

**ENVIRONMENTAL ASSESSMENT
for
Blodgett Road and South Patrol Road Wetlands Restoration**

**MIDEWIN NATIONAL TALLGRASS PRAIRIE
Will County, Illinois**

September 15, 2000

Responsible Agency: USDA Forest Service, Midewin National Tallgrass Prairie

Responsible Official: Frank Koenig, Prairie Supervisor
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**United States
Department of
Agriculture**

**Forest
Service**

**Midewin National
Tallgrass Prairie**

**30071 South State
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File Code: 1950

Date: September 15, 2000

Dear Friends of Midewin,

The draft environmental assessment for the proposed proposed wetlands restoration at Blodgett Road and South Patrol Road sites is now available for public review and comment over the next 30 days. The environmental assessment will be available at Midewin's website <http://www.fs.fed.us/mntp>. For hardcopy of a copy of the environmental assessment or additional information, please call Renee Thakali at (815) 423-6370.

The proposal includes disabling drain tiles and filling in ditches to restore the hydrology, removing non-native trees, and planting the sites with appropriate native wetland and prairie plants. The two proposed wetland restoration sites are located on Midewin National Tallgrass Prairie in Will County approximately 4 miles north of Wilmington, Illinois.

On May 20, 1999 Midewin National Tallgrass Prairie initiated a public comment period to scope for issues regarding the proposed wetlands restoration. The scoping period ended June 30, 1999. Public comments received were used to identify significant issues, mitigation measures, and to craft the alternatives.

The 30 day public comment period for this environmental assessment closes on October 20, 2000. Responses to all public comments on the draft Environmental Assessment will be a part of the final Environmental Assessment. A final Environmental Assessment, a Finding of No Significant Impact, and a Decision Notice will be published after considering all public comments received.

As the Prairie Supervisor, I am the Forest Service deciding official for this project. Please send all written comments to me on or before October 20, 2000. Thank you for providing your comments on this environmental assessment.

Sincerely,

Frank Koenig
Prairie Supervisor

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PROJECT SCOPE

Introduction

This site-specific environmental assessment (EA) documents the potential environmental effects of proposed wetlands restoration at two sites on Midewin National Tallgrass Prairie. This EA was prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts and any irreversible or irretrievable commitment of resources that would result from the proposed action and alternatives.

The Interdisciplinary Team used a systematic approach for analyzing the proposed project and alternatives to it, estimating the environmental effects, and preparing this EA. The planning process complies with NEPA and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508). An environmental assessment is "a concise public document... that serves to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" (40 CFR 1508.9). The background analysis and reports are located in the project record.

Project Location

The project area is located on 730 acres of the western portion of Midewin National Tallgrass Prairie, 15 miles south of Joliet and 4 miles north of Wilmington, Illinois. The Blodgett Road site covers 271 acres in Section 34, T34N, R9E in Channahon Township, in Grant Creek watershed. This site borders private property on Midewin's western boundary. The South Patrol Road site covers 459 acres in Sections 13 and 14, T33N, R9E, Wilmington Township, and lies within the Prairie Creek watershed.

Proposed Action

Blodgett Road Site

The proposed action is to restore 60 acres of wet dolomite prairie, and 137 acres of mesic (moderately moist soils) dolomite prairie, and enhance 74 acres of existing wetlands as a model for other restoration projects. The majority of the project would consist of returning the land surface to original conditions through filling or obliteration of ditches and drain tiles that currently exist. In addition, about 28 acres of brush and wooded fencerows would be cleared to open up the habitat, restore the hydrology, and return the site to a more natural condition. Once the hydrology is restored, the area would be seeded and planted with appropriate native species.

South Patrol Road Site

The proposed action is to restore 410 acres of wet prairie and sedge meadow community and 49 acres of mesic prairie community. (Note: The proposed action map that was part of the scoping letter mistakenly included 100 acres of land that will be managed as seedbeds for Midewin. The proposed action described here does not include the future seedbed area.) The majority of the project will consist of returning the original hydrology of the land through filling of ditches and the destruction of drain tiles throughout the area. Over 14,000 linear feet of drain tile are known to exist in the area, and it is likely that more than 30,000 tiles exist. Thirty-six acres of brush and

wooded fencerows would be cleared to open up the habitat, restore the hydrology, and return the site to a more natural condition. Once the hydrology is restored, the area would be seeded and planted with appropriate native species. Because the site is so large, the proposed restoration would be implemented in three sections, from east to west.

Both Blodgett Road and South Patrol Road sites will be continually managed and monitored after completion of the initial prairie restoration activities.

More specific details on the proposed action and alternatives is contained in Section 2 - Alternatives of this EA.

Relationship to Management Plans

The Land and Resource Management Plan (LRMP) for Midewin National Tallgrass Prairie is currently under development. Under the enabling legislation (PL 104-106 Illinois Land Conservation Act, 1996) the Forest Service may conduct management activities on the Prairie prior to completion of a Land and Resource Management Plan. Wetlands restoration is one of the interim projects listed in the "*Notice of Intent to Prepare an Environmental Impact Statement for the Land and Resource Management Plan*," June 1998, as needing to be implemented pending compliance with the following criteria:

1. Forest Service must determine that the environmental conditions of the site meet the standards necessary for that activity.
2. The activity does not interfere with Army cleanup operations.
3. The activity does not represent an irrevocable commitment of resources, unless it is necessary for safety or resource protection.
4. The activity represents a valid, existing right as provided by legislation.

This environmental analysis addresses the four criteria above in Applicable Laws and Plans.

The "Analysis of the Management Situation", July 1999, outlined specific planning criteria and decision criteria that are being used to develop and evaluate alternatives to the Plan. These include but are not limited to:

- Manage for large unfragmented habitats
- Maintain/increase ecosystems for threatened, endangered and sensitive species
- Manage for a diversity of plants and animals
- Use an adaptive management approach using different techniques and monitor the results
- Gradually phase out cultivated row crops within 20 years and begin restoration to prairie ecosystem habitats
- Recreation activities and facilities should promote knowledge, awareness and understanding of prairie ecosystems
- Maintain or increase acres of wetlands

As outlined in the Analysis of the Management Situation a minimum level of wetlands restoration that would be considered for the Prairie Plan is 1,076 acres, with a maximum of 6,968 acres.

