

**SKARE PARK MITIGATION BANK
NATIVE VEGETATION RESTORATION & MANAGEMENT PLAN**

Submitted to:



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(AES Project # 17-0057)

Prepared by:



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1.0 INTRODUCTION

Overview

This document is designed to inform the eventual “Vegetative Management and Restoration Plan” that will be included in Construction Documents related to the proposed Skare Park Mitigation Bank site. An AES Senior Ecologist conducted a detailed onsite Vegetation Community Inventory for the approximately 50 acre area comprising the proposed Mitigation Bank on February 28, 2017. AES walked the entire site to accurately identify, map, compile dominant vegetation species lists, assess the condition of each existing vegetation community, and ultimately recommend restoration and management opportunities for each vegetation community.

Historic Land Cover/Land Use

According to pre-European settlement vegetation mapping completed during the U.S. Government’s 1840’s land survey (Figure 1), the area comprising the proposed Skare Park Mitigation Bank site was primarily “slough” (wet prairie/sedge meadow) bordered by “Timber” (floodplain woodland and savanna).

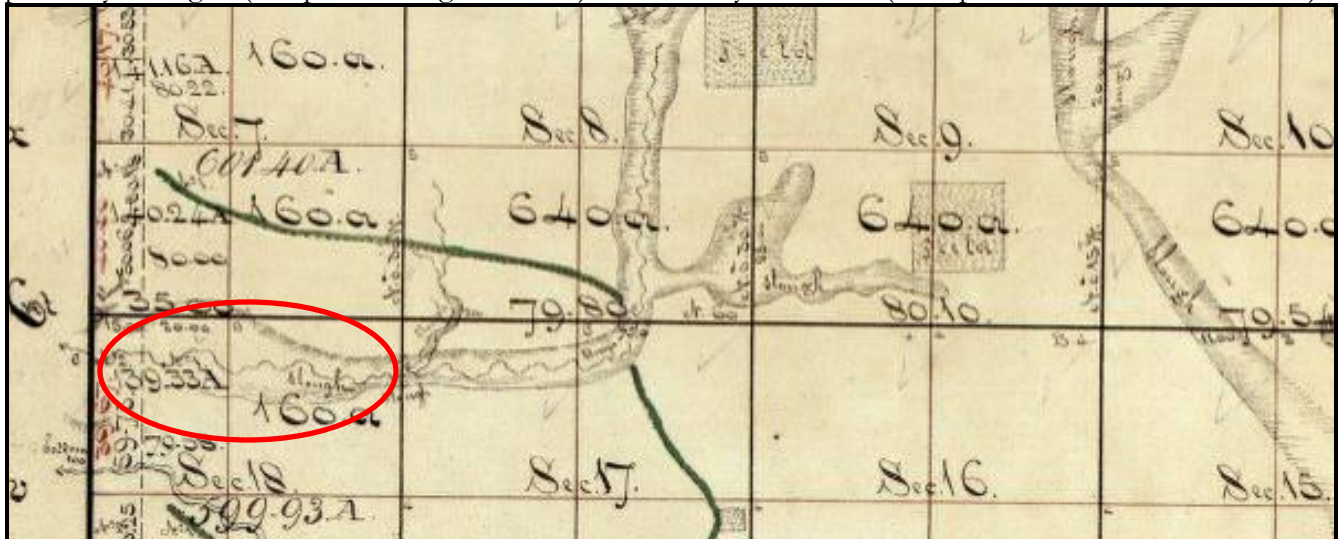


Figure 1. 1840 Pre-settlement Vegetation Map (source: Federal Township Plats of Illinois).

The earliest aerial photographs taken in 1939 (Figure 2) depict the Skare Park Mitigation Bank project area when row crop farming and cattle grazing were the primary land uses. It appears that attempts were made to farm an area south of Deer Creek while much of the woodland and savanna north of Deer Creek was cleared. It is also interesting to note that Deer Creek is still a meandering stream in 1939.

