

When designing a meadow, plants are selected for much more than simple aesthetic value. The way that plants relate within a plant community, and to each other, should be part of the overall design equation. Plants should easily adapt to the existing soil conditions, available water, and microclimate, so added inputs such as irrigation, fertilizer and soil amendments can be reduced or avoided altogether.

## CHOOSE A SITE

Many factors contribute to a meadow's successful longevity. **Selecting a site that can sustain a meadow is crucial.** The total hours of sunlight the site receives during the day is an important consideration. Most meadow plants prefer full sun; therefore, an area must receive no less than half a day of direct sunlight to ensure success with sun-loving plants. Understanding the required minimum hours of sunlight that support the desired plant species is critical. Some native meadow plants may be easily incorporated into a location with few hours of direct sunlight, such as a woodland edge, while misplaced plants will quickly fade in conditions that are unfavorable to their establishment.

Other site considerations that affect meadow longevity and plant establishment include soil type, moisture, pH, and fertility. Grade and topography also impact the meadow location and species composition. For example, a north slope may create shady conditions unfavorable to many native meadow species. **An honest assessment of the site is critical to the overall understanding and function of the meadow.**

## ASSESS EXISTING SITE CONDITIONS

- **Draw a map or diagram of the location, including the intended meadow area.** Identify and highlight areas that differ in soil, light or water conditions.
- **Analyze the site.** Recognize solar patterns and movements, water availability, drainage patterns, and existing vegetation.
  - **Take a soil test** to evaluate the pH, existing nutrients and other soil characteristics of the intended meadow area. For instructions, visit <http://www.soiltest.uconn.edu/sampling.php> or call the UConn Soil testing lab at (860) 486-4274 or the UConn Home and Garden Education Center toll-free at (877) 486-6271. Typically, for native areas, unless the site is extremely infertile, few amendments are required.
  - Note the total **hours of sun** the area receives each day and the path of the sun over the area.
  - Determine how water moves within the site. Identify **drainage patterns** and low spots where water settles. Note any areas of standing water and the time required for the water to recede from the site. Identify if a high water table exists. Consider changes in water movement over the course of the year through multiple seasons (i.e., a spot could be flooded in spring, but dry in summer) and the historical pattern over several years.
  - Identify the **soil type, texture and structure** - clay, sandy, gravelly, silt or loam.
  - Evaluate the **topography** of the area (hills, slopes, and directional exposure).
  - Consider **wildlife** (deer, groundhogs, or rabbits) that may affect the success of plant establishment.
  - Some species act as tell-tale **indicators of soil conditions.** **Note existing plant communities and weeds** as to what plants would most likely thrive in the site. Neighboring properties may provide clues if the current property is maintained primarily as turf, without a diversity of species.



*This area at a school was chosen to be transitioned to a meadow because the slope makes it too difficult to maintain as turf. (Photo by Tom Barry)*

- **Consider micro-variations within the site.** If areas of the site vary in moisture levels, soil type, or other factors, match plants in those areas to the specific conditions for greater establishment success.

## FUNCTIONAL CONSIDERATIONS FOR PLANT SELECTION

Based on an honest assessment of existing growing conditions, choose plants that will best thrive at the site. A meadow will require minimal fertilizer inputs, barring an extreme soil imbalance. Most soil amendments will promote weed growth at the expense of the desirable species.

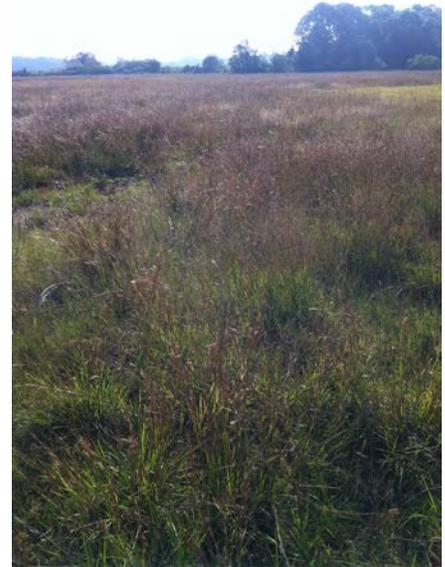
**1. Determine planting method: seed or live plants (plugs).** This choice should be determined based on species availability, matching plant communities of similar sites, and budget to establish the site. If planting by seed, a predetermined seed mix can be purchased that is most suitable to the site's conditions. Use caution with seed mixes composed of a high percentage of flowering annuals and short-lived perennials. These mixes offer quick visual results, but long term, the challenge to outcompete weeds can be a burden.