Purpose and Need for Action

The primary purposes of the Midewin National Tallgrass Prairie as outlined in the Illinois Land Conservation Act:

1. To manage the land and water resources to conserve and enhance the native populations of fish, wildlife and plants.
2. To provide scientific, environmental and land use education and research.
3. To allow continuation of agriculture uses over the next 20 years, and
4. To provide a variety of recreation opportunities that are not inconsistent with the preceding purposes.

Wetlands provide important fish and wildlife habitat, water quality, groundwater recharge, and flood control benefits across the watersheds at Midewin. As described above, the first of the four purposes for which Midewin was established, is to manage the land and water resources of Midewin in a manner that will conserve and enhance the native populations of fish, wildlife, and plants. Past activities (including planting of non-native species and drainage of wet areas) have changed the character of the land. Based on soils considered to be hydric, over 40% of Midewin may have been wetlands prior to 1830. Today only remnants of former wetlands remain, due to draining fields by ditches and installation of field tiles. Currently, approximately 7 percent (1,120 acres) of lands at Midewin meet the US Fish and Wildlife Service wetland definition ranging from streams and marshes to open water ponds. The existing marshes and sedge meadows remaining at Midewin have been heavily disturbed by farming and grazing. Enhancing the native populations will require activities to restore the land to a character more similar to its past, including wetlands restoration.

The 1999 Chicago Wilderness Biodiversity Recovery Plan, lists Dolomite Prairie as the highest priority for conservation targets in the prairie community, since this is the rarest prairie type and the region has already suffered a tremendous loss. The Biodiversity Plan also recommends restoration of degraded wetlands due to the high value of these communities both for species diversity and for ecological processes. It also states that "natural hydrology needs to be restored and other threats such as invasive species need to be controlled in order to maintain healthy communities."

A survey and inventory of wetland resources at Midewin was completed by The Wetlands Initiative, 1999 and summarized in a report, "Wetlands Restoration Plan" that identifies 110 sites on Midewin which have potential for wetlands restoration. (Note: Site 16 will be referred to as Blodgett Road and Site 30 as South Patrol Road throughout the remainder of this document.)

The purpose and need for this project is to enhance the native populations of wetland and prairie species at Midewin in the Blodgett Road and South Patrol Road areas. These two areas are the highest priority areas needing wetland restoration identified by the Forest Service based on the following criteria:

- Presence of drained hydric soils with tile or open drainage systems discharging into a stream or tributary
- Water quality and habitat improvement potential
- Soils and/or historical data indicating hydrologic conditions
- No hazardous wastes on site.
- Presence of dolomitic prairie soil.
- Presence of native vegetative communities.

Other considerations included access to the sites for restoration equipment, seasonal moisture levels, and impacts to other species if the site was restored.

The process of returning these sites to native wetland and prairie species takes time. Thus it is important to begin this process on the highest priority sites soon. These two sites are both planned for restoration in all of the action alternatives being considered in the Midewin Land and Resource Management Plan currently being developed. The Blodgett Road site (271 acres) is a rare dolomite

prairie ecosystem that was formerly planted to agriculture crops through 1998. This site has the greatest potential in the lower Des Plaines river valley for restoration of this rare prairie habitat. The site at South Patrol Road (459 acres) has the largest contiguous tract of hydric soils (former wetlands) on Midewin, and once restored would provide enhanced habitat for grassland birds, and State-listed and Regional Forester sensitive species.

Project Objectives

The interdisciplinary team identified the following objectives of the wetlands restoration project:

1. Conserve/enhance native vegetation and wildlife as directed in Midewin's enabling legislation.
2. Provide potential habitat for Regional Forester sensitive species and state listed species.
3. Increase wetlands at Midewin.
4. Control exotic and invasive plant species.
5. Reduce soil erosion and runoff of nonpoint source pollution (from pesticides and fertilizers used in agriculture row crops by converting from row crops to native wetlands).
6. Provide Midewin visitors learning opportunities about wetlands restoration.

Desired Future Condition

Once restored, the former cropland on both sites would return to a mosaic of native prairie and wetland habitats similar to that found in nearby native prairies. Existing wetlands and prairie will also be enhanced. Wetlands hydrology throughout the area will be restored. Restoration of wetlands on both sites will provide improved habitat for prairie and wetland wildlife, including Illinois threatened and endangered species and Regional Forester sensitive species. The Blodgett Road site will be restored to dolomite prairie/sedge meadow based on existing vegetative communities found at nearby Grant Creek and Drummond prairies in similar soil types. The South Patrol Road site will be restored to wet and mesic prairie (prairies on moist but well drained soils), and sedge meadow species.

Figure 1. Current Condition and Desired Condition

BLODGETT ROAD SITE	
Current Condition	Desired Condition
74 acres Wetland	74 acres Wetlands
19 acres Prairie	127 acres Mesic Dolomite Prairie restored
21 acres Trees/Brush	10 acres Trees/Brush
20 acres Woody Fencerows	0 acres
110 acres Former Cropland	60 acres Wet Dolomite Prairie restored
27 acres Pasture	0 acres
271 acres	271 acres
SOUTH PATROL ROAD SITE	
Current Condition	Desired Condition
18 acres Wetland/Wet Prairie	400 acres Wet Prairie/Sedge meadow restored
17 acres Grassland/Prairie	49 acres Mesic Prairie restored
16 acres Trees/Brush/	10 acres - Trees/Brush

20 acres Woody Fencerows	0 acres
388 acres Former Cropland	0 acres
459 acres	459 acres

Current Condition

The Blodgett Road site (271 acres) has poorly drained, shallow soils over dolomite bedrock that still support small areas of wet dolomite and mesic prairie. Approximately 110 acres of this site was under Forest Service Agriculture Special Use Permit until 1998, and then allowed to go fallow. It was mowed in 1999 to control noxious weeds. About 93 acres of the site currently support remnant prairies and wetlands. Brush and woody fencerows cover approximately 16% of this site, with 17% in exotic grassland species. There are three drainage ditches crossing the site, one of which is a major stormwater ditch from adjacent lands that cannot be modified as part of this project.