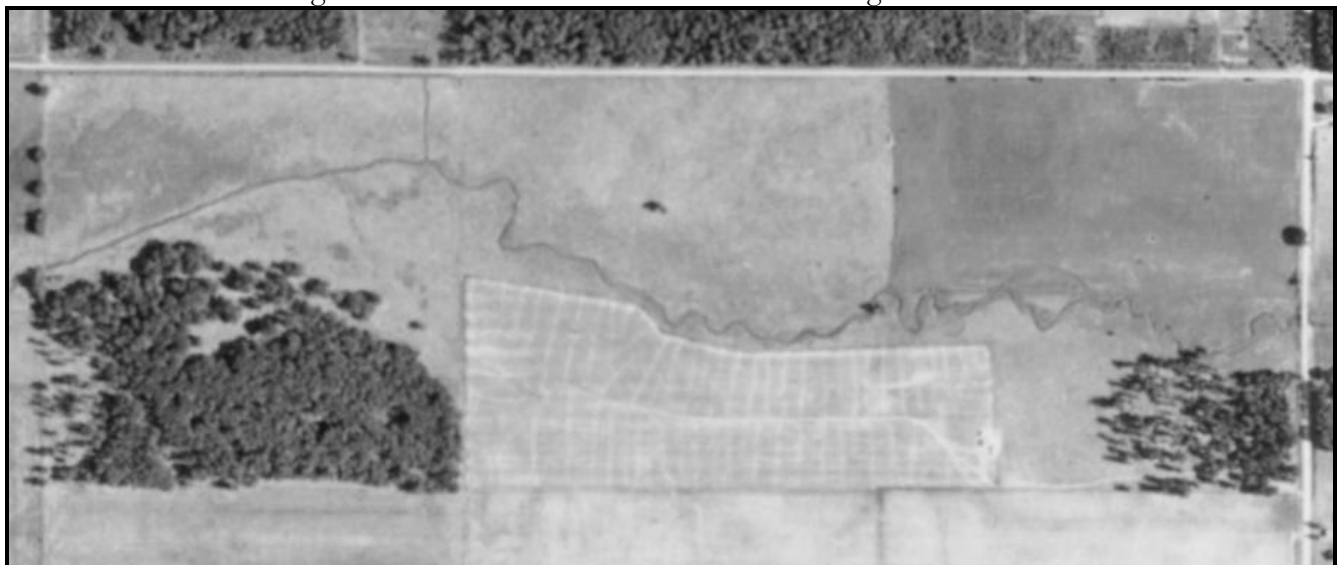


Figure 2. 1939 Aerial Image (source: Illinois Clearing House Historical Images).

Existing Land Cover/Land Use

The existing landscape is much different than first documented in the 1840's (Figure 3). Most of the area that was first described as "slough" (wet prairie/sedge meadow) is now wet old field dominated by invasive reed canary grass. Dominance by reed canary grass is likely a product of past attempts to farm the wet soils along Deer Creek. Second growth woodland dominated by non-native and/or invasive native trees and shrubs is now found south of Fowler Road. Pine plantations are also scattered throughout the areas south of Fowler Road.



Figure 3. Existing Aerial Image (source: Google Maps 2016).

2.0 VEGETATION COMMUNITY ASSESSMENT METHODS

Vegetation Community Inventory

Prior to the February 28, 2017 site visit, AES reviewed historic vegetation maps, historic and present day aerial photography, and the “Skare Park Restoration Masterplan” completed by Ecology + Vision, LLC (dated January 10th, 2013) for Flagg-Rochelle Community Park District.

An AES Senior Ecologist conducted a detailed onsite Vegetation Community Inventory for the approximately 50 acre area comprising the proposed Mitigation Bank on February 28, 2017. AES walked the entire site to accurately identify, map, compile dominant vegetation species lists, assess the condition of each existing vegetation community, and ultimately recommend restoration and management opportunities for each vegetation community. The quality ranking system is described in detail in Table 1.

Table 1. Quality ranking system for quality of existing natural vegetation communities.

Quality Rank	Condition	Description
1	Excellent	The native plant community is intact and has existed for decades to centuries. The community has species diversity typical of the natural community type with little to no invasion by non-native or invasive species and with no significant adverse human disturbances.
2	Fair	The native plant community is generally intact and has existed for decades to centuries. The community has species diversity that is lower than typical. Invasion by non-native or weedy species is generally moderate and there are obvious adverse human disturbances.
3	Poor	The historic native plant community is generally highly degraded or non-existent. The community retains few native species and may be secondary growth dominated by invasive native and/or non-native species. Human disturbances are generally high.
4	Cultural	The native plant community not longer exists and has been converted to “Cultural” uses by humans.

