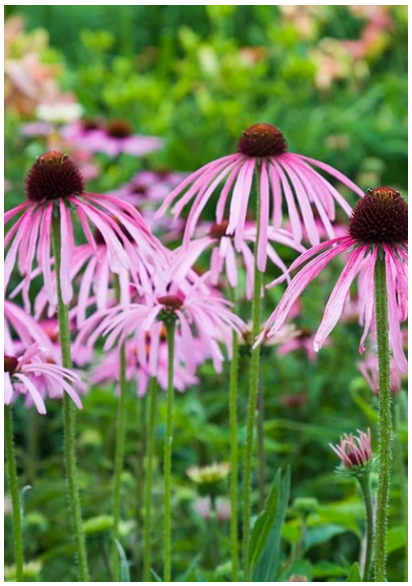
PRAIRIE CLOVER
Dalea purpurea

Height: 1-3’

Habitat: dry prairies and woods in sandy to clayey soil; full sun.

Biodiversity benefit: a nitrogen fixer that feeds pollinators and mammal herbivores.

Ecology in a meadow: purple prairie clover is a fine-textured legume that grows very well in dry, rocky soils like the Quad Meadow site. Adaptable in a wide range of soil conditions as long as competition with other plants is light. This transplant from the Great Plains is considered naturalized in NY.



American Meadows

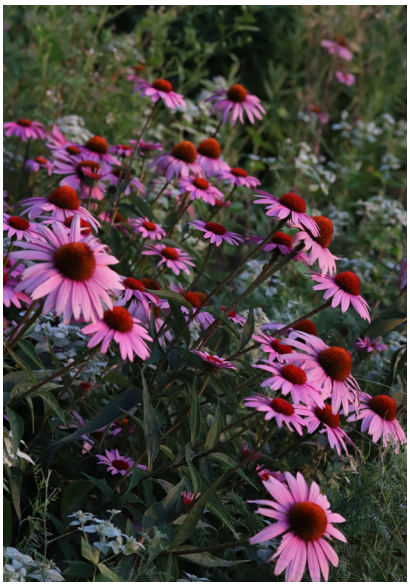
PALE CONEFLOWER
Echinacea pallida

Height: 1-3’

Habitat: adaptable to diverse conditions, average to dry, in full sun.

Biodiversity benefit: an important plant for many short-tongued insects.

Ecology in a meadow: usually smaller than its cousin, purple coneflower, pale coneflower seems to be the more tolerant drought tolerant of the two species, perhaps thanks to its deep taproot. Despite claims about the medicinal properties of *Echinacea* species, the health benefits of this plant are disputed, and we do not recommend it be harvested from the Quad Meadow.



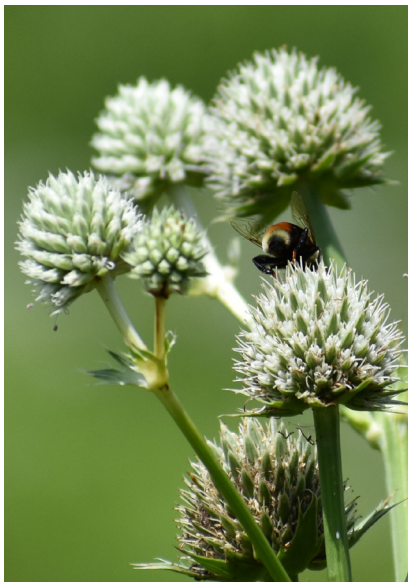
PURPLE CONEFLOWER
Echinacea purpurea

Height: 2-4’

Habitat: open woods and forest edges; sun to part shade.

Biodiversity benefit: favorite of pollinating insects and its seeds provide food for songbirds.

Ecology in a meadow: believe it or not, purple coneflower is more closely associated with woodlands than open habitats, but it is often used in restored meadows owing to its many biodiversity benefits, such as feeding pollinators. This widely adaptable plant is also used medicinally. We expect this species to perform well despite the harsh growing conditions of this site.