### 2. Elements to consider when choosing plants:

#### Grasses:

**A substantial portion (about 40%) of a meadow should be comprised of grasses<sup>1</sup>.** A combination of cool season (e.g., fine fescues) and warm season (e.g., little bluestem) grasses is recommended. None of the meadow grasses should be so aggressive that they will dominate the stand. Clump-forming grasses are preferred over rhizomatous grasses. Grasses offer:

- **Fibrous root systems** that limit erosion and provide quick access to soil water needed to survive drought periods.
- **Aesthetic qualities** of color, texture, and movement.
- Support for taller meadow flowers.
- **Important food sources**, nesting material, and habitat for many species of wildlife.
- **A cover to prevent weeds** from establishing.
- An extension of the aesthetic appeal of the meadow beyond the flower-blooming period with **graceful texture and foliage color** of amber, red, and golden hues in the winter landscape.



*A successfully established meadow.*

#### Nurse crop:

An annual “nurse” crop is recommended in the first year to aid in establishment of the meadow, particularly if the slope of the area is of concern. A nurse crop is usually a quick establishing, clump-forming grass that helps reduce weed invasion, holds the seed or young plants in place, and protects the soil from erosion. Annual oats (*Avena sativa*) or cereal rye grass (*Secale cereale*) can be used as a nurse grass for a spring seeding, while winter wheat (*Triticum aestivum*) can be used in the fall. **Mow an annual nurse crop before it goes to seed to prevent it from re-seeding.** The nurse crop also can be slower growing, non-competitive perennial grasses. Hard fescues are often selected as the nurse grass here in the New England area.

#### Flowering annuals:

Flowering annuals are sometimes a component of seed mixes, as they offer eye-catching color and establish quickly. **Flowering annuals must be chosen carefully** and, if desired, can be avoided entirely, as they can make establishment and maintenance in the first growing season more challenging. Showy, exotic species selected for their aesthetic appeal may be less likely to survive in a highly competitive meadow environment, if they have not adapted to the existing conditions. Be aware that some aggressive, non-native annuals and perennials are sometimes included in meadow mixes, such as Forget-me-not (*Myosotis sylvatica*), Queen Anne's lace (*Daucus carota*), and Dame's Rocket (*Hesperis matronalis*), and should be avoided if possible.

<sup>1</sup> *Urban and Suburban Meadows: Bringing Meadows to Big and Small Spaces*, Catherine Zimmerman, 2010.

If flowering annuals are desired as a permanent component of the meadow, then part of the meadow maintenance plan should include overseeding with these desired annuals every 1-3 years to maintain or rejuvenate the bold colors within the stand. If added pops of color are desired, annuals can also be added once the meadow has become established.

### Timing of Planting:

Warm season grasses and late summer/fall-flowering plants establish most readily when seeded (or planted) in late spring. Cool season perennial grasses and spring flowering plants develop best with late summer/early fall seedings. Summer annual grassy weeds are less of a challenge and weather conditions are usually more favorable for establishment in the fall.

**3. Group plants of natural communities that grow together in uncultivated areas**, with similar sun, water and nutrient needs.

- **Choose plants that grow well in the existing conditions.** If the intended meadow area is on a slope, different species may thrive in different sections. Water tends to flow to low areas, so low areas typically will receive more water than high areas.
- Select plants that have co-evolved into stable **plant communities** and that complement one another. For example, goldenrod, aster, and little bluestem work well in a dry, infertile, sunny site, while swamp milkweed, gayfeather, and sedge thrive in a wet, swampy meadow.

**4. Understand the process of successional change** that occurs in a meadow over time.

- **Through the season:** growth of some plants is most active in summer (warm season) while growth of others is most vigorous during spring and fall (cool season). To reduce invading weeds include both types of plants to occupy space and avoid leaving a seasonal opening for weed establishment.
- **For multi-year health of the meadow, include:**
  - **Short-term species (annuals and biennials)** that germinate, flower, and fade in the first or second year. These plants are critical to establishing the meadow early and providing immediate competition for problematic weeds. **Annual nurse grasses** are recommended over flowering annuals, due to the maintenance required in the first year to successfully establish perennials.
  - **Long-term perennial species** that take an extended time to establish. While many perennials will germinate during the first year, root systems often take multiple years to fully develop. They generally will not flower until the second or third year. Perennials are necessary and vital to succeed short-term species that may fade in the second and third years.

**5. Aesthetic qualities** such as plant color, texture, growth form, and sequence of bloom can also be considered, once the site condition needs have been identified. Many meadow species bloom or have aesthetic appeal at varying times throughout the year, offering the possibility of a beautiful, four-season display if species are chosen carefully. Other attractive elements that can be included are:

- **A mowed border** of cool season grasses along the perimeter, which can

*A small meadow in its first year delights with colorful annual poppies and bachelor's buttons (above right, photo by Tom Kalal). By fall, the establishing meadow is dominated by black-eyed Susans, grasses, and perennials (below right, photo by Alyssa Siegel-Miles).*



focus the eye and make a meadow look more well-tended and consistent with a suburban setting.