South Patrol Road (459 acres) -Approximately 388 acres of the The South Patrol Road site was in soybeans under Forest Service Agriculture Special Use Permit through 1999. The site is now fallow. Thirty-six acres (6%) of the site consist of low quality woodlands and fencerows typically dominated by Osage orange, Eastern cottonwood, red haw, multiflora rose and hackberry. The small pasture area (17 acres) is dominated by exotic pasture grasses, while the remnant wetlands (18 acres) supports some native grasses, sedges, and forbs. It is estimated that over 30,000 linear feet of clay and plastic tiles drain the site. A major drainage ditch runs 7300 feet through the project area.

Decision To Be Made

The Prairie Supervisor will decide whether or not to restore the two wetland/prairie sites at Blodgett Road and South Patrol Road. If the decision is made to restore the sites, it will also determine how the restoration would occur. If approved, project implementation would begin on or about November 2000, and planting and maintenance activities would continue during the next five years.

Public Involvement Summary

Public involvement for this proposed action began in May 1999. The interdisciplinary team contacted approximately 1,600 interested parties on May 20, requesting comments on the proposed wetland restoration project. The scoping letter invited people on a tour of the proposed project at Midewin, and fifteen people participated on the field trip on June 15, 1999. Eighteen written comments were received.

Significant Issues

Significant issues and other concerns related to the proposed action were identified by reviewing appropriate source materials being used to develop the Land and Resource Management Plan, and by internal scoping to identify site-specific issues and concerns. Comments received in response to the Proposed Action were reviewed to help determine significant issues related to the Proposed Action (40 CFR 1501.7). The issues were used to formulate alternatives, prescribe mitigation measures and as a basis for analyzing effects.

Scoping is an early and open process used to determine the scope of issues and significant issues related to the effects of the proposed action. The following issues were identified as significant for this proposal:

Ecological Condition: This issue is related to whether the proposed restoration would result in moving the natural communities toward the desired condition and whether existing remnant communities of native plants and threatened or sensitive species would be affected by restoration activities.

Hazardous Materials: Potential contaminants from Army land that is still hazardous, may have migrated downstream to the wetland restoration sites via ditches or through groundwater, and may adversely impact plants or animals on the wetlands to be restored. Restoration activities should comply with contaminant remediation goals currently being developed for Midewin. All ground disturbing activities at Midewin must be approved by the USDA and Forest Service Regional Forester while Midewin is still under a "No Ground Disturbance Moratorium".

Cultural Resources: Restoration activities must consider the impacts on cultural resources if present.

Economics. The cost of the restoration methods.

Compliance with other Laws and Plans: The proposed action must comply with the four criteria for interim projects prior to completion of a Land and Resource Management Plan as listed in the *Notice of Intent for the Midewin Land and Resource Management Plan* and described on page 1 of this document, and with all applicable federal laws, regulations and orders.

Hydrology. Filling ditches and removing drain tiles on the restoration sites must consider potential hydrologic effects to adjacent lands not owned by the Forest Service.

Recreation: Future access to trail corridors and Blodgett Road may be prevented or limited by wetlands restoration on these sites. Completed restoration sites may be good sites for interpretation and may be interesting to prairie visitors.

2. ALTERNATIVES

Actions Common to all Action Alternatives

The following activities are similar for all action alternatives: The South Patrol Road site would be implemented in three phases from east to west, with phase 1 beginning in Year 1, phase II in Year II, and phase III in Year III. Land-disturbing activities, e.g. removal of drain tile, excavation or fill, and obliteration of fence-rows would occur before planting.

Planting Prescription and Strategy

An appropriate mix of native species will be used for restoration planting. Only seeds and plants grown from seed that originated from nearby provenances will be used. See Appendix for a list of plant species. Planting techniques used will include broadcast seeding, seed drilling, and hand or mechanical planting of plugs. Depending upon seed availability and planting survival during the first several years, the sites will be re-planted and overseeded as needed over the next few years to improve species composition and diversity.

Continued Maintenance

The restored vegetation would be managed by mowing, prescribed burning, hand pulling and cutting of noxious weeds and invasive plant species. Appropriate documentation and burn plans

would be prepared and followed by qualified fire personnel for prescribed burns.

Adaptive Management

The restoration process will take several years. This is the first large wetland restoration project to be undertaken at Midewin. Changes to the restoration strategy and maintenance may be made if new and appropriate techniques become available, or if monitoring suggests needed changes.

Alternative 1- Proposed Action

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh. Native vegetation remnants (approximately 130 acres) will not be rehabilitated or enhanced.

Blodgett Road

Tree Removal

All trees and brush growing along ditches or in old fence rows would be mechanically cleared, or cut and removed by hand where heavy equipment cannot be used. Brush piles would be burned. Trees and other woody plants growing in or adjacent to wetlands and prairie remnants would not be removed.

Hydrology Restoration

Any drain tiles found on site would be permanently disabled to restore the hydrology. The two drainage ditches would be filled with local soil.

Planting Prescription and Strategy

Planting would be as described above in Actions Common to All Action Alternatives.

South Patrol Road

Tree Removal

All trees and brush growing in old fence rows and along drainage ditches would be mechanically cleared to allow access to the ditches, open up large areas of grassland habitat, and to remove exotic and invasive species from the area. Brush piles would be burned.

Hydrology Restoration

All existing drain tiles would be permanently disabled. The main east-west drainage ditch would be filled in with sidecast soil from the banks from surrounding areas.

Planting Prescription and Strategy

Planting would be as described above in Actions Common to All Action Alternatives.

Continued Maintenance for both sites

As described above in Actions Common to All Action Alternatives.

Alternative 2 - (Restoration with Control Valves on All Drain Tiles)

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh.

There will be limited rehabilitation and enhancement of approximately 130 acres of native vegetation remnants by removal of exotic species and prescribed burning. Native woody species will not be removed.

Blodgett Road

Tree Removal

Trees and brush from old fencerows and ditches would be selectively removed. Only exotic trees along edges of existing wetlands would be girdled (removing bark around the circumference of trees) and the dead trees left standing. Native trees species would remain. Exotic trees and shrubs growing in existing prairies would be girdled. No trees would be removed along the levee and ditch that runs parallel to Blodgett Road.

Hydrology Restoration

Any drain tiles located would be fitted with control valves and seasonally opened and closed to allow manipulation of vegetation, whether native or invasive species, through control of moisture levels. Ditches would be partially blocked or filled to permit continued use of drain tiles or allowed to slowly fill in over time where no drain tiles are connected.