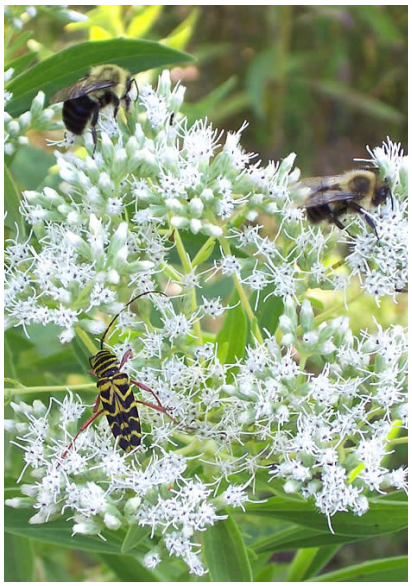
RATTLESNAKE MASTER
Eryngium yuccifolium

Height: 2-5’

Habitat: moist to dry soils from woods to barrens in full sun.

Biodiversity benefit: supports short- and long-tongued pollinators.

Ecology in a meadow: native to the American prairie, rattlesnake master still grows well in Central New York and feeds a variety of pollinators. In addition to its objectively cool name, the plant also has an unusual appearance that adds character to a meadow with its white, round flower heads and leaves resembling yucca, hence its species name.



Minnesota Wildflowers

TALL THOROUGHWORT
Eupatorium altissimum

Height: 2-5’

Habitat: average to dry soils along roads; sun to part shade.

Biodiversity benefit: feeds bees and other insects, hosts a diversity of caterpillars.

Ecology in a meadow: this relative of common boneset (*E. perfoliatum*) can grow in much drier sites than its wetland associated cousin. Performing well in slightly mesic to dry soils, this attractive plant can readily spread by seed in restored sites. Expect its white flowers to brighten the Quad Meadow in late summer.

SMOOTH OXEYE
Heliopsis helianthoides

Height: 3-5’

Habitat: primarily in alluvial soils in full sun to part shade.

Biodiversity benefit: used by pollinators for food and shelter and seeds eaten by birds.

Ecology in a meadow: This common wildflower grows well in a variety of conditions, from moist riparian soils to drier sites. The bright yellow flowers provide pollen and nectar for numerous pollinating insects, and birds enjoy eating its abundant seeds. Many insects shelter in smooth oxeye over winter, and birds use this robust plant as a perch in meadows.

ROUNDHEAD LESPEDEZA
Lespedeza capitata

Height: 3-5’

Habitat: dry, sandy soils in fields and open woods; full sun.

Biodiversity benefit: used by a variety of lepidopterans as a host plant.

Ecology in a meadow: roundhead lespedeza is one of the few nitrogen-fixing plants in the Quad Meadow. Its flowers feed numerous insects and the seeds and leaves are eaten by wildlife. This species often included in forage for livestock. Roundhead lespedeza can tolerate very dry, sandy soils and help reduce erosion, making it ideal for this setting.

Ernst Conservation Seeds

SLENDER LESPEDEZA
Lespedeza virginica

Height: 2-4’

Habitat: dry to mesic soils in fields and open woods; full sun.

Biodiversity benefit: supports pollinators and birds enjoy its abundant seeds.

Ecology in a meadow: one of the most visually striking lespedeza species, the bright pink flowers of slender bushclover are also preferred by many pollinators. This nitrogen-fixer thrives in harsh soils like that of the Quad Meadow, helping manage erosion. Slender bushclover also produces abundant seeds that feed wildlife like ground nesting birds.

Wildflower Farm

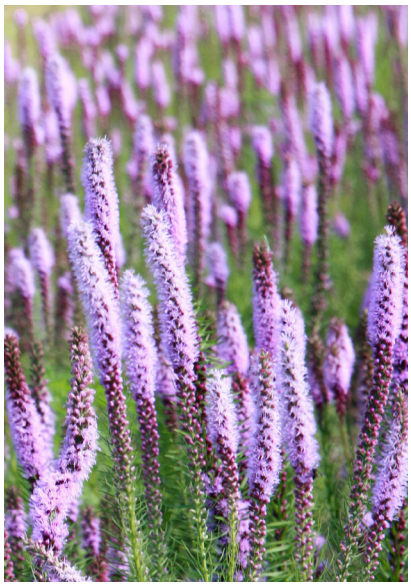
ROUGH BLAZING STAR
Liatris aspera

Height: 2-5’

Habitat: mesic to dry fields and open woods in full sun.

Biodiversity benefit: important food source for pollinators including the monarch butterfly.

