

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Restoration and Management of Declining Habitats

(acre)

Code 643

DEFINITION

Restoring and managing rare and declining habitats and their associated wildlife species to conserve biodiversity.

- The site can be documented as prairie or savanna from historical records. (Note that historical records can be obtained from the Indiana State Archives, Indianapolis, Indiana.)

PURPOSES

Provide habitat for rare and declining species.

This standard applies to *sedge meadow* enhancement or restoration where sites are dominated by hydric soils (i.e. greater than 50% hydric). Sedge meadows are plant communities that are dominated by sedge species (*Carex spp.*).

CONDITIONS WHERE PRACTICE APPLIES

Sites that previously or currently support the rare or declining habitat targeted for restoration or management.

This standard applies to *Fen* wetland types that are degraded or that can be enhanced. Fens are wetlands that are dominated by muck and/or marl that are calcareous under natural conditions. Hydrology is alkaline from natural groundwater seepage and dominant plant species are calciphiles (plants adapted to alkaline conditions) under natural conditions.

This standard applies to the establishment/restoration of following habitat types:

- I. Tall Grass Prairie Establishment (page 2)
- II. Low Stature Prairie Establishment (page 4)
- III. Sedge Meadow Establishment (page 5)
- IV. Fen Restoration (page 6)
- V. Savanna Establishment (page 7)
- VI. Restoration of Existing Degraded Habitats (page 7)

This standard applies to prairie and savanna establishment if one of the following conditions exist:

- The soil is a Mollisol, **or**
- The site is a remnant prairie or savanna, **or**

GENERAL CRITERIA

Plans and application of habitat restoration shall comply with all applicable federal, state, and local laws and regulations. Haying and/or grazing plans will be developed if used to achieve or maintain the intended purpose.

Management practices and activities shall not disturb cover during the primary nesting period in Indiana (March 1 – July 15), except chemical methods, prescribed burning or mowing may be utilized during the establishment period, or when necessary to maintain the health and/or vigor of the plant community.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the electronic Field Office Technical Guide for your state.

Many herbicides may damage wildflowers used with this practice. Check the herbicide label and a local expert before spraying herbicides.

Vegetative manipulations to restore plant and/or animal diversity shall be accomplished by prescribed burning or by mechanical, biological or chemical methods, or a combination of the above. See Indiana NRCS FOTG Standard (647) *Early Successional Habitat Development/Management* for additional guidance.

Site preparation and planting of the plant materials will insure an acceptable survival rate. Seeding and planting rates will be adequate to accomplish the planned purpose. Species planted shall be suitable for the planned purpose, soils, climate and site conditions.

Fertilizer shall not be used for this practice (this includes nitrogen) as it only encourages competing weed growth.

Tree and/or shrub plantings shall follow site preparation, planting dates, planting and storage guidelines as detailed in Indiana NRCS FOTG Standard (612) *Tree/Shrub Establishment*.

This practice shall comply with all federal, state, and local laws.

Seeding Dates

Native Plants shall be seeded from April 1 – June 15 or using a Dormant seeding December 1 - April 1. Increase dormant seeding rates by 25% (except for: forbs and low stature prairie seedings).

Low Stature Prairies shall be established only by using a dormant seeding, do not increase the seeding rate as it is incorporated into the seeding rate.

Plant materials selection

Three options exist for plant material selection:

- 1) The use of local genotype herbaceous plant material within a 200 mile radius of the planting site.
- 2) The use of Indiana native seeds and or plants. Indiana native is defined as a plant that originated in Indiana; was not introduced; and existed within the state borders prior to arrival of settlers.

- 3) Plant material from outside Indiana if its genetic origin is within the state.

Additional Criteria to Provide Habitat for Rare and Declining Species

I. Tall Grass Prairie Establishment

The seeding mixture will consist of one (1) of the following prairie grass mixes, plus 10 additional species including at least:

- a) Five (5) species from the *Composite List*
- b) Two (2) species from the *Other Species List and*
- c) One (1) species from the *Legume List*

Native Prairie Grass List

Select one of the following prairie grass mixes.