- **Pathways**, which can be mowed or constructed through the meadow to better appreciate the beauty from various viewpoints, and promote an opportunity to observe up close the many interesting insects and birds feeding in the interior.

### RECOMMENDED NATIVE PERENNIALS FOR A CONNECTICUT MEADOW

Aster ( <i>Symphyotrichum novae-angliae</i> )	Deer resistant. Attracts butterflies, birds. Good cut flower.
Bee balm ( <i>Monarda fistulosa</i> )	Deer and rabbit resistant. Attracts butterflies, hummingbirds.
Black-eyed Susan ( <i>Rudbeckia hirta</i> )	Biennial (short lived perennial). Use for early meadow establishment. Deer resistant. Attracts butterflies and birds. Self-seeds freely.
Blazing star ( <i>Liatris spicata</i> )	Attracts butterflies, birds. Tolerant of drought and clay soil. Intolerant of wet soils in winter. Slow to establish from seed.
Butterfly weed ( <i>Asclepias tuberosa</i> )	Deer resistant. Attracts butterflies. Essential food source for Monarch butterfly caterpillars.
Coreopsis ( <i>Coreopsis lanceolata</i> )	Deer resistant. Attracts butterflies, birds. Showy flowers. Self-sowing.
Culver's root ( <i>Veronicastrum virginicum</i> )	Showy flowers attract butterflies. Takes several years to establish.
Ironweed ( <i>Vernonia noveboracensis</i> )	Deer resistant. Self-seeds freely.
Mountain mint ( <i>Pycnanthemum muticum</i> )	Attracts butterflies, bees. Attractive silver-blue foliage.
Pale purple coneflower ( <i>Echinacea pallida</i> )	Deer resistant. Attracts butterflies, bees. Mixes well with grasses. Showy, fragrant, good cut flowers. Self-seeds freely.
Queen of the prairie ( <i>Filipendula rubra</i> )	Deer resistant. Attracts butterflies, hummingbirds. Fragrant foliage. Showy, fragrant flowers. Intolerant of drought.
Yarrow ( <i>Achillea millefolium</i> )	Deer resistant. Salt tolerant. Fragrant flowers attract butterflies.

### RECOMMENDED NATIVE GRASSES AND SEDGES FOR A CONNECTICUT MEADOW

Awl sedge ( <i>Carex stipata</i> )	Deer resistant. Beneficial to caterpillars, grasshoppers, birds, ducks.
Big bluestem ( <i>Andropogon gerardii</i> )	Deer resistant. Salt tolerant. Optimum time to plant is usually early May to late June. Self-seeds. Warm season grass.
Fringed sedge ( <i>Carex crinita</i> )	Deer resistant. Attracts birds. Cool season sedge.
Indian grass ( <i>Sorghastrum nutans</i> )	Deer resistant. Salt tolerant. Attracts birds, butterflies. Attractive blue-green foliage. Orange-yellow fall color. Warm season grass.
Little bluestem ( <i>Schizachyrium scoparium</i> )	Deer resistant. Bronze-orange fall foliage color. Warm season grass.
Pink muhly grass ( <i>Muhlenbergia capillaris</i> )	Deer resistant. Clump forming. Warm season grass.
Prairie dropseed ( <i>Sporobolus heterolepis</i> )	Deer resistant. Adds winter interest. Slow to establish. Can be sown by seed but does not freely self-seed. Warm season grass.
Purple lovegrass ( <i>Eragrostis spectabilis</i> )	Performs best in sandy loam in hot, dry locations. Warm season.
Sideoats grama ( <i>Bouteloua curtipendula</i> )	Attracts birds. Good ground cover. Good fall color. Warm season.
Switchgrass ( <i>Panicum virgatum</i> )	Attracts birds, butterflies. Warm season grass.

#### GLOSSARY:

**Annual:** plants with a life cycle that lasts only one year. They grow from seed, bloom, produce seeds and die in one growing season.

**Biennial:** a plant that completes its life cycle in two years. Flowering and seed production take place in the second year.

**Cool Season Grasses:** turfgrass species best adapted to growth during spring and fall (cool, moist periods of the year), optimally when daytime air temperatures are between 60-75 degrees F and soil temperatures are between 50-65 degrees F.

**Perennial:** plants that live for more than two years. They continue growing until they reach maturity, which varies by plant but averages three to five years.

**pH:** a measure of acidity and alkalinity, measured on a scale of 1-14: 7 represents neutrality, lower numbers indicate increasing acidity and higher numbers increasing alkalinity.

**Warm Season Grasses:** grasses that grow best when temperatures are between 75-90°F. Most of their growth occurs in the summer.