Ecology in a meadow: this adaptable blazing star species can grow in a variety of soil textures and moisture conditions. It tends to perform best when competition from other plants is minimal. The dry, rocky slope of the Quad Meadow should serve as ideal habitat for this attractive naturalized species.



Taylor Creek Restoration Nurseries

PRAIRIE BLAZING STAR
Liatris pycnostachya

Height: 2-4’

Habitat: moist to dry soils in fields and open woods; full sun.

Biodiversity benefit: feeds pollinators, hummingbirds and songbirds.

Ecology in a meadow: considered naturalized in NY, prairie blazing star still supports a diversity of pollinators from insects to birds. Its spires of pink-purple flowers are an attractive feature in restored meadows. Expect this species to be a hummingbird favorite in the Quad Meadow.

WILD BERGAMOT
Monarda fistulosa

Height: 3-4’

Habitat: moist to dry soils of fields and open woods; full sun.

Biodiversity benefit: used by many pollinators from insects to hummingbirds.

Ecology in a meadow: wild bergamot is a common member of the mint family often used in restored meadows. It is adaptable to a range of growing conditions, sometimes even becoming aggressive in an ideal setting. The harsh soils of the quad will keep this species in check as it feed pollinators and helps reduce erosion with its rhizomatous growth habit.

DOTTED MINT
Monarda punctata

Height: 2-3.5’

Habitat: dry, sandy soils along roads and in woods; full sun.

Biodiversity benefit: feeds many pollinators, particularly long-tongued species.

Ecology in a meadow: this striking mint species produces flowers preferred by bees, lepidopterans and other pollinators. It flowers right after its cousin wild bergamot, creating a continuous supply of nectar and pollen for long-tongued pollinators. Dotted mint thrives in very poor, dry, sandy soils, making it an ideal addition to the Quad Meadow.

FOXGLOVE BEARDTONGUE
Penstemon digitalis

Height: 2-4.5’

Habitat: old fields, woodland openings; sun to part shade.

Biodiversity benefit: food source for early summer pollinators including humminbirds.

Ecology in a meadow: the bright white flowers of this plant feed a variety of pollinators from bumblebees to hummingbirds. It blooms in early summer, providing floral resources to pollinators active at this time, and takes on an attractive burgundy color in fall. Foxglove beardtongue is considered naturlized in NY.

HAIRY BEARDTONGUE
Penstemon hirsutus

Height: 1-2.5’

Habitat: dry, rocky slopes and open woods; sun to part shade.

Biodiversity benefit: feeds pollinators from insects to birds in areas with poor soils.

Ecology in a meadow: shorter than its cousin foxglove beardtongue, hairy beardtongue is well adapted to poor, dry soils and naturally occurs in sites like the Quad Meadow. It blooms in early summer, dotting restored meadows with its purple to white flowers.

HOARY MOUNTAIN MINT
Pycnanthemum incanum

Height: 2-4’

Habitat: mesic to dry open woods in full sun to part shade.

Biodiversity benefit: supports a high diversity of beneficial insects including pollinators.

Ecology in a meadow: hoary mountain mint grows in very poor, dry, rocky soils making it a useful addition to the Quad Meadow. This mint attracts a diverse array of beneficial insects from pollinators to crop pest predators like wasps that use this plant as their secondary food source. People enjoy its white flowers and sweet fragrance.

NARROWLEAF MOUNTAIN MINT
Pycnanthemum tenuifolium

Height: 1-2.5’

Habitat: moist to dry fields and woods in diverse soils; full sun.

Biodiversity benefit: supports many pollinating insects.

Ecology in a meadow: like many other mints, this species can spread aggressively, but its short-stature prevents it from becoming too dominant in restored meadows. An adaptable plant on dry to sometimes wet soils, this mint often occurs on rocky bluffs similar to the Quad Meadow, where it will aid in erosion control.

VIRGINIA MOUNTAIN MINT
Pycnanthemum virginianum

Height: 2-3’

Habitat: moist to average fields and open woods in full sun.

Biodiversity benefit: like other mints this species supports a diversity of pollinators.

Ecology in a meadow: mints are useful plants in restored meadows because they are associated with so many beneficial insect species and perform other important functions, like controlling erosion thanks to their typical rhizomatous growth habit. People will also enjoy the pleasing aroma of this species’ flowers and leaves.