Planting prescription and strategy

Planting activities would be the same as described above in Actions Common to All Action Alternatives and the same as described in Alternative 1.

South Patrol Road

Tree Removal

Exotic trees and shrubs growing in old fence rows and along drainage ditches would be selectively removed by girdling. Trees growing within and around old homesites would not be removed.

Hydrology Restoration

All drain tiles would be fitted with control valves and seasonally opened and closed to allow manipulation of vegetation, whether native or invasive species, through control of moisture levels. All ditches would remain open and could slowly fill in over time or be blocked by beaver dams, if beavers stay active in the area.

Planting Prescription and Strategy

Planting activities would be the same as described above in Actions Common to All Action Alternatives.

Continued Maintenance

As described above in Actions Common to all Action Alternatives, with additional regular maintenance of drain tiles and control valves.

Alternative 3 - Preferred Alternative

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh.

There will be rehabilitation and enhancement of approximately 130 acres of native vegetation remnants. This will emphasize removal of all woody species (both native and exotic) and prescribed burning; but there will be no enrichment by overseeding with additional species.

Blodgett Road

This alternative proposes hydrology and planting activities on only the disturbed croplands and fencerows (approximately 151 acres), avoiding impacts to quality remnant wetland and prairie sites.

Tree Removal

Dense stands of trees growing in fencerows would be removed by bulldozer, piled and burned or chipped into mulch. Non-native and invasive native trees that could threaten the restoration process along wetland areas would be selectively removed by chainsaw. Trees to remain (leave trees) would be designated prior to tree removal activity. Selective groups of native trees will remain on the edges of the wetlands for both scenic quality and diversity of wildlife habitat. Selected trees growing along the levee and ditch that parallel Blodgett Road will be removed by chainsaw and chipped into mulch.

Hydrology Restoration

Any drain tiles located would be reversibly disabled. Ditches would be filled with available spoil material along banks or plugged with earthen berms to eliminate drainage.

Planting Prescription and Strategy

Planting and seeding would be the same as described for Actions Common to all Action Alternative, although it would be limited to the approximately 151 acres of former cropland and fencerows.

Continued Maintenance

This would be the same as described above for Alternative 1.

South Patrol Road

Tree Removal

All trees, excluding those in the immediate area surrounding remains of early homesites, would be removed by bulldozing, then piled and burned as described above or chipped into mulch.

Hydrology Restoration

Any drain tiles located would be reversibly disabled. The main east-west drainage ditch would be filled using local spoil material and graded into a swale. Gravel ballast and soil fill from two old elevated railroad beds on the eastern portion of the South Patrol Road site would be removed. These spurs rise approximately five feet above the surrounding landscape.

Planting Prescription and Strategy

This would be the same as described above for Alternatives 1 and 2.

Continued Maintenance

This would be the same as described above for Actions Common to All Alternatives.

Alternative 4 - No Action Alternative

This alternative is required by Council on Environmental Quality regulations and also responds to certain concerns. It forms the baseline for comparison of the other alternatives. In this alternative the Forest Service would defer any management or wetland restoration activities at this time.

Alternatives Dropped From Further Analysis:

Alternative 5 - Wetland Restoration and Shorebird Habitat Development

Another alternative that was considered initially proposed to construct a 30-acre shorebird pond and habitat area in the western portion of the South Patrol Road project. Drain tiles that could contribute runoff to the pond would be connected to feeder lines if necessary, and feeder lines would be equipped with control valves to control the supply of water to the pond and extent of drainage of contributing areas. Other aspects of the alternative were similar to Alternative 2 for the other portions of the South Patrol Road and the Blodgett Road areas.

A thorough feasibility study and analysis of effects could not be prepared in a timely manner to support the proposal, so the alternative was dropped from further consideration for several reasons. First, the proposed technique for construction of the pond included excavation of topsoil over a substantial area and construction of a berm. The type and magnitude of soil disturbance conflicts with Standards and Guidelines in the forthcoming Prairie Land and Resource Management Plan, and the effects on subsurface drainage were not analyzed. Secondly, the Midewin staff hydrologist determined that the contributing area for the proposed pond, by both surface and subsurface flow, was probably inadequate to provide a reliable source of water to sustain a 30-acre pond. Also, any augmentation of the natural water supply to the site through the use of drain tile systems would necessarily detract from the water supply from other wetland areas. Thirdly, two natural depressions or swales in the vicinity of the proposed pond may support smaller marsh wetlands in the future (i.e. one to three acres). However, the restoration of the marshes must wait until future opportunities allow for restoration of adjacent lands.

Alternative Mitigation Measures

In addition to project design criteria in each alternative, the following mitigation measures would be followed for any action alternative to reduce or minimize impacts from the actions.

- **Sensitive, Threatened and Endangered Species** - No earth disturbing activities will be conducted in native vegetation remnants. Vehicles and equipment will be excluded from

native vegetation remnants by silt fences, flagging, and education of drivers and operators. All removal of woody vegetation in native vegetation remnants would be conducted manually, and during the dormant season (1 November-30 March). Woody plant stands (thickets or fencerows) will not be removed during the bird breeding season (30 March-1 August). When conducting prescribed burns in native vegetation remnants, less than one-half of the individual remnants will be burned per year, to minimize impacts on populations of sensitive insects. Species of conservation concern will not be introduced into the project areas until it has been determined that any naturally occurring population would not be adversely impacted by such activity. Restored and rehabilitated habitats will be evaluated for their potential to support additional species.