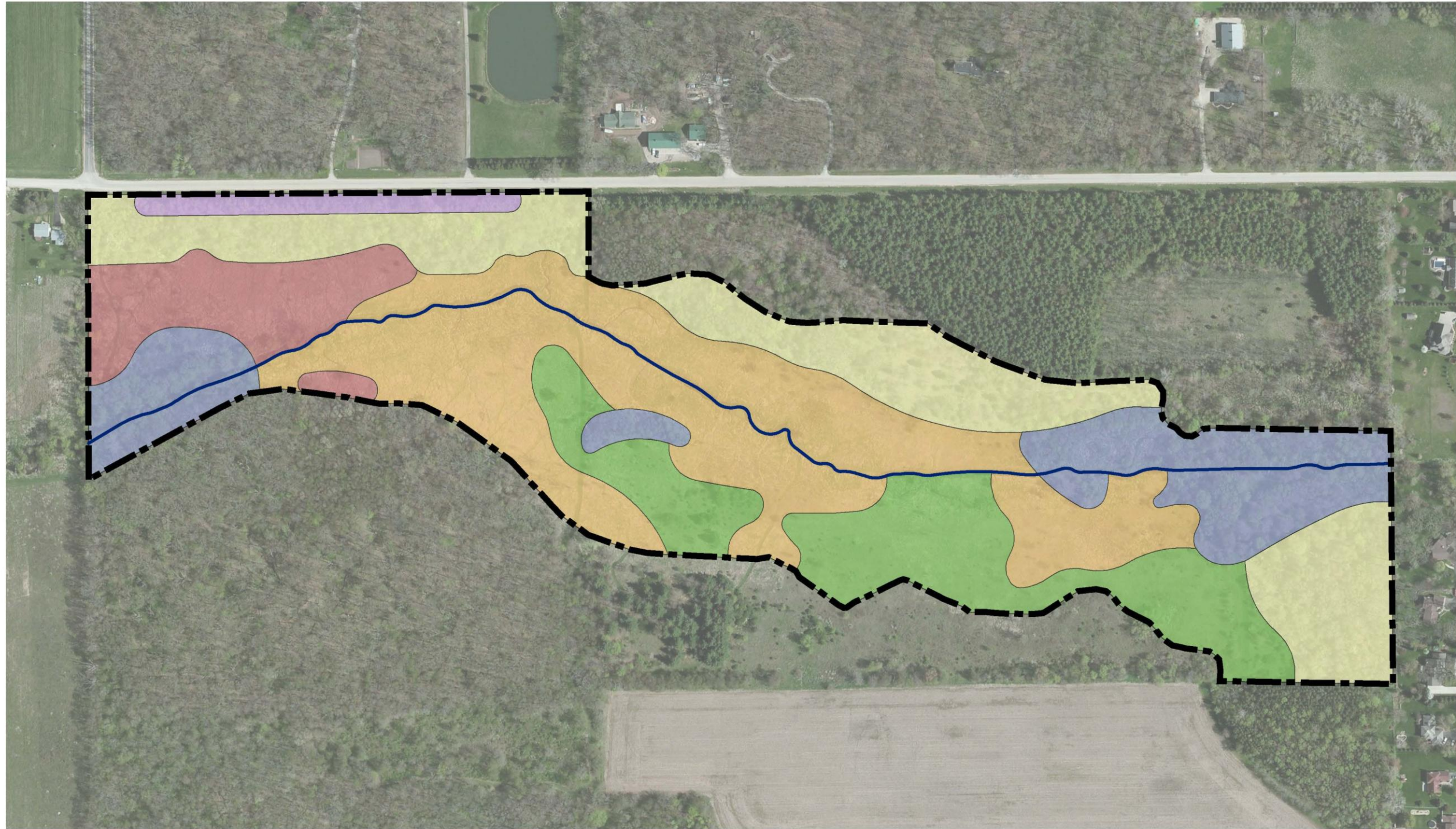
Based on the Vegetation Community Inventory conducted by AES on February 28, 2017, the proposed Skare Park Mitigation Bank site is comprised of 6 distinct vegetation communities, each in various locations and ecological quality (Table 2; Figure 4). Figure 5 depicts the “Restoration Target Community” for each of the 6 existing vegetation communities.

Table 2. Existing natural vegetaiotn communities summary table.

Exisitng Natural Community	Acres	Quality Rank	Restoration Target Community
Second Growth Floodplain Woodland	8.0 Ac	Quality 3 (Poor)	Floodplain Woodland/Savanna
Sedge Meadow	4.4 Ac	Quality 1 (Excellent)	Sedge Meadow
Second Growth Wet-Mesic Woodland	12.1 Ac	Quality 3 (Poor)	Wet-Mesic Woodland/Savanna
Pine Plantation	1.3 Ac	Quality 4 (Cultural)	Pine Plantation
Wet Old Field	17.0 Ac	Quality 3 (Poor)	Wet Prairie/Sedge Meadow
Wet-Mesic Old Field	9.0 Ac	Quality 3 (Poor)	Wet-Mesic Prairie