BLACK-EYED SUSAN
Rudbeckia hirta

Height: 1.5-3’

Habitat: old fields, roadsides and open woods; full sun.

Biodiversity benefit: used by pollinators and birds eat its abundant seeds.

Ecology in a meadow: one of the most recognizable wildflowers, black-eyed Susan is a very short-lived plant in Central NY that readily reseeds itself. It is one of the first species to flower in restored meadows, typically creating a bright display of yellow blossoms in the second growing year, after which it fades from dominance.

WILD SENNA
Senna hebecarpa

Height: 4-6’

Habitat: mostly in moist soils of fields and woods; full sun.

Biodiversity benefit: especially attractive to bumblees and used by many other pollinators.

Ecology in a meadow: the conditions of the Quad Meadow are not ideal for this species which typically occurs in moist, rich soils. We expect those individuals that germinate to remain small given these conditions, which is intentional. This species does not spread rhizomatously, but its creeping root system will help aid in erosion control.

SILVERROD
Solidago bicolor

Height: 2.5-4.5’

Habitat: dry, thin soils of woods and barrens; sun to part shade.

Biodiversity benefit: valuable to pollinators and as a larval host plant for lepidopterans.

Ecology in a meadow: silver rod usually occurs on very thin, dry soils where competition from other plants is minimal. The Quad Meadow should be an ideal setting for this species, which will provide food for pollinators in late summer and fall, and host a variety of caterpillars. Its white flowers distinguish it from other NY goldenrods.

EARLY GOLDENROD
Solidago juncea

Height: 2-4’

Habitat: old fields, open woods and roadsides in full sun.

Biodiversity benefit: earliest blooming goldenrod in NY; important pollinator plant.

Ecology in a meadow: early goldenrod blooms before any other goldenrod in NY. This feature makes it an importnat food source for insects that prefer goldenrod before the other species bloom later in summer. Early goldenrod does best in poor soils with low competition, and unlike many other goldenrods it tends not to spread aggressively.

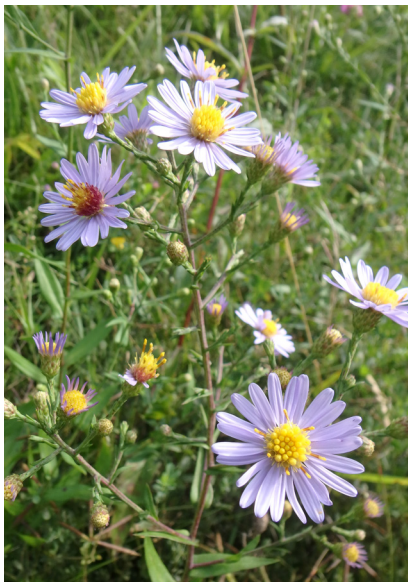
GREY GOLDENROD
Solidago nemoralis

Height: 1.5-2.5’

Habitat: poor soils in old fields and open woods in full sun.

Biodiversity benefit: like most goldenrods this species supports numerous pollinators.

Ecology in a meadow: goldenrods are associated with old fields and this species is no exception. Grey goldenrod grows well in dry, thin soils, and is moderately resistant to deer browse, making it a tough plant indeed. This species should perform well in the challenging growing conditions of the Quad Meadow where it will attract pollinators in late summer.



SMOOTH ASTER
Symphyotrichum laeve

Height: 2-3.5’

Habitat: dry, rocky slopes and open woods in full sun.

Biodiversity benefit: important pollinator food source like most *Symphyotrichum* species.

Ecology in a meadow: smooth aster is among the more easily identifiable Symphyotrichum asters thanks to its characteristic waxy, smooth stems and leaves. This species thrives on rocky outcrops, making it an ideal choice to introduce to the Quad Meadow. Its attractive form and flowers will also be a beautiful feature for people to enjoy.

CALICO ASTER
Symphyotrichum lateriflorum

Height: 2.5-4’

Habitat: average to dry open sites in full sun to part shade.

Biodiversity benefit: associated with many pollinator and beneficial insect species.

