

(From Jacobson 2006)

The following information summarizes expectations for a new planting. It is followed by tables that summarize the expectations for establishment of individual species in State seed mixes.

Year 1 Expectations

This section applies to the first full growing season after planting occurs. For fall plantings it is the following growing season and for spring plantings it is the current growing season (considering that forbs are pre-stratified for the spring planting). Cover species (for uplands) should be present over the entire site by the end of the growing season. Example species are oats (*Avena sativa*) and winter wheat (*Triticum aestivum*). Refer to the seed mixes installed for which species to look for. Tables X & Y show what year you would expect to see species flowering after planting.

Wetland Vegetation – Seedlings of at least three early successional native sedges, rushes and/or grasses should be dispersed through the seeded area. Example species are common fox sedge (*Carex stipata*), brown fox sedge (*Carex vulpinoidea*), green bulrush (*Scirpus atrovirens*), soft-stem bulrush (*Scirpus validus*), American slough grass (*Beckmannia syzigachne*), fowl bluegrass (*Poa palustris*), and giant manna grass (*Glyceria grandis*). Forbs present as seedlings are likely to be boneset (*Eupatorium perfoliatum*), blue vervain (*Verbena hastata*), beggar's tick's (*Bidens cernua*), and monkey flower (*Mimulus ringens*). The American slough grass and fowl bluegrass are normally present and recognizable by the end of the first growing season. Keep in mind that some of the forb species may not germinate the first year if seeded in late June (and not pre-stratified).

Upland Vegetation – Seedlings of at least three native grasses and three native forbs should be widely dispersed through the seeded area. Refer to the seed mixes installed to determine which species to look for. Example prairie grass species are slender wheat grass (*Elymus trachycaulus*), Canada wild-rye (*Elymus canadensis*), big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*). Examples of woodland edge grass species are Virginia wild-rye (*Elymus virginicus*), hairy wood-chess (*Bromus purgans*), bottle brush grass (*Elymus hystrix*), slender wheat grass (*Elymus trachycaulus*), Canada wild-rye (*Elymus canadensis*). Example forb species are black-eyed Susan's (*Rudbeckia hirta*), partridge pea (*Chamaecrista fasciculata*), blue vervain (*Verbena hastata*), hoary vervain (*Verbena stricta*), early sunflower (*Heliopsis helianthoides*), and bergamot (*Monarda fistulosa*). All of the species noted above will be present as seedlings and probably won't flower the first year except for partridge pea and Black-eyed Susan's. Grass seedlings may be hard to pick out if the cover crops have put on a lot of growth. They will normally be 2-6 inches tall whereas the cover crops may be 1-2 feet tall.

Year 2 Expectations

This section refers to the second full growing season of wetland and upland establishment. The site should have 50% cover of native grasses/sedges or native forbs. The site should contain 70% of the middle successional species contained in the specified seed mixes. There should be no more than 10% cover of exotic, non-native invasive vegetation. Tables X & Y show what year you would expect to see species flowering after planting.

Wetland Vegetation – Under saturated soil conditions the wetland vegetation may transition from being dominated by American slough grass and fowl bluegrass to being dominated by green bulrush, common fox sedge, brown fox sedge, and soft-stem bulrush. Sites that are a little drier may show dominance by grasses in addition to American slough grass and fowl blue grass, examples are giant manna grass, Virginia wild-rye, and fringed brome (*Bromus ciliata*). Forbs found in Year 1 may bloom in the 2nd year (Jacobson 2006).

Upland Vegetation – cool-season native grasses such as wild ryes and wheat grasses will generally dominate Prairie sites. Warm-season grasses will be present but may still be small in stature and scattered throughout the site. Most of

the forbs from Year 1 will bloom in Year 2.

Years 3 to 5 Expectations

This section refers to years 3 through 5 after wetland and upland establishment. The site should have 70% cover of native grasses/sedges and native forbs. The site should contain 50% of all species contained in the specified seed mixes. There should be no more than 10% cover of exotic, non-native invasive vegetation. Note that some species may not be visibly established in the first 5 years as noted below. Tables X & Y show what year you would expect to see species flowering after planting.

Wetland Vegetation – A number of wetland species take several years to establish (visibly) from seed. Examples are bur-reed, lake sedge, hummock sedge, blue-joint grass, blazingstars, and blue-flag iris. This is probably because they either require more than one winter of cold/moist treatment to break dormancy or they have exceptionally thick seed coats that take several years to break down before germination can occur. Woody species such as red osier dogwood planted as seed may take 5-7 years to establish from seed.