Mix 1 - Mesic/ Dry Prairies consisting of moderately well drained (MWD), well drained (WD), and excessively drained (ED) soils:

Mix 1 Species	lbs./ac. of PLS ¹
Big Bluestem <i>Andropogon gerardii</i>	1.0
Indiangrass <i>Sorghastrum nutans</i>	1.0
Little Bluestem <i>Schizachyrium scoparium</i>	1.0
Sideoats Grama <i>Bouteloua curtipendula</i> or	0.5
Canada Wildrye <i>Elymus canadensis</i>	1.0
Switchgrass <i>Panicum virgatum</i>	0.5

¹Pure Live Seed

Mix 2 -Wet Mesic Prairies consisting of somewhat poorly drained (SPD) soils or poorly drained (PD) soils with drainage:

Mix 2 Species	lbs./acre of PLS
Switchgrass <i>Panicum virgatum</i>	0.5
Virginia Wildrye <i>Elymus virginicus</i>	2.0
Indiangrass <i>Sorghastrum nutans</i>	1.5
Big Bluestem <i>Andropogon gerardii</i>	1.5

Mix 3 - Wet Prairies consisting of poorly drained (PD) and very poorly drained (VPD) soils with out drainage:

Mix 3 Species	lbs./acre of PLS
Switchgrass <i>Panicum virgatum</i>	0.5
Big Bluestem <i>Andropogon gerardii</i>	1.0
Virginia Wildrye <i>Elymus virginicus</i>	2.0
Fox Sedge <i>Carex vulpinoidea</i>	2 oz./acre
Fowl Mana Grass <i>Glyceria striata</i>	4 oz./acre
Prairie Cordgrass <i>Spartina pectinata</i> , and/or Canada Blue Joint <i>Calamagrostis canadensis</i>	50 plants per acre planted in depressions

Composite List

Species	Soil Drainage	oz./ac. of PLS
Blackeyed Susan <i>Rudbeckia hirta</i>	MWD-ED	1
Button Blazing Star <i>Liatris aspera</i>	MWD – ED	2
Compass Plant <i>Silphium laciniatum</i>	MWD- WD	4
Dense Blazing Star <i>Liatris spicata</i>	PD – WD	2
Downy Sunflower <i>Helianthus mollis</i>	WE – ED	1
Entire-Leaf Rosinweed <i>Silphium integrifolium</i>	MWD – ED	4
False Aster <i>Boltonia latisquama</i>	PD-SPD	1
False Sunflower <i>Heliopsis helianthoides</i>	MWD – ED	1
Flat Topped Aster <i>Aster umbellatus</i>	PD – SPD	2
Gray-Headed Coneflower <i>Ratibida pinnata</i>	MWD – ED	2
New England Aster <i>Aster novae-angliae</i>	PD – WD	1
Nodding Bur Marigold <i>Bidens cernua</i>	PD – SPD	2

Species	Soil Drainage	oz./ac. of PLS
Prairie Dock <i>Silphium terebinthinaceum</i>	SPD – ED	4
Riddell's Goldenrod <i>Solidago riddelli</i>	PD – ED	1
Sawtooth Sunflower <i>Helianthus grosseserratus</i>	PD – WD	1
Smooth Aster <i>Aster laevis</i>	MWD-ED	1
Smooth Ironweed <i>Vernonia fasciculata</i>	PD-MWD	2
Sneezeweed <i>Helenium autumnale</i>	PD - SPD	1
Spotted Joe Pye Weed <i>Eupatorium maculatum</i>	PD - SPD	1
Stiff Goldenrod <i>Solidago rigida</i>	MWD-ED	1
Swamp Aster <i>Aster puniceus</i>	PD - SPD	1
Sweet Black-Eyed Susan <i>Rudbeckia subtomentosa</i>	PD-MWD	1
Tall Coreopsis <i>Coreopsis tripteris</i>	SPD – ED	3
Wild Quinine <i>Parthenium integrifolium</i>	MWD – ED	2