Ecology in a meadow: one of the region’s most common asters, calico aster is an important pollinator species that feed a variety of insects in late summer through fall. At maturity it takes on a bushy form dotted with white flowers often with pink highlights. Expect these plants to be covered in pollinators through late summer into fall.

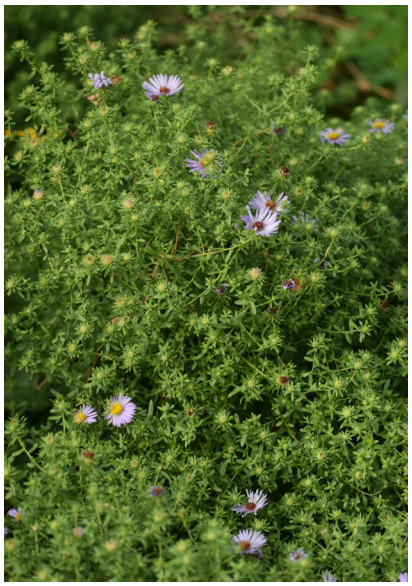
NEW ENGLAND ASTER
Symphyotrichum novae-angliae

Height: 3-6.5’

Habitat: old fields, usually moist, rich soils in full sun.

Biodiversity benefit: important pollinator plant that supports bees active late in the summer.

Ecology in a meadow: this tall aster is normally associated with moist soils in old fields and along roads. In these conditions it would rapidly outcompete many of the other plants in this meadow community, but the harsh growing conditions of the Quad Meadow will keep this beautiful aster short and prevent its dominance. Enjoy its vibrant purple flowers in fall.



AROMATIC ASTER
Symphyotrichum oblongifolius

Height: 1-2.5’

Habitat: dry, rocky slopes, cliffs and barrens in full sun.

Biodiversity benefit: a very long-blooming aster that feeds a diversity of pollinators in fall.

Ecology in a meadow: the rocky, thin soils of Quad Meadow create ideal growing conditions for this robust aster. Aromatic aster takes on a bush-like form, even becoming woody near the base of stems. In fall, shrubby mounds of this species will be dotted with pink/purple flowers that stay in bloom for weeks. Like the name implies, the foliage has a fragrant aroma.

HEATH ASTER
Symphyotrichum pilosum

Height: 2.5-5’

Habitat: dry, rocky sites like slopes and roadsides in full sun.

Biodiversity benefit: its abundance of small flowers provide food for pollinators.

Ecology in a meadow: heath aster can thrive in very poor, dry, gravelly soils, so is expected to perform well in the Quad Meadow. In these conditions the plant should take on a compact, bushy form. In late summer it will burst with an abundance of small, mostly white flowers with ocassional pink/purple highlights.

OHIO SPIDERWORT
Tradescantia ohiensis

Height: 1-3.5’

Habitat: moist to dry in woods and fields; sun to part shade.

Biodiversity benefit: flowers throughout summer in CNY providing pollinator food.

Ecology in a meadow: Ohio spiderwort is a relatively early-flowering species in the Quad Meadow. In our region it can flower from June through late summer. When hot and sunny, flowers wilt by mid-day to be replaced the following day with new blooms. The seeds of this species require cold stratification so it will take multiple years to appear.

CULVER’S ROOT
Veronicastrum virginicum

Height: 3-6’

Habitat: moist open areas and woods in full sun.

Biodiversity benefit: an important pollinator plant that supports many insect species.

Ecology in a meadow: Given the dry conditions of the Quad Meadow it is unlikely Culver’s root will achieve its full height, and this is by deign. We expect it to germinate only in the wetter areas of the meadow, which will prevent this tall plant from outcompeting nearby species. Even if stunted, Culver’s root will support a diversity of pollinating insects.