* Non-native and/or invasive species

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Legend

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| Mitigation Bank Boundary (51.8 Acres) | Second Growth Wet-Mesic Woodland (Quality 3, 12.1 Acres) |
| Deer Creek (3,745 LF) | Pine Plantation (Quality 4, 1.3 Acres) |
| Second Growth Floodplain Woodland (Quality 3, 8.0 Acres) | Wet Old Field (Quality 3, 17.0 Acres) |
| Sedge Meadow (Quality 1, 4.4 Acres) | Wet-Mesic Old Field (Quality 3, 9.0 Acres) |

500 250 0 500 Feet



Coordinate System:
Illinois State Plane E, NAD83 US Foot

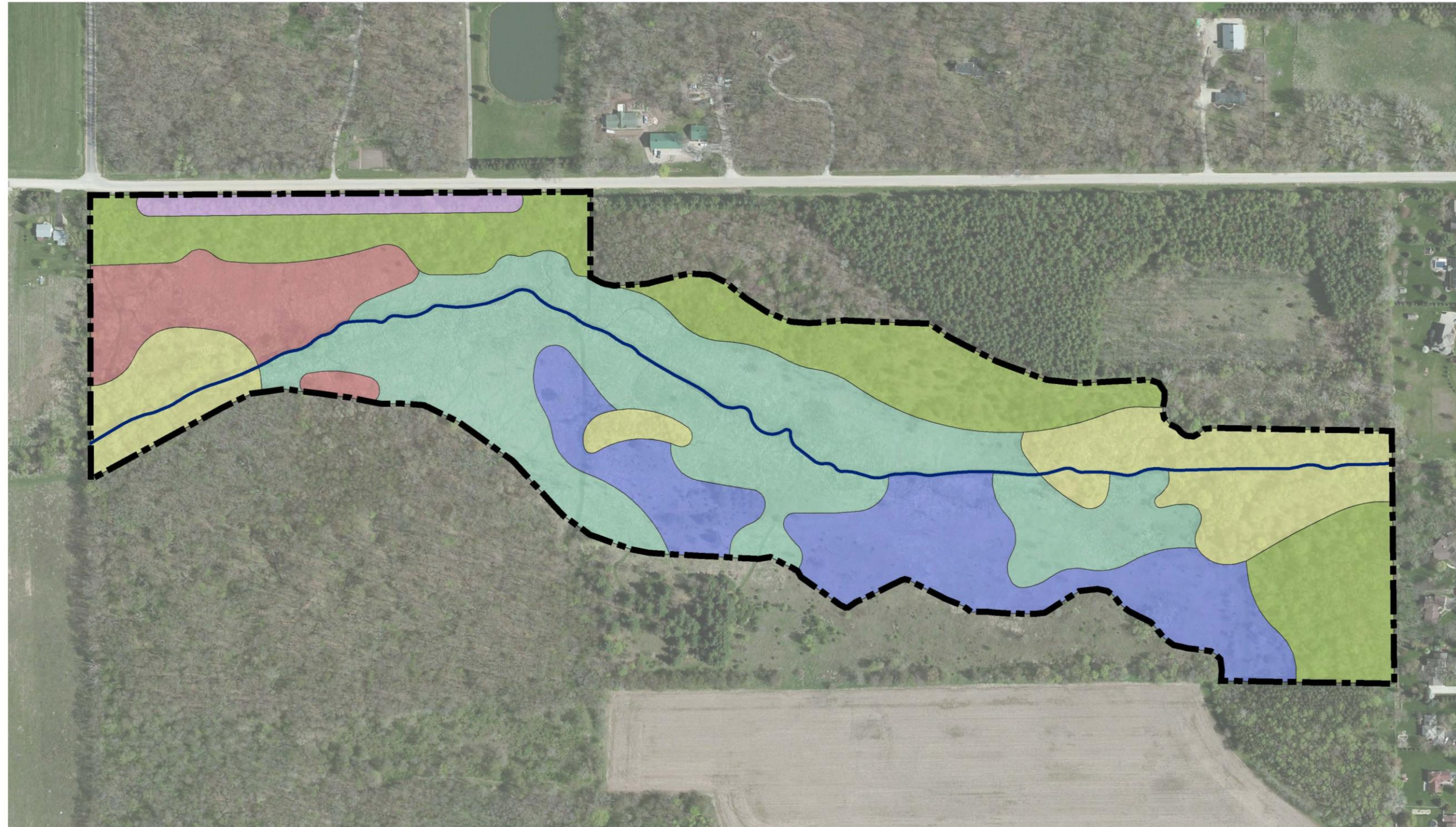
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 5: Skare Park Mitigation Bank
Restoration Existing Vegetation Community Map**