Other Species List

Species	Soil Drainage	oz./ac. of PLS
Butterfly Weed <i>Asclepias tuberosa</i>	MWD – ED	3
Cardinal Flower <i>Lobelia cardinalis</i>	PD - SPD	0.5
Foxglove Beardtongue <i>Penstemon digitalis</i>	PD-MWD	1
New Jersey Tea (small shrub less than 3' tall)	MWD – ED	2
Obedient Plant <i>Physostegia virginiana</i>	PD - SPD	2
Ohio Spiderwort <i>Tradescantia ohiensis</i>	SPD – WD	2
Rattlesnake Master <i>Eryngium yuccifolium</i>	MWD-ED	2
Swamp Milkweed <i>Asclepias incarnata</i>	PD - SPD	3

Other Species List Continued from page 3

Species	Soil Drainage	oz./ac. of PLS
Virginia Blue Flag <i>Iris virginica</i> , var. <i>shrevei</i>	PD - SPD	4
Virginia Mountain Mint <i>Pycnanthemum virginianum</i>	SPD – WD	1
Wild Bergamot <i>Monarda fistulosa</i>	SPD – WD	2
Prairie Willow <i>Salix humilis</i> (Shrub seedlings planted on a 6-foot by 6-foot spacing.)	PD - SPD Plant in clumps 1/4 ≤ acre and not more than 5% of the restoration acres	

Legume List

Species	Soil Drainage	oz./ac. of PLS
Hoary Tick Trefoil <i>Desmodium canescens</i>	MWD – ED	3
Lead Plant (small shrub) <i>Amorpha canescens</i>	WD – ED	1
Partridge Pea <i>Cassia fasciculata</i>	MWD – ED	4
Roundheaded Lespedeza <i>Lespedeza capitata</i>	MWD – ED	2
Slender Lespedeza <i>Lespedeza virginica</i>	MWD – ED	2
White Wild Indigo <i>Baptisa leucantha</i>	MWD – ED	4
Purple Prairie Clover <i>Petalostemum purpureum</i>	MWD– ED	2
Wild Senna <i>Cassia hebecarpa</i>	PD – WD	4

II. Low Stature Prairie Establishment

The seeding mixture will consist of one (1) of the following prairie grass mixes, plus 10 native species from the *Forb List*. **Note: low stature prairie requires a dormant seeding. Do not use low stature prairies on closed depressions that can pond water. These sites can be restored as a sedge meadow.**

Mow at a height of 6 inches when competing vegetation growth reaches 10 inches in height for

the 1st growing season for weed control during establishment.

Mix 1 - Wet Mesic to Dry Prairies consisting of somewhat poorly drained (SPD), moderately well drained (MWD), well drained (WD), and excessively drained (ED) soils:

Mix 1 Species	lbs./acre of PLS
Prairie Dropseed <i>Sporobolus heterolepis</i>	1.5
Little Bluestem <i>Schizachyrium scoparium</i>	3.0
Sideoats Grama <i>Bouteloua curtipendula</i>	1.0
Canada Wildrye <i>Elymus canadensis</i>	2.0

Mix 2 - Wet Prairies consisting of poorly drained (PD) and very poorly drained (VPD) soils. *Note: Do not use on organic and/or clay soils.*

Mix 2 Species	oz./acre of PLS
Prairie Dropseed <i>Sporobolus heterolepis</i>	24
Little Bluestem <i>Schizachyrium scoparium</i>	48
Virginia Wildrye <i>Elymus virginicus</i>	32
Yellow Fox Sedge <i>Carex annectans</i>	2

Forb List

Species	Soil Drainage	oz./ac. of PLS
Button Blazing Star <i>Liatris aspera</i>	MWD-ED	2
Dense Blazing Star <i>Liatris spicata</i>	PD – WD	2
Foxglove Beardtongue <i>Penstemon digitalis</i>	PD – WD	1
Golden Alexanders <i>Zizia aurea</i>	PD – WD	2
Gray Goldenrod <i>Solidago nemoralis</i>	MWD – ED	1
Virginia Mountain Mint <i>Pycnanthemum virginianum</i>	SPD – WD	1