Upland Vegetation – Years 3 and 4 are transitional years for prairie plantings. There is almost always a visible transition from cool-season grasses (Canada wild-rye and slender wheat grass) to warm-season grasses (big bluestem, Indian grass, little bluestem, etc.). By year five, warm-season grasses and late successional forbs should dominate prairie plantings. Cool-season grasses will be nearly gone from a site. However, they may persist in wet depressions, or on north facing slopes or in partial shade. Annual (partridge pea) and biennial (black-eyed Susan's) forbs will also tend to fade out and be replaced by later successional forbs. Wetness, shading, aspect and temperature will tend to delay transitions. Woody species such as bur oak planted as acorns may take 6-7 years to reach a height where they are visible in amongst grasses and forbs.

Herbaceous Seedlings, Bare-root Stock, Tubers & Pre-vegetated Mats - The goal of planting live plants in the aquatic and emergent aquatic zones is to establish colonies of the desired species, which can spread on their own throughout the site. Most of the species planted will spread by rhizome and/or by seed. In general, it doesn't take 100% survival of the planted species to accomplish this goal. For most species, a minimum of 20% survival is sufficient to achieve colonization of a site. Live plant materials are installed in the spring; if a minimum of 20% survive the first growing season and are growing in 3-4 different areas on the site they should be considered a success.

Woody Potted Seedlings & Bare-root Stock - This applies to trees and shrubs for Type 1 (floodplain forests), Type 6 (shrub carr & alder thickets), Type 7 (wooded), Type 8 (coniferous and open bogs) and upland forest plantings. It is expected that a minimum of 50% survival of planted materials be achieved after the first two years of establishment. Replacements should be made on a species-by-species basis if survival falls below 50% after 2 years. It should be noted that some species may not be appropriate for some sites. If there is significant loss of a species (80%-100%), that species probably should not be replaced again. Also, if there is significant loss due to unexpected hydrology changes, or other factors, but herbaceous species have established well, then the site may not be suitable for trees and shrubs and should be re-evaluated for suitability for trees/shrub survival.

Establishment of Wetland Species			
		SPECIES	YEARS TO ESTABLISH (FLOWER)
TYPE	Common Name	Botanical Name	
GRASS	Bluestem, big	<i>Andropogon gerardi</i>	++
	Oats or winter wheat	<i>Avena sativa</i> or <i>Triticum aestivum</i>	+
	Slough grass, American	<i>Beckmannia syzigachne</i>	+
	Brome, fringed	<i>Bromus ciliata</i>	++
	Blue-joint grass	<i>Calamagrostis canadensis</i>	+++
	Wild-rye, Canada	<i>Elymus canadensis</i>	++
	Wheat-grass, slender	<i>Elymus trachycaulus</i>	++
	Wild-rye, Virginia	<i>Elymus virginicus</i>	++
	Manna grass, rattlesnake	<i>Glyceria canadensis</i>	++
	Manna grass, reed	<i>Glyceria grandis</i>	+
	Manna grass, fowl	<i>Glyceria striata</i>	+
	Cut-grass, rice	<i>Leersia oryzoides</i>	++
	Rye-grass, annual	<i>Lolium italicum</i>	+
	Switchgrass	<i>Panicum virgatum</i>	+++
	Bluegrass, fowl	<i>Poa palustris</i>	++
	Indian grass	<i>Sorghastrum nutans</i>	+++
Cord grass, prairie	<i>Spartina pectinata</i>	+++	
GRAMINOID	Sedge, bottlebrush	<i>Carex comosa</i>	+++
	Sedge, porcupine	<i>Carex hystericina</i>	+++
	Sedge, lake	<i>Carex lacustris</i>	++++
	Sedge, pointed-broom	<i>Carex scoparia</i>	++
	Sedge, tussock	<i>Carex stricta</i>	++++
	Sedge, fox	<i>Carex vulpinoidea</i>	++
	Spike-rush, creeping	<i>Eleocharis acicularis</i>	+
	Spike-rush, great	<i>Eleocharis palustris</i>	++
	Rush, common	<i>Juncus effusus</i>	++
	Rush, slender	<i>Juncus tenuis</i>	++
	Bulrush, hard-stem	<i>Scirpus acutus</i>	++
	Bulrush, green	<i>Scirpus atrovirens</i>	+
	Wool grass	<i>Scirpus cyperinus</i>	++
	Bulrush, river	<i>Scirpus fluviatilis</i>	+++
	Bulrush, soft-stem	<i>Scirpus validus</i>	+
Bur-reed, giant	<i>Sparganium eurycarpum</i>	++++	

Key: The number of "+" equals the number of years (growing seasons after fall or spring planting) of establishment before a species can be expected to flower.