AES Project #: 17-0057
Date: 3/7/2017



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Legend

- | | |
|---|---|
| Mitigation Bank Boundary (51.8 Acres) | Wet-Mesic Woodland/Savanna (12.1 Acres) |
| Deer Creek (3,745 LF) | Pine Plantation (1.3 Acres) |
| Floodplain Woodland/Savanna (8.0 Acres) | Wet Prairie/Sedge Meadow (17.0 Acres) |
| Sedge Meadow (4.4 Acres) | Wet-Mesic Prairie (9.0 Acres) |



Coordinate System:
Illinois State Plane E, NAD83 US Foot

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Figure 5: Skare Park Mitigation Bank
Restoration Target Vegetation Community Map**

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3.0 VEGETATION COMMUNITIES, RESTORATION, & MANAGMENT

Second Growth Floodplain Woodland

Acres: 8.0

Quality Rank: 3 (Poor)

Dominant Species: box elder (*Acer negundo*), common buckthorn (*Rhamnus cathartica*), cockspur hawthorn (*Crategeous crus-galli*), red osier dogwood (*Cornus stolonifera*), garlic mustard (*Allaria petiolata*)

Other Common Species: Silver maple (*Acer saccharinum*), dead (EAB) green ash (*Fraxinus pennsylvanica*), European alder (*Alnus glutinosa*), swamp white oak (*Quercus bicolor*), Virginia wild rye (*Elymus virginicus*), black willow (*Salix nigra*), stickseed (*Hackelia virginiana*), white mulberry (*Morus alba*), American elm (*Ulmus Americana*), Pin oak (*Quercus palustris*), black walnut (*Juglans nigra*)

Restoration Target Community = Floodplain Woodland/Savanna: 1) Remove all non-native and invasive native shrubs (preserve hawthorn and dogwood) → 2) remove all non-native and invasive native trees (preserve silver maple and oak species) → 3) mow in preparation for herbicide treatment → 4) broadcast herbicide ground layer in preparation for seeding → 5) grub and drag soil then drill seed using the Floodplain Woodland/Savanna seed mixture.

5-Year Management & Monitoring: Mow twice during the first growing season and one time during the second growing season. Conduct two trips per year to spot herbicide herbaceous and woody invasives. Perform remedial interseeding if needed. Conduct controlled burn in spring of the fifth growing season. In addition, the area should be monitored by an Ecologist and reported on each year.

Conceptual Restoration Cost Estimate: \$156,000



Sedge Meadow

Acres: 4.4

Quality Rank: 1 (Excellent)

Dominant Species: Tussock sedge (*Carex stricta*), blue joint grass (*Calamagrostis Canadensis*), giant goldenrod (*Solidago gigantea*), spotted joe-pye-weed (*Eupatorium maculatum*), grass-leaved goldenrod (*Solidago graminifolia*), common mountain mint (*Pycnanthemum virginiana*), sneezeweed (*Helianium autumnali*), sawtooth sunflower (*Helianthus grosseserratus*), red-osier dogwood (*Cornus stolonifera*)

Other Common Species: Reed canary grass (*Phalaris arundinaceae*), common buckthorn (*Rhamnus cathartica*), cockspur hawthorn (*Crataegeous crus-galli*), box elder (*Acer negundo*)

Restoration Target Community = Sedge Meadow: 1) Remove all non-native and invasive native shrubs (preserve hawthorn and dogwood) → 2) spot herbicide (two trips) scattered reed canary grass stands → 3) prepare and interseed bare areas left my dead reed canary grass with the Wet Prairie/Sedge Meadow seed mixture.

5-Year Management & Monitoring: Conduct two trips per year to spot herbicide herbaceous and woody invasives. Perform remedial interseeding if needed. Conduct controlled burn in spring of the fifth growing season. In addition, the area should be monitored by an Ecologist and reported on each year.

Conceptual Restoration Cost Estimate: \$15,700



Second Growth Wet-Mesic Woodland

Acres: 12.1

Quality Rank: 3 (Poor)

Dominant Species: dead (EAB) green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), European alder (*Alnus glutinosa*), Japanese honeysuckle (*Lonicera japonica*), common buckthorn (*Rhamnus cathartica*), swamp white oak (*Quercus bicolor*), Pin oak (*Quercus palustris*), bur oak (*Quercus macrocarpa*), black cherry (*Prunus serotina*), cockspur hawthorn (*Crategeous crus-galli*), garlic mustard (*Allaria petiolata*), wood avens (*Geum canadensis*)

Other Common Species: Eastern cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), cedar (*Cedrus sp.*), black walnut (*Juglans nigra*), silver maple (*Acer saccharinum*), white mulberry (*Morus alba*), hackberry (*Celtis occidentalis*), white pine (*Pinus strobus*), shagbark hickory (*Carya ovata*), Virginia wild rye (*Elymus virginicus*)

Restoration Target Community = Wet-Mesic Woodland/Savanna: 1) Remove all non-native and invasive native shrubs (preserve cockspur hawthorn) → 2) remove all non-native and invasive native trees (preserve oak species, sycamore, black walnut, white pine, and hackberry) → 3) mow in preparation for herbicide treatment → 4) broadcast herbicide ground layer → 5) grub and drag soil then seed using the Wet-Mesic Woodland/Savanna seed mixture.