Forb List Continued from page 4

Species	Soil Drainage	oz./ac. of PLS
Nodding Wild Onion <i>Allium cernuum</i>	SPD-WD	2
Obedient Plant <i>Physostegia virginiana</i>	PD - SPD	2
Plains Coreopsis <i>Coreopsis palmata</i>	SWD-ED	2
Prairie Cinquefoil <i>Potentilla arguta</i>	MWD-ED	1
Purple Prairie Clover <i>Petalostemum purpureum</i>	SPD-ED SPD	1
Rattlesnake Master <i>Eryngium yuccifolium</i>	SPD-WD	2
Riddell's Goldenrod <i>Solidago riddellii</i>	PD – ED	1
Roundheaded Lespedeza <i>Lespedeza capitata</i>	MWD – ED	2
Sky Blue Aster <i>Aster azureus</i>	SPD-ED	1
Western Sunflower <i>Helianthus occidentalis</i>	MWD-ED	2
Wild Quinine <i>Partheniu integrifolium</i>	SPD-WD	2
Shining Aster <i>Aster firmus</i>	PD-SPD	1
Showy Black Eyed Susan <i>Rudbeckia fulgida</i>	PD-SPD	1

III. Sedge Meadow Establishment

Sedge meadows are wetlands that can be restored on areas that are dominated by hydric soils (i.e. greater than 50% hydric). Before vegetation can be established, hydrology must be restored to its natural state. Use Indiana NRCS FOTG Standard (657) *Wetland Restoration* to restore hydrology.

The seeding mixture will consist of:

- The *Sedge Meadow Mix*, plus
- Three (3) species from the *Sedge List*, and
- Five (5) species from the *Forb List*

Sedge Meadow Mix

Species	oz./ac. of PLS
Dark Green Bulrush <i>Scirpus atrovirens</i>	2
Virginia Wildrye <i>Elymus virginicus</i>	10
Switchgrass <i>Panicum virgatum</i>	2
Fowl Mana Grass <i>Glyceria striata</i>	2

Sedge List

Species	oz./ac. of PLS
Bottlebrush Sedge <i>Carex lurida</i>	3
Crested Sedge <i>Carex cristatella</i>	2
Fox Sedge <i>Carex vulpinoidea</i>	4
Frank's Sedge <i>Carex frankii</i>	4
Meadow Sedge <i>Carex granularis</i>	3
Tussock Sedge <i>Carex stricta</i>	1

Sedge Meadow Forbs List

Species	oz./ac of PLS
Blue Vervain <i>Verbena hastata</i>	1
Boneset <i>Eupatorium perfoliatum</i>	1
Cardinal Flower <i>Lobelia cardinalis</i>	1
Flat Topped Aster <i>Aster umbellatus</i>	1
Great Blue Lobelia <i>Lobelia siphilitica</i>	1
New England Aster <i>Aster novae-angliae</i>	1
Nodding Bur Marigold <i>Bidens cernua</i>	2
Obedient Plant <i>Physostegia virginiana</i>	2
Riddell's Goldenrod <i>Solidago riddellii</i>	1
Sneezeweed <i>Helenium autumnale</i>	1
Spotted Joe Pye Weed <i>Eupatorium maculatum</i>	1
Swamp Aster <i>Aster puniceus</i>	1
Swamp Milkweed <i>Asclepias incarnata</i>	3

IV. Fen Restoration

Fens are wetlands that can be restored on sites that are dominantly muck and/or marl and that are calcareous under natural conditions and hydrology is alkaline from groundwater seepage.

Before vegetation can be established, hydrology must be restored to its natural state as described above. Use Indiana NRCS FOTG Standard (657) *Wetland Restoration* to restore hydrology.

The seeding mixture will consist of:

- The *Fen Mix*, plus
- Three (3) species from the *Sedge List*, and
- Ten (10) species from the *Forb List* including at least one each of an Aster (A), Goldenrod (G), and Silphium (S).