- **Hazardous Materials** - No earth disturbing activities will be conducted within 5 feet of the security fences along South Patrol Road and West Patrol Road due to potentially hazardous levels of arsenic in the soil.
- **Cultural Resources** - All cultural sites located will be avoided. Any other sites located during project implementation will be reported to the Forest Service archaeologist and further activity at such locations will be avoided.
- **Wetlands** - Erosion control fencing will be installed on the edges of existing wetlands to prevent siltation or damage to the natural areas by heavy equipment.
- **Soils** - Vehicular traffic will not occur on wet soils. Fill material for ditches will be material of native origin and local source. Soils will not be disturbed or compacted when wet. Where heavy machinery is used on hydric soils, the equipment will ride on pads or wide-area (low-pressure) tires to minimize surface compaction. Heavy equipment will be confined to designated work areas and travel routes located primarily in areas that will be disturbed by restoration work (e.g. fencerows, along ditches). Areas of excavation or heavy machinery traffic will be plowed following work to eliminate deep compaction. Top soil will be removed and replaced over drain tile excavations.
- **Hydrology** - Clay or plastic tiles would be disabled by removing sections of tile at intervals along the length of the tile, depending on slope, tile diameter and length. Tile sections designated for removal would be either dug up and removed or crushed in place and the trench backfilled. Ditch fill material will be selected, placed, compacted, and leveled to have permeability, porosity, and bulk structure comparable to that of native soil. Vegetation will be planted on barren surfaces to control erosion. The bank slopes of modified ditches will be reduced to 1:3 or less and erosion control measures (e.g. vegetation, netting) will be used to prevent bank erosion.
- **Air Quality** - When woody debris is burned, the piles should be made at least 100 feet from the edge of any remaining stands of trees. Piles should be made free of soil. Woody debris should dry out at least 6 months prior to ignition of piles to reduce fuel moisture. Burning should be conducted in the late fall or winter (outside the primary burning season). Burning should be done when the wind is blowing westerly (away from I-55) and when weather systems are stable (generally clear skies, light winds, and no temperature inversions). Applicable state and county burning permits must be approved prior to executing prescribed burns, in addition to a project prescribed burn plan. Prescribed burning will only be conducted on days when the area does not exceed the ozone standard and when prevailing westerly winds keep smoke away from I-55. Local area residents will be warned about smoke from any prescribed fires at Midewin. Notices may be posted on area highways to warn motorists.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This chapter briefly describes the present condition of the environment and changes that may be expected by implementing one of the action alternatives or by taking no action at this time. The significant issues generated through the scoping process, plus the requirements of the National Environmental Policy Act (NEPA) define the general scope of environmental concern for this

project. This chapter also forms the scientific and analytic basis for the comparison of alternatives.

Cumulative effects are discussed for each major issue or concern. Cumulative effects result from incremental impacts of proposed activities when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

Physical Factors

Soils

Affected Environment

The scale of the affected environment concerning soils is limited to the soil types found at the two sites. Soils at these sites were surveyed and mapped in 1999 by Hey and Associates.

The landscape of the project area consists of broad, uniform plains. Slopes are generally less than 1 percent across the analysis area and approach zero in many locations. Less than 10 percent of the land area has slopes above 2 percent. Berms along drainage ditches and rises along fencerows are the principal relief features, commonly rising 1 to 3 feet higher than surrounding lands. The low slopes limit the potential for rapid surface runoff and water erosion. The banks of drainage ditches show evidence of minor surface erosion or sloughing and sediment supply to surface water. The soils have high potential for soil loss by wind erosion due to the abundance of fine soil material, high regional wind velocities, and the low effective roughness of the broad, open plains.

The Blodgett Road (271 acres) site is underlain by dolomitic bedrock that is exposed along an old drainage channel which cuts through the site. Poorly drained, shallow soils (Joliet silty clay loam) (Millsdale) over bedrock still support small areas of wet dolomite prairie. Upland areas have Channahon silt loam, which supported a dry-mesic dolomitic prairie community. These soils have been cultivated for row crops or used for pasture in the past, and retain only scattered stands of native species.

The soils at South Patrol Road are predominantly Selma loam, a poorly drained soil (hydric) formed in sandy lakebed sediments and glacial outwash deposits that supported a wet prairie sedge meadow community under natural conditions. The upland areas are Jasper and Darroch (Drummer and Brenton) silt loam soils that formed in silty sediment and glacial outwash and most likely supported a mesic prairie community. These soils have been drained and cultivated for row crops or used as pasture in the past. All of the cropland on this site was formerly designated as prime farmland soils by the USDA-Natural Resource Conservation Service based on soil types. The South Patrol Road area includes localized glacial deposits of well-drained sands, silts, and fine gravels.

Environmental Consequences

Effects Common to Action Alternatives-- Soils that are managed for restored prairie will undergo a number of changes through time to improve the suitability of the soil for prairie ecosystem support. The hydrologic regime, e.g. the extent and duration of soil saturation and late-season soil moisture levels, would be restored to conditions that more closely approximate those prior to 1830. Soils that were well-drained prior to 1830, e.g. limited areas of sandy glacial outwash, will continue to be well-drained. Soil erosion and agricultural runoff will be reduced when crop production ceases.

Without further cropping or other soil disturbance, soils will begin to develop or redefine their horizons under the action of precipitation and drainage, rooting vegetation, and burrowing animals. Organic content in the upper soil horizon will increase. The organic matter in the soil will increase the water storage capacity of the soils and trap carbon and nutrients that are now released to the

environment from the cultivated soils. The perennial surface cover of the soil will protect the surface from erosion and runoff. Drainage through the soil will depend more on burrows, root margins, and other macropores. Annual application of pesticides and fertilizers on former croplands will be eliminated, improving natural soil characteristics.

Soil disturbance will occur during restoration. Compaction will occur on hydric and non-hydric soils where equipment is used to remove or pile woody vegetation, fill ditches, excavate drain tiles, or cultivate vegetation. Soil profiles that were previously disturbed, along ditches and above drain tiles, will be disrupted again. The extent and intensity of compaction and disturbance will be minimized or avoided through application of Standards and Guidelines. Soil compaction will be further alleviated through time by burrowing animals, frost action, and shrink-swell processes.

Alternative 1 - Effects as described above.

Alternative 2 - Effects as described above, but use of the control structures would allow for use of existing drainage structures to establish hydrological patterns that differ from conditions prior to 1830, such as permitting greater drainage and runoff in wet spring months. Hydrologic regimes on hydric soils may not be restored to the fullest possible extent. If undesirable vegetation becomes a problem, the control structures will allow opportunities to control the vegetation by control of water levels and drainage.

Alternative 3 - Effects as described in Effects Common to All Action Alternatives.

Alternative 4 - (No Action) - Effects as described above, but the hydrological regime of hydric and other soils will not be restored. No soil disturbance would occur.