GOLDEN ALEXANDERS
Zizia aurea

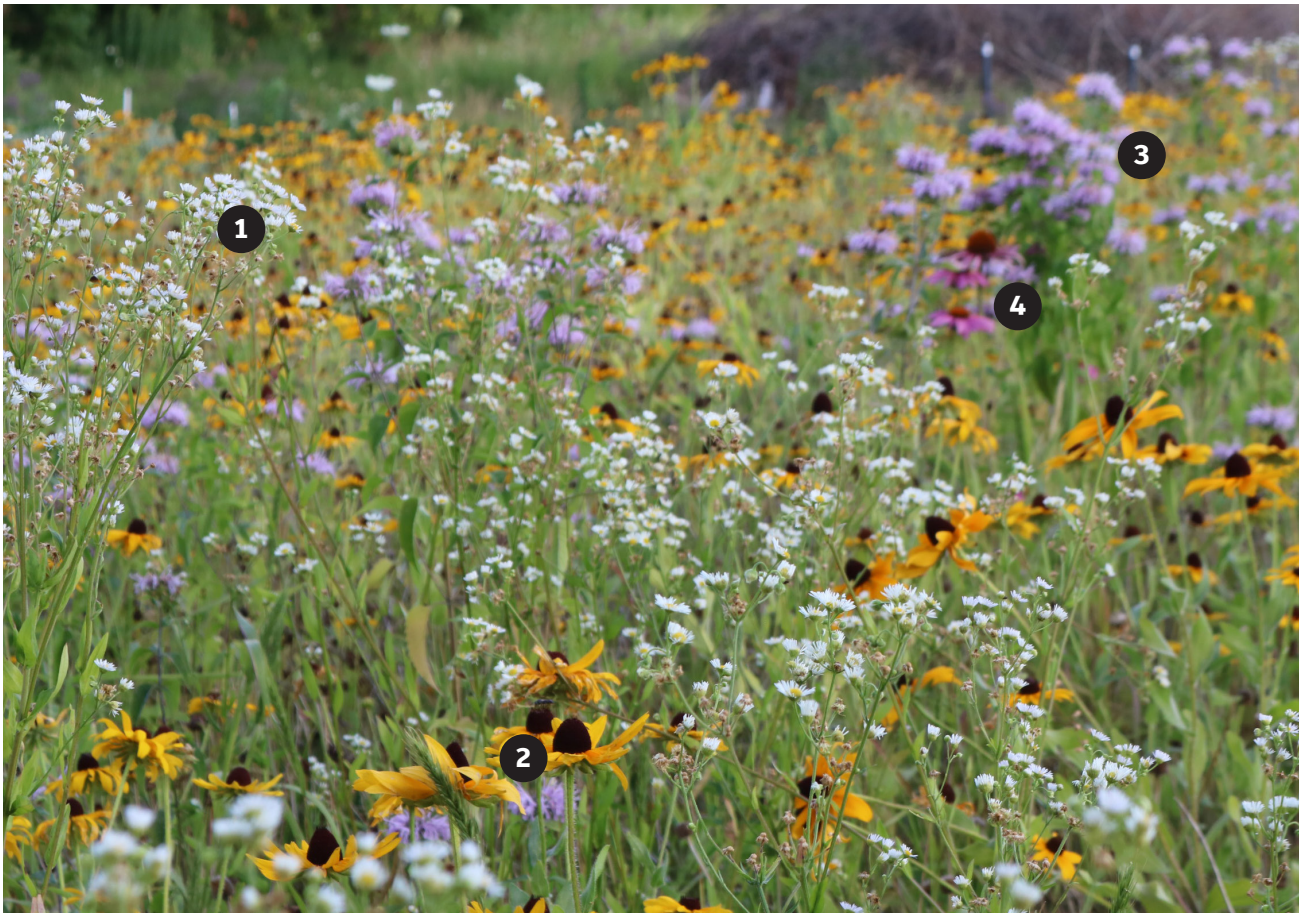
Height: 2-3’

Habitat: alluvial soils and moist areas in full sun to part shade.

Biodiversity benefit: associated with many beneficial insects including crop pest predators.

Ecology in a meadow: an early-flowering species renown for its value to pollinators, golden Alexanders is also associated with many important crop pest predators that eat its nectar and pollen when their prey species is unavailable. It is expected to germinate and persist only in the moist areas of the Quad Meadow.

ESTABLISHED EXAMPLES



ABOVE

1) Daisy fleabane, *Erigeron annuus*. 2) Black-eyed Susan, *Rudbeckia hirta* 3) Wild bergmot, *Monarda fistulosa* 4) Purple coneflower, *Echinacea purpurea*

LEFT

1) Culver's root, *Veronicastrum virginicum* 2) Gray-headed prairie coneflower, *Ratibida pinnata* 3) Wild bergamot, *Monarda fistulosa*

POLLINATORS & WILDLIFE

WE HOPE ESF STUDENTS, FACULTY AND STAFF HELP US DOCUMENT THE QUAD MEADOW'S BIODIVERSITY. WE PROVIDED THIS SPACE FOR PEOPLE TO RECORD, DRAW AND TAKE NOTES ON THE WILDLIFE THEY OBSERVE TO HELP US DEVELOP THIS BIOLOGICAL INVENTORY.