5-Year Management & Monitoring: Mow twice during the first growing season and one time during the second growing season. Conduct two trips per year to spot herbicide herbaceous and woody invasives. Perform remedial interseeding if needed. Conduct controlled burn in spring of the fifth growing season. In addition, the area should be monitored by an Ecologist and reported on each year.

Conceptual Cost Estimate: \$235,950



Pine Plantation

Acres: 1.3

Quality Rank: 4 (Cultural)

Dominant Species: White pine (*Pinus strobus*)

Other Common Species: Not applicable

Restoration Target Community = Pine Plantation: No restoration recommended

5-Year Management & Monitoring: No management recommended

Conceptual Cost Estimate: Not applicable

Wet Old Field

Acres: 17.0

Quality Rank: 3 (Poor)

Dominant Species: Reed canary grass (*Phalaris arundinacea*), sandbar willow (*Salix interior*),

Other Common Species: tussock sedge (*Carex stricta*), Canada goldenrod (*Solidago Canadensis*), sawtooth sunflower (*Helianthus grosseserratus*), European alder (*Alnus glutinosa*), Japanese honeysuckle (*Lonicera japonica*), common buckthorn (*Rhamnus cathartica*), red-osier dogwood (*Cornus stolonifera*), box elder (*Acer negundo*)

Restoration Target Community = Wet Prairie/Sedge Meadow: 1) Remove all non-native and invasive native shrubs using forestry mower (preserve hawthorn and dogwood) → 2) remove all scattered non-native and invasive native trees → 3) grade/spread all existing spoil piles along Deer Creek and grade all eroded rivulets → 4) prescribed burn in spring to remove dead thatch in preparation for herbicide treatment → 5) broadcast herbicide ground layer in spring and fall → 6) mow in fall in preparation for fall seeding → 8) drill seed in fall using the Wet Prairie/Sedge Meadow seed mixture. ***Note: at least one growing season is required to prepare the wet prairie/sedge meadow areas for seeding.***

5-Year Management & Monitoring: Mow twice during the first growing season and one time during the second growing season. Conduct two trips per year to spot herbicide herbaceous and woody invasives. Perform remedial interseeding if needed. Conduct controlled burn in spring of the fifth growing season. In addition, the area should be monitored by an Ecologist and reported on each year.

Conceptual Cost Estimate: \$213,300



Wet-Mesic Old Field

Acres: 9.0

Quality Rank: 3 (Poor)

Dominant Species: Canada goldenrod (*Solidago canadensis*), grey dogwood (*Cornus racemosa*), Japanese honeysuckle (*Lonicera japonica*), European alder (*Alnus glutinosa*), Kentucky bluegrass (*Poa pratensis*), Canada thistle (*Cirsium arvense*)

Other Common Species: Meadow sedge (*Carex granularis*), wild bergamot (*Monarda fistulosa*), box elder (*Acer negundo*), Reed canary grass (*Phalaris arundinaceae*), dead (EAB) green ash (*Fraxinus pennsylvanica*), white pine (*Pinus strobes*)

Restoration Target Community = Wet-Mesic Prairie: 1) Remove all non-native and invasive native shrubs (preserve hawthorn) → 2) remove all scattered non-native and invasive native trees (preserve white pine and oak species) → 3) prescribed burn in spring to remove dead thatch in preparation for herbicide treatment → 4) broadcast herbicide ground layer in spring → 5) drill seed in spring using the Wet-Mesic Prairie seed mixture.

5-Year Management & Monitoring: Mow twice during the first growing season and one time during the second growing season. Conduct two trips per year to spot herbicide herbaceous and woody invasives. Perform remedial interseeding if needed. Conduct controlled burn in spring of the fifth growing season. In addition, the area should be monitored by an Ecologist and reported on each year.