Wetlands

Affected Environment

As defined by Executive Order 11990, wetlands are "*areas inundated by surface or ground water with a frequency under normal circumstances to support a prevalence of vegetation or aquatic life that requires saturation or seasonal saturation for growth or reproduction*". Wetlands at Midewin provide habitat for native wildlife and plants, including many species of concern (Federal Endangered, Regional Forester's Sensitive Species, and those listed by the state of Illinois). Wetland functions also include filtering of pollutants, recharging of groundwater, retention of floodwaters, buffer for open water habitats, and nutrient and mineral recycling.

The scale of wetlands affected by the proposed project includes all wetlands within the project areas. Indicators of wetlands are vegetative and aquatic life characteristically found on wetlands with the same soil types and undisturbed hydrology. Most existing or proposed wetlands in the project area (e.g. wet prairie, sedge meadows) occur on soils that are classified as hydric due to seasonally high water table and persistent soil saturation.

Blodgett Road - About 74 acres of the site supports natural wetlands, including large components of wet prairie and sedge meadow. The project area includes a portion of an abandoned overflow channel of the Des Plaines River. The predominant plant community in this wetland is shallow marsh, dominated by the emergents cattail (*Typha latifolia* and *T. angustifolia*), common bur-reed (*Sparganium eurycarpum*), river bulrush (*Scirpus fluviatilis*), great bulrush (*Scirpus validus*), rice-cut grass (*Leersia oryzoides*), and common reed (*Phragmites australis*). Limited deep (open-water) marsh also occurs in the site, with submerged and floating aquatic plants, including pond lilies (*Nuphar advena*), smartweeds (*Polygonum amphibium* and *P. coccineum*) and white water crowfoot (*Ranunculus longirostris*). Narrow zones of wet prairie and sedge meadow occur around

the edges of the former channel, and also along the southeastern edge of the project area. These wet prairies and sedge meadows are dominated by prairie cordgrass (*Spartina pectinata*), sedges (*Carex pellita*, *C. vulpinoidea*), bluejoint grass (*Calamagrostis canadensis*), big bluestem (*Andropogon gerardii*), bulrushes (*Scirpus pendulus*, *S. pungens*), blue iris (*Iris shrevei*), and spikerushes (*Eleocharis* spp.).

South Patrol Road -18 acres of wetlands are found on this site over several scattered locations. Most of these are "farmed wetlands" with no natural vegetation, and have standing water during part of the growing season. These areas, when not planted with crops, are usually dominated by annual plants, including barnyard grass (*Echinochloa crusgallii*), bur marigold (*Bidens aristosa*), and smartweeds (*Polygonum pensylvanicum*, *P. persicaria*, and *P. lapathifolium*). There is a disturbed wet prairie remnant located on the eastern edge of the site that is separated from the remainder by old railroad spurs. This wetland is dominated by prairie cordgrass and switch grass (*Panicum virgatum*), but contains only a few other wetland species. A small natural wet prairie remnant is located beyond the southeastern corner of the site near the existing railroad tracks. The drainage ditch in the project area is vegetated primarily by willows, cottonwood (*Populus deltoides*), and common reed, and sustains intermittent flowing water.

Environmental Consequences

Effects Common to All Action Alternatives-All action alternatives result in restoration of wetlands on lands that are presently used for agricultural purposes, primarily wet prairie and sedge meadows. All action alternatives include the obliteration or blockage of drainage ditches that presently support excavated intermittent riverine wetlands.

Alternative 1 - 442 acres of wetlands will be restored (382 acres of wet prairie/sedge meadow at South Patrol Road and 60 acres of wet dolomite prairie at Blodgett Road), and 18 acres of wetland at South Patrol Road will be enhanced. The 74 acres of existing wetlands at Blodgett Road will not be enhanced in this alternative, as the exotic trees growing at the edge of the marsh are not being removed. Blockage of drain tiles and ditches will alter the supply of water to downstream wetlands (see Hydrology section below). These hydrological changes may also benefit some of the existing wetlands within the project areas.

Alternative 2 - 442 acres of wetlands will be restored (382 acres of wet prairie/sedge meadow at South Patrol Road and 60 acres of wet dolomite prairie at Blodgett Road), and 92 acres of existing wetlands (74 acres at Blodgett and 18 acres at South Patrol Road sites) will be enhanced, if exotic trees are girdled as proposed in this alternative. Closing of drain tiles (with valves) and filling of ditches will alter the supply of water to downstream wetlands (see Hydrology section below).

Alternative 3 - 442 acres of wetlands will be restored (382 acres of wet prairie/sedge meadow at South Patrol Road and 60 acres of wet dolomite prairie at Blodgett Road), and 18 acres of existing wetlands South Patrol Road and 74 acres at Blodgett Road will be enhanced, if exotic trees are either removed as proposed in this alternative. Removal and disabling of drain tiles and filling of ditches will alter the supply of water to downstream wetlands (see Hydrology section below).

Alternative 4 - (No Action) - There will be no change in the amount of wetlands at these sites. However, the quality and species richness of existing wetlands may decline as a consequence of continued encroachment by non-native and invasive native plant species. A few small wetlands may develop in the former agricultural fields as drainage ditches become blocked or drain tiles fail. However, these wetlands will be of low quality, and will probably dominated by invasives species, such as reed canary grass (*Phalaris arundinacea*).

Figure 2. Wetland Restoration by Alternative

Alternative	Approximate Total Area (Acres)		
	<i>Wetlands Restored</i>	<i>Existing Wetlands Enhanced</i>	<i>Total Wetlands Restored or Enhanced</i>
1	442	18	460
2	442	92	534
3	442	92	534
4	0	0	0

Hydrology

Affected Environment

The area considered for this effects analysis covers the project areas and adjacent properties. See map in appendix.

Indicators include: extent, depth, and persistence of soil saturation or ponded water, surface flow in ditches, overland flow, depth to water table.

Both project areas occupy a broad, level plain at an elevation approximately 30 feet above the water level of the Kankakee and Des Plaines Rivers. Depths to the water table are shallow across the plain, usually varying from 1 to 8 feet depth, depending on location and season. The slope of the water table, like the topographic slope, is very low, and groundwater moves slowly through the area. The dominant groundwater gradient is to the west. Recharge of groundwater comes from the topographic drainage basin and more extensive areas to the east.

The low slopes of the analysis area favor ponding of water. Surface runoff is unlikely over large areas of both sites under most climatological and vegetative conditions. Excess precipitation ponds on the surface and gradually infiltrates and drains through the subsurface. Artificial drainage structures, i.e. drain tiles and ditches, intercept subsurface drainage and more rapidly discharge the water into streams or marshes. Under mild to moderately extreme precipitation, surface flow is generally limited to local undulations around depressions and drainage ditches.

Environmental Consequences

Effects Common to All Action Alternatives- The elimination of tiles and ditches will establish a less efficient drainage system that more frequently results in ponded water in upland areas (i.e. under all alternatives, the extent, depth, and persistence of soil saturation and ponding will increase). Excess precipitation will be dispersed over broad areas rather than being channelized and discharged downstream, and watershed areas will generate smaller floods in response to storms. The perennial grass cover will reduce the potential for surface runoff and erosion during spring months. Improvements in soil conditions, coupled with removal of artificial drainage, will permit greater moisture storage capacity in and on the soil. A larger percent of discharge will occur due to subsurface flow. The water table will tend to fluctuate at slightly higher levels, depending on local effects of drain tiles and ditches. Soil moisture will tend to be higher throughout the year. Evapotranspiration may be higher during spring months where perennial grasses replace row crops. Evapotranspiration may be lower where trees are removed from fencerows and ditches. Water quality will improve due to elimination of the use of agricultural pesticides and fertilizers formerly used on crop fields.

No adverse effects will occur to adjacent lands under any of the action alternatives. As described

above, all of the action alternatives will reduce downstream flooding by reducing the rate and volume of runoff following storms (i.e. more rainfall will be retained on site following precipitation). Ponding will occur in the South Patrol Road area, but the area of ponding will be disconnected from North River Road and other lands to the south by the presence of a major drainage ditch with high banks. Alteration of the tile systems will not adversely impact upstream areas, as the drain tile systems drain only lands of Midewin. (The western portion of the Blodgett Road area may include a tile that drains across a portion of Midewin from private land. If so, the effective drainage of the tile will not be altered. Alteration of the tile is not included under any alternative).

Alternative 1 - Effects as described above. Surface flow will no longer occur in ditches. Overland flow will occur more frequently or more extensively, in conjunction with ponding, but overland flow will generally have a reduced or imperceptible velocity and lower erosive potential due to greater vegetative cover.

Alternative 2 - Effects as described above to a lesser degree (i.e. extent, depth, and persistence of ponding and soil saturation will be increased to a lesser degree). Drain tiles will remain functional and may be opened on a periodic basis. When tiles are open, soils would be drained more deeply, and the drained water would contribute to downstream marshes or streams. Surface flow in ditches will continue. Overland flow will occur more frequently, in conjunction with ponding, but overland flow will generally have a reduced or imperceptible velocity and erosive potential due to greater vegetative cover.

Alternative 3 - Effects as described above.

Alternative 4 - (No Action) Drain tiles and drainage ditches will remain intact and will continue to drain water away from the hydric soils until they deteriorate. Drainage ditches will gradually fill in with organic debris from surrounding vegetation, producing a partial restoration of hydrology. Perennial vegetation would reduce the potential for surface runoff and erosion during spring months.

Figure 3. South Patrol Road Area

Alternative	Approximate Length of Artificial Drainage Structures (Feet)	
	Drain Tiles	Drainage Ditches
1	0	0
2	37,600*, with control valves	7270, blocked
3	0	0
4	37,600*	7270

*Estimated total length of drain tiles, assuming that not all tiles have been mapped.

Figure 4. Blodgett Road Area

Alternative	Approximate Length of Artificial Drainage Structures (Feet)	
	Drain Tiles, feet	Drainage Ditches, feet
1	0	0
2	0 to 3900*, with control valves	3600, blocked

3	0	3600, blocked or filled
4	0 to 3900*, none treated	3600, open

* Estimated possible length of tiles

Air Quality

Affected Environment

National Ambient Air Quality Standards (NAAQS) exist for certain criteria pollutants in the Clean Air Act as amended November 15, 1990, including ozone, lead, carbon monoxide, sulfur oxides, and particulate matter. Of these, carbon monoxide and particulate matter are produced by wildland biomass burning in significant concentrations. Will County is within a Class II airshed and in a non-attainment zone for 1-hour Ozone. Under the general conformity provisions of the Clean Air Act, federal agencies are prohibited from taking any action within a non-attainment area that causes or contributes to a new violation of the standards, or increases severity of a standard. Federal agencies are required to ensure their actions conform to applicable State Implementation Plans.

Environmental Consequences

Common to Alternatives 1 and 3:

These alternatives propose to burn an estimated 100 piles of trees removed from fencerows or along ditches. Smoke from prescribed fire can also impair visibility. The primary smoke products from prescribed fire include carbon dioxide, water vapor, carbon monoxide, particulate matter, hydrocarbons, and nitrogen oxides. Ozone will not be produced in significant quantities if the wood piles are burned and these alternatives should not have a significant effect on the air quality. Total emissions are reduced when piles are burned (compared to burning standing dead trees). If the wood and debris piles are chipped into mulch these alternatives would have no effect on the air quality of Will County.

Common to Alternatives 2 and 4:

These alternatives do not propose to burn woody debris and will have no effect on air quality.

Hazardous Materials

Affected Environment

Blodgett Road - The existing drainage into the Blodgett Road site was evaluated for migration routes from the Army TNT manufacturing site (M4) Lead Azide area which also receives drainage from the Red Water area (M7). The ditch which drains westward along the north side of M5 receives water from the Red Water area to the east and from the Lead Azide area to the south. Sediment samples from the north side ditch (just east of the Blodgett Road restoration site) reported in the Final Feasibility Study Report, 1997 indicate that the highest TNT concentration was 1.1 mg/kg, and the highest nitrotoluene concentration was 2.8 mg/kg. The Army did not consider these concentrations to be of concern.

South Patrol Road - This area lies south of the M1 South Ash Pile which is slated for removal when the Will County Landfill becomes available and operational. Associated with the M1 Ash Pile is a Groundwater Management Zone (GMZ) addressing the sulfate groundwater contamination caused by the Ash Pile. Migration of the sulfate in the GMZ is being monitored by the Army, and the Army

does not anticipate that wetland restoration will impact the GMZ in a negative manner. The groundwater contamination does not directly affect the wetlands restoration area, and raising the water table through wetland restoration may serve to reduce the groundwater gradient in the area, thus reducing overall migration. This potential effect is not definitively expected or quantified. Two sediment samples taken along the security fence contained 30 mg/kg of arsenic, which was not considered a site related contaminant and was not included in further evaluation. Arsenic is fairly immobile in soil and sediment, and should not present a concern provided that recommended mitigation is followed.