Fen Mix

Species	oz./ac. of PLS
Dark Green Bulrush <i>Scirpus atrovirens</i>	1
Virginia Wildrye <i>Elymus virginicus</i>	48
Fox Sedge <i>Carex vulpinoidea</i>	4
Fowl Mana Grass <i>Glyceria striata</i>	2
Tussock Sedge <i>Carex stricta</i> <u>and</u> Canada Blue Joint <i>Calamagrostis canadensis</i>	50 plants each per acre

Sedge List

Species	oz./ac of PLS
Bottlebrush Sedge <i>Carex lurida</i>	2
Crested Sedge <i>Carex cristatella</i>	1
Porcupine Sedge <i>Carex hystericina</i>	2
Frank's Sedge <i>Carex frankii</i>	4
Awl-Fruited Sedge <i>Carex stipata</i>	1
Pointed Oval Sedge <i>Carex tribuloides</i>	1

Forb List

Species	oz./ac of PLS
(A) Flat Topped Aster <i>Aster umbellatus</i>	1
(A) Swamp Aster <i>Aster puniceus</i>	1
(A)New England Aster <i>Aster novae-angliae</i>	1
(G) Riddell's Goldenrod <i>Solidago riddellii</i>	1
(G) Swamp Goldenrod <i>Solidago patula</i>	1
(S) Entire-Leaf Rosinweed <i>Silphium integrifolium</i>	1
(S) Cupplant <i>Silphium perfoliatum</i>	1
(S) Prairie Dock <i>Silphium terebinthinaceum</i>	1
Angelica <i>Angelica atropurpurea</i>	1
Boneset <i>Eupatorium perfoliatum</i>	1
Dense Blazing Star <i>Liatris spicata</i>	1
Golden Alexanders <i>Zizia aurea</i>	1
Queen of the Prairie <i>Filipendula rubra</i>	0.5
Showy Black Eyed Susan <i>Rudbeckia fulgida</i> var.	2
Sneezeweed <i>Helenium autumnale</i>	1
Spotted Joe Pye Weed <i>Eupatorium maculatum</i>	1
Wild Senna <i>Cassia hebecarpa</i>	2
Virginia Mountain Mint <i>Pycnanthemum virginianum</i>	1

V. Savanna Establishment

Trees, grasses, and forbs will be planted to establish the savanna.

A. Tree Planting

Trees shall be established using seedlings or container trees.

- For uniformly trees planted in rows, the density shall not exceed 200 trees per acre.
- For clump planting tree density shall not exceed 300 trees per acre. When clump planting is used the smallest clump will be 0.5 acres in size, and no clump will exceed 5 acres in size.

Newly planted trees must be protected from fire during establishment. Trees shall be protected from fire for a minimum of 5 years after planting or until they have a minimum diameter of 3 inches at breast height.

Protect young trees from fire using firebreaks, plowed fire line, water fire lines, or other methods.

At least 50% of the trees species will be selected from the *Primary List*:

Primary List

Common Name	Scientific Name	Soil Drainage
Black Oak	<i>Quercus velutina</i>	MWD - ED
Bur Oak	<i>Quercus macrocarpa</i>	PD - ED
Chinquapin Oak	<i>Quercus muhlenbergii</i>	MWD - ED
White Oak	<i>Quercus alba</i>	MWD - WD
Swamp White Oak	<i>Quercus bicolor</i>	PD - MWD
Pin Oak	<i>Quercus palustris</i>	VPD - MWD

Remaining trees to be planted can be selected from the *Secondary List*:

Secondary List

Common Name	Scientific Name	Soil Drainage
Black Walnut	<i>Juglans nigra</i>	MWD - WD
Mockernut Hickory	<i>Carya tomentosa</i>	MWD – ED
Persimmon	<i>Diospyros virginiana</i>	MWD – WD
Sassafras	<i>Sassafras albidum</i>	MWD – ED
Scarlet Oak	<i>Quercus coccinea</i>	MWD – ED
Shagbark Hickory	<i>Carya Ovata</i>	MWD – WD
Shingle Oak	<i>Quercus Imbricaria</i>	SPD – WD

B. Grass Planting

Select one grass species mix as described above under, *I. Tall Grass Prairie Establishment*.

C. Forb Planting

A minimum of any four (4) forb species will be selected from the *Composite List*, *Legume List*, or *Other Species List* described under *I. Tall Grass Prairie Establishment*.

VI. Restoration of Existing Degraded Habitats

For sites that still have some of the characteristic species of the desired habitat type, use restoration techniques such as prescribed burning, woody vegetation control, and inter-seeding with the desired species.