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POLLINATORS & WILDLIFE

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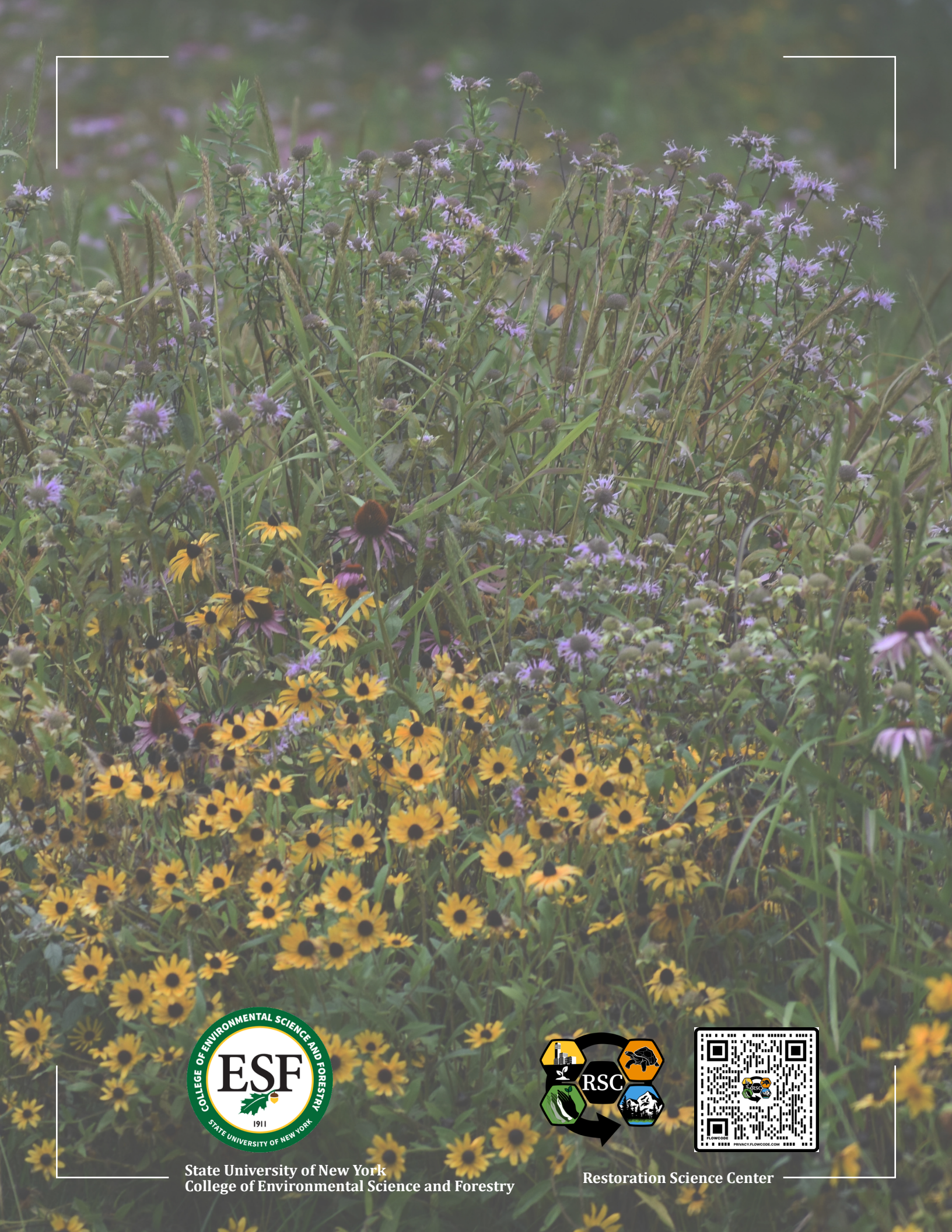

State University of New York
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Restoration Science Center