Conceptual Cost Estimate: \$62,100



4.0 RECOMMENDED NATIVE SEED MIXTURES

FLOODPLAIN WOODLAND/SAVANNA SEED MIXTURE (8.0 Acres)

Scientific name	Common Name	Oz./Acre	Total lbs./Acre
Grasses & Sedges:			
<i>Carex lupulina</i>	Common hop sedge	14.5	
<i>Carex scoparia</i>	Pointed broom sedge	2.2	
<i>Carex vulpinoidea</i>	Brown fox sedge	1.9	
<i>Cinna arundinacea</i>	Common wood reed	2.3	
<i>Glyceria striata</i>	Fowl mana grass	2.3	
<i>Elymus riparius</i>	Riverbank wild rye	52.3	
<i>Leersia oryzoides</i>	Rice cut grass	2.2	
<i>Panicum virgatum</i>	Switch grass	23.2	
Total Grasses & Sedges		100.9	6.3
Forbs:			
<i>Asclepias incarnata</i>	Swamp milkweed	11.5	
<i>Aster novae-angliae</i>	New England aster	1.3	
<i>Aster lateriflorus</i>	Side-flowering aster	1.3	
<i>Bidens cernua</i>	Swamp bur marigold	3.6	
<i>Iris virginica</i>	Blue flag iris	30.7	
<i>Lobelia cardinalis</i>	Cardinal flower	0.2	
<i>Lobelia siphilitica</i>	Great blue lobelia	0.2	
<i>Penstemon digitalis</i>	Foxglove beard tongue	1.1	
<i>Rudbeckia laciniata</i>	Wild golden glow	5.9	
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed Susan	1.7	
<i>Rudbeckia triloba</i>	Brown eyed susan	2.4	
<i>Zizia aurea</i>	Golden Alexanders	8.7	
Total Forbs		68.7	4.3
Total All Species		169.6	10.6
Temporary Cover Crop:			
<i>Avena sativa</i>	Common oats	240.0	15.0
<i>Elymus virginicus</i>	Virginia wild rye	64.0	4.0

WET-MESIC WOODLAND/SAVANNA SEED MIXTURE (12.1 Acres)

Scientific name	Common Name	Oz./Acre	Total lbs./Acre
Grasses & Sedges:			
<i>Andropogon gerardii</i>	Big bluestem	31.9	
<i>Bromus pubescens</i>	Woodland brome	16.0	
<i>Cinna arundinacea</i>	Common wood reed	2.3	
<i>Glyceria striata</i>	Fowl mana grass	0.9	
<i>Elymus hystrix</i>	Bottlebrush grass	41.8	
<i>Elymus vilosus</i>	Silky wild rye	16.8	
<i>Panicum virgatum</i>	Switch grass	21.8	
<i>Sorghastrum nutans</i>	Indian grass	24.6	
Total Grasses & Sedges		156.1	9.8
Forbs:			
<i>Allium cernuum</i>	Nodding wild onion	6.8	
<i>Aquilegia canadensis</i>	Wild columbine	2.8	
<i>Aster lateriflorus</i>	Side-flowering aster	0.8	
<i>Aster saggitifolius</i>	Arrow-leaved aster	0.6	
<i>Campanula americana</i>	Tall bellflower	1.1	
<i>Desmodium glutinosum</i>	Pointed tick trefoil	5.8	
<i>Eupatorium purpureum</i>	Purple joe-pye-weed	3.3	
<i>Lobelia cardinalis</i>	Cardinal flower	0.2	
<i>Lobelia siphilitica</i>	Great blue lobelia	0.2	
<i>Penstemon digitalis</i>	Foxglove beard tongue	0.9	
<i>Rudbeckia triloba</i>	Brown eyed susan	3.2	
<i>Solidago flexicaulis</i>	Broad-leaved goldenrod	0.9	
<i>Solidago ulminifolia</i>	Elm-leaved goldenrod	0.6	
<i>Zizia aurea</i>	Golden Alexanders	6.5	
Total Forbs		33.8	2.1
Total All Species		189.8	11.9
Temporary Cover Crop:			
<i>Avena sativa</i>	Common oats	240.0	15.0
<i>Elymus canadensis</i>	Canada wild rye	32.0	2.0
<i>Elymus virginicus</i>	Virginia wild rye	32.0	2.0

WET PRAIRIE/SEDGE MEADOW SEED MIXTURE (17.0 Acre)