- Exotic or invasive woody herbaceous species will be controlled.
- Use Indiana NRCS FOTG Standard (338) *Prescribed Burning* to burn one third to one-half of the area every year on a rotating schedule until the desired vegetative community is established.
- If the species diversity does not increase within three (3) to five (5) years, inter-seed the desirable native species into the existing stand.

- To control encroaching woody vegetation treat all girdled trees or cut stumps with labeled herbicide.
- For Savanna Restorations, control excessive stocking of trees to provide additional sunlight to existing herbaceous plants (see Table 1.). The site should contain at least 10% woody vegetation.

Table 1. Savanna Stocking Levels

Ave. Tree Diameter	Trees/acre (40% canopy)	Trees/acre (30% canopy)	Trees/acre (20% canopy)
4	210	160	105
6	110	80	60
8	75	60	40
10	50	40	25
12	35	30	20
14	27	20	15
16	22	16	11
18	17	13	8
20	14	11	7

CONSIDERATIONS

Consider the minimum habitat requirements of target species or other species of concern when determining the size and location of the restored area.

Consider the edge to area ratio for area sensitive target species.

Consider the potential for disturbance by restoration and/or management activities to threatened or endangered species or their habitat.

Consider varying the timing of prescribed burn (i.e. late winter v.s. early spring) to enhance plant diversity.

Evaluate the site to determine if the habitat can be restored through management techniques, or if it must be established by planting seed and/or tree seedlings.

Consider establishing woody vegetation large enough (3 inches at breast height) to survive prescribed burning before establishment of herbaceous plants for savannas.

Seed and plant material should originate from a source within a 200-mile radius of the site.

Consider working with other agencies and organizations such as the U. S. Fish and Wildlife Service, Indiana Division of Fish and Wildlife, Indiana Division of Forestry, Indiana Division of Nature Preserves, The Nature Conservancy or similar organizations to develop site-specific plans.

Consider soil fertility, structure, drainage, aspect and slope when selecting species.

PLANS AND SPECIFICATIONS

Plans and specifications for restoration and management of declining habitats shall be in keeping with this standard and other applicable federal, state and local codes.

Plans and specifications will include:

- Site map indicating practice type and acreage.
- Necessary management practices.
- Site preparation.
- Species selection and seeding rates.
- Planting dates, care, and handling of seed and plant material.
- A soil map.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be provided to, and reviewed with, the landowner. The plan shall include the following items and others as appropriate:

- Undesirable woody vegetation. Undesirable woody vegetation should be controlled to maintain prairies and sedge meadows. Small woody vegetation may be removed by mowing or using prescribed burning. Larger woody vegetation can be controlled by girdling the stem and/or applying herbicides.
- Prescribed Burning. Grassland communities are best managed by the use of prescribed burning. When prescribed burning is not feasible, mowing (to set back woody or broadleaf species) or light disking (to set back excessive grass growth) may be used as a maintenance measure. When mowing,

care must be taken so that residue does not accumulate and smother the plants.

During the establishment of prairies, mowing or prescribed burning should be conducted every year. After establishment prescribed burning can be conducted every third year or as needed to best manage the site. Prescribed burning shall take place during the dormant season. When NRCS recommends prescribed burning, a qualified person shall develop a burn plan according to Indiana NRCS policy.

- Mowing. If mowing is used during establishment, mow high enough so the desired vegetation is not disturbed. Mow no more than 1/4 to 1/3 of the field every year. Rotate mowed strips across the field.

If mowing is used during establishment for weed control, mow high enough so the desired vegetation is not disturbed. Mow when competing weeds are taller than the planted vegetation, and at a height above the planted vegetation. Planted grasses and wildflowers should not be mowed lower than six (6) inches to ensure plant health.

Spot mowing, spraying or strip disking may be needed to control weed problems.

- Spraying. To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds will be done on a "spot" basis to protect forbs and legumes that benefit native pollinators and other wildlife.
- Invasive and Noxious Species. Management measures shall be provided to control invasive species and noxious weeds in order to comply with state noxious weed laws.

REFERENCES

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