Environmental Consequences

Alternative 1 - This alternative would have no direct, indirect, short-term or adverse effects on existing hazardous materials conditions.

Alternative 2 - This alternative would have no direct, indirect, short-term or adverse effects on existing hazardous materials conditions.

Alternative 3 - This alternative would have no direct, indirect, short-term or adverse effects on existing hazardous materials conditions.

Alternative 4 - (No Action) - This alternative would have no direct, indirect, short-term or adverse effects on existing hazardous materials conditions.

Biological Factors

Vegetation and Natural Communities

Affected Environment

Prior to 1830 the natural vegetation on both tracts proposed for wetland restoration probably consisted of a mosaic of mesic prairie, wet prairie, and sedge meadow, with dolomite prairie and marsh communities present at the Blodgett Road site. Since 1830, most natural vegetation has been removed or highly altered by farming, grazing, fire exclusion, drainage, and invasion by non-native plants.

At present, the Blodgett Road restoration area supports remnants of marsh, sedge meadow, wet prairie, and dolomite prairie communities. Marsh, sedge meadow, and wet prairie vegetation were previously described in the Wetland Section. The dolomite prairie remnants around the Blodgett Road Marsh have been degraded by agricultural activities, and for the most part are dominated by a relatively low diversity of species. A few small remnants are of higher quality, and contain a rich diversity of forbs. These dolomite prairies have a relatively deep soil layer above the bedrock, so they are more similar to typical prairies, with greater representation of deep-rooted forbs. Common grasses and forbs in these remnants include big bluestem, switchgrass, prairie cordgrass, saw-toothed sunflower (*Helianthus grosseserratus*), wild bergamot (*Monarda fistulosa*), nodding wild-onion (*Allium cernuum*), prairie ironweed (*Vernonia fasciculata*), round-headed bush-clover (*Lespedeza capitata*), rosinweed (*Silphium integrifolium*), heath aster (*Aster ericoides*), stiff goldenrod (*Solidago rigida*), rattlesnake-master (*Eryngium yuccifolium*), thicket parsley (*Perideridia americana*), dense blazing-star (*Liatris spicata*), prairie dock (*Silphium terebinthinaceum*), and mountain-mint (*Pycnanthemum virginianum*). Invasive exotic species present in these prairies include autumn-olive (*Eleagnus umbellata*), Asiatic shrub-honeysuckles (*Lonicera* spp.), wild parsnip (*Pastinaca sativa*), and sweet clover (*Melilotus* spp.). There is also a remnant of dolomite prairie along the east boundary of the Blodgett Road project, adjacent to West Patrol Road; although degraded by past grazing and attempts at cultivation, this remnant remains dominated by

native grasses with some forbs. Dolomite prairie is considered the rarest of the different types of prairie communities remaining in Illinois.

Other grasslands present in both project areas are abandoned crop fields and pastures now dominated by Eurasian cool-season grasses, especially smooth brome (*Bromus inermis*) and bluegrasses (*Poa pratensis* and *P. compressa*). Common forbs include sweet clover, wild carrot (*Daucus carota*), wild parsnip, tall goldenrod (*Solidago canadensis*), hoary vervain (*Verbena stricta*), and tall boneset (*Eupatorium altissimum*). A few prairie species may persist in these fields, including yellow coneflower (*Ratibida pinnata*), rough dropseed (*Sporobolus asper*), stiff goldenrod, rosinweed, and wild bergamot. These grasslands are undergoing invasion by shrubs, especially the exotic autumn-olive, Asiatic shrub-honeysuckles, and multiflora rose (*Rosa multiflora*).

Both restoration areas contain old fence rows dominated by dense stands of box elder (*Acer negundo*), Osage orange (*Maclura pomifera*), black cherry (*Prunus serotina*), hackberry (*Celtis occidentalis*), black walnut (*Juglans nigra*) and Asiatic shrub-honeysuckles (*Lonicera* spp.). Along ditches and around the margins of existing wetlands are thickets and young stands of trees, including green ash (*Fraxinus pennsylvanicus*), white mulberry (*Morus alba*), box elder, hackberry, black cherry, Osage orange, and black walnut. Shrubs include gooseberry (*Ribes missouriense*) and Asiatic shrub-honeysuckles. The understory of these stands is often dominated by exotic herbs, especially garlic mustard (*Alliaria petiolata*), motherwort (*Leonurus cardiaca*), and burdock (*Arctium minus*). A few disturbance-tolerant natives are frequent: tall bellflower (*Campanula americana*), white snakeroot (*Eupatorium rugosum*), poison-ivy (*Toxicodendron radicans*), and yellow hedge-nettle (*Agastache hyssopifolia*).

Approximately 87% of the South Patrol Road restoration area was planted in row crops until fall 1999, and approximately 72% of the Blodgett Road area was planted in row crops until fall 1998. Since they have been allowed to lie fallow (with annual mowing) they have become dominated by annual, biennial, and short-lived perennial grasses and forbs. Common species in these fallow fields include wild carrot, giant foxtail (*Setaria faber*), ragweeds (*Ambrosia* spp.), sweet clovers, evening primrose (*Oenothera biennis*), tall goldenrod, timothy (*Phleum pratense*), Canada thistle (*Cirsium arvense*), quackgrass (*Agropyron repens*), hairy aster (*Aster pilosus*), and late boneset (*Eupatorium serotinum*).

Environmental Consequences

Common to All Action Alternatives:

These restorations will consist of large, contiguous tracts. Over time, there will be increases in the quality and overall diversity of these areas because of ongoing management activities, including cutting of woody species, mowing of noxious weeds, and prescribed burning. Periodic overseeding will continue to enrich these restorations. Native plant populations in these restorations will expand to form more natural associations within the overall matrix of restored habitats. Exotic plant species will decline as their habitats (especially fencerows) are removed and replanted with native vegetation; there will be less internal seed sources of exotic plant species to re-infest these project areas.

There will be increases in restored native vegetation both within the project areas and on Midewin.