Scientific name	Common Name	Oz./Acre	lbs./Acre
Grasses, Rushes & Sedges:			
<i>Andropogon gerardii</i>	Big bluestem	6.4	
<i>Carex comosa</i>	Bristly sedge	1.3	
<i>Carex scoparia</i>	Pointed broom sedge	2.2	
<i>Carex vulpinoidea</i>	Brown fox sedge	1.5	
<i>Glyceria striata</i>	Fowl mana grass	0.9	
<i>Juncus dudleyi</i>	Dudley's rush	0.2	
<i>Juncus effusus</i>	Common rush	0.2	
<i>Juncus torreyi</i>	Torrey's rush	0.2	
<i>Leersia oryzoides</i>	Rice cut grass	2.2	
<i>Panicum virgatum</i>	Switch grass	21.8	
<i>Scirpus atrovirens</i>	Dark green rush	0.4	
<i>Spartina pectinata</i>	Prairie cord grass	6.6	
Total Grasses, Rushes & Sedges		43.9	2.7
Forbs:			
<i>Alisma subcordatum</i>	Common water plantain	0.9	
<i>Asclepias incarnata</i>	Swamp milkweed	11.5	
<i>Aster novae-angliae</i>	New England aster	1.3	
<i>Bidens cernua</i>	Swamp bur marigold	3.6	
<i>Boltonia asteroides</i>	False aster	0.2	
<i>Eupatorium perfoliatum</i>	Common boneset	0.4	
<i>Eupatorium maculatum</i>	Spotted joe-pye-weed	0.6	
<i>Helenium autumnale</i>	Sneezeweed	0.6	
<i>Lobelia siphilitica</i>	Great blue lobelia	0.2	
<i>Lycopus americanus</i>	Water horehound	0.1	
<i>Mimulus ringins</i>	Monkey flower	0.2	
<i>Penthorum sedoides</i>	Ditch stonecrop	0.2	
<i>Physostegia virginiana</i>	Obedient plant	2.1	
<i>Pycnanthemum virginianum</i>	Common mountain mint	0.2	
<i>Solidago graminifolia</i>	Grass-leaved goldenrod	0.3	
<i>Solidago riddellii</i>	Riddell's goldenrod	0.8	
<i>Veronia fasciculata</i>	Common ironweed	2.0	
<i>Verbena hastata</i>	Blue vervain	0.4	
Total Forbs		25.6	1.6
Total All Species		69.5	4.3
Temporary Cover Crop:			
<i>Avena sativa</i>	Common oats	240.0	15.0
<i>Elymus virginicus</i>	Virginia wild rye	64.0	4.0

WET-MESIC PRAIRIE SEED MIXTURE (9.0 Acres)

Scientific name	Common Name	Oz./Acre	lbs./Acre
Grasses, Rushes & Sedges:			
<i>Andropogon gerardii</i>	Big bluestem	38.3	
<i>Carex scoparia</i>	Pointed broom sedge	0.9	
<i>Carex vulpinoidea</i>	Brown fox sedge	1.0	
<i>Glyceria striata</i>	Fowl mana grass	0.7	
<i>Juncus dudleyi</i>	Dudley's rush	0.2	
<i>Panicum virgatum</i>	Switch grass	110.5	
<i>Scirpus atrovirens</i>	Dark green rush	0.4	
<i>Sorghastrum nutans</i>	Indian grass	24.6	
<i>Spartina pectinata</i>	Prairie cord grass	8.3	
Total Grasses, Rushes & Sedges		185.0	11.6
Forbs:			
<i>Asclepias incarnata</i>	Swamp milkweed	5.8	
<i>Bidens cernua</i>	Swamp bur marigold	3.6	
<i>Cassia hebecarpa</i>	Wild senna	7.3	
<i>Coreopsis tripteris</i>	Tall coreopsis	3.7	
<i>Aster novae-angliae</i>	New England aster	1.4	
<i>Echinacea purpurea</i>	Purple coneflower	7.9	
<i>Eryngium yuccifolium</i>	Rattlesnake master	6.5	
<i>Helenium autumnale</i>	Sneezeweed	0.4	
<i>Lobelia siphilitica</i>	Great blue lobelia	0.2	
<i>Monarda fistulosa</i>	Wild bergamot	0.7	
<i>Penstemon digitalis</i>	Foxglove beard tongue	0.7	
<i>Physostegia virginiana</i>	Obedient plant	2.1	
<i>Pycnanthemum virginianum</i>	Common mountain mint	0.2	
<i>Ratibida pinnata</i>	Yellow coneflower	3.1	
<i>Rudbeckia hirta</i>	Black eyed Susan	1.0	
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed Susan	1.7	
<i>Solidago graminifolia</i>	Grass-leaved goldenrod	0.2	
<i>Solidago riddelli</i>	Riddell's goldenrod	0.8	
<i>Veronia fasciculata</i>	Common ironweed	2.0	
<i>Zizia aurea</i>	Golden Alexanders	4.4	
Total Forbs		53.6	3.3
Total All Species		238.5	14.9
Temporary Cover Crop:			
<i>Avena sativa</i>	Common oats	240.0	15.0
<i>Elymus canadensis</i>	Canada wild rye	32.0	2.0
<i>Elymus virginicus</i>	Virginia wild rye	32.0	2.0