Establishment of Upland Species			
		SPECIES	YEARS TO ESTABLISH (FLOWER)
TYPE	Common Name	Botanical Name	
GRASS	Bluestem, big	Andropogon gerardi	+++
	Oats or winter wheat	Avena sativa or Triticum aestivum	+
	Slough grass, American	Beckmannia syzigachne	+
	Grama, sideoats	Bouteloua curtipendula	++
	Grama, blue	Bouteloua gracilis	++
	Brome, Kalm's	Bromus kalmii	++
	Wood chess, hairy	Bromus purgans	++
	Buffalo grass	Buchloe dactyloides	+++
	Wild-rye, Canadian	Elymus canadensis	++
	Bottle-brush grass	Elymus hystrix	++
	Wheat-grass, slender	Elymus trachycaulus	++
	Wild-rye, Virginia	Elymus virginicus	++
	Wheat-grass, western	Elytrigia smithii	++
	June grass	Koeleria macrantha	++
	Rye-grass, annual	Lolium italicum	+
	Switch grass	Panicum virgatum	+++
	Bluegrass, fowl	Poa palustris	++
	Bluestem, little	Schizachyrium scoparium	+++
	Indian grass	Sorghastrum nutans	+++
	Dropseed, tall	Sporobolus asper	+++
Dropseed, sand	Sporobolus cryptandrus	+++	
Dropseed, prairie	Sporobolus heterolepis	+++	
Needle grass, green	Stipa viridula	++	
FORB	Hyssop, fragrant-giant	Agastache foeniculum	++
	Onion, prairie	Allium stellatum	+++
	Milkweed, butterfly	Asclepias tuberosa	+++
	Milkweed, whorled	Asclepias verticillata	+++
	Aster, sky-blue	Aster azureus	+++
	Aster, heath	Aster ericoides	+++
	Aster, smooth-blue	Aster laevis	+++
	Aster, large-leaved	Aster macrophyllus	+++
	Aster, silky	Aster sericeus	+++
	Milkvetch, Canada	Astragalus canadensis	++
	Partridge pea	Chamaecrista fasciculata	+
	Coreopsis, prairie	Coreopsis palmata	+++
	Prairie clover, white	Dalea candidum	++
	Prairie clover, purple	Dalea purpureum	++
	Tick-trefoil, showy	Desmodium canadense	++
Coneflower, narrow-leaved	Echinacea angustifolia	+++	

FORB	Sunflower, early	<i>Heliopsis helianthoides</i>	++
	Bush clover, round-headed	<i>Lespedeza capitata</i>	+++
	Blazingstar, rough	<i>Liatris aspera</i>	+++
	Blazingstar, dotted	<i>Liatris punctata</i>	+++
	Blazingstar, tall	<i>Liatris pycnostachya</i>	+++
	Bergamot, wild	<i>Mondarda fistulosa</i>	++
	Bee balm, spotted	<i>Mondarda punctata</i>	++
	Beardtongue, foxglove	<i>Penstemon digitalis</i>	+++
	Penstemon, showy	<i>Penstemon grandiflorum</i>	+++
	Coneflower, columnar	<i>Ratibida columnifera</i>	++
	Coneflower, grey-headed	<i>Ratibida pinnata</i>	+++
	Black-eyed Susan	<i>Rudbeckia hirta</i>	++
	Golden-glow, wild	<i>Rudbeckia laciniata</i>	+++
	Aster, upland-white	<i>Solidago ptarmicoides</i>	+++
	Goldenrod, stiff	<i>Solidago rigida</i>	++
	Spiderwort, prairie	<i>Tradescantia bracteata</i>	++
	Spiderwort, Ohio	<i>Tradescantia ohiensis</i>	++
	Vervain, blue	<i>Verbena hastata</i>	++
	Vervain, hoary	<i>Verbena stricta</i>	++
	Vetch, American	<i>Vicia americana</i>	+++
Alexanders, heart-leaved	<i>Zizia aptera</i>	++	
Alexanders, golden	<i>Zizia aurea</i>	++	

Key: The number of "+" equals the number of years (growing seasons after fall or spring planting) of establishment before a species can be expected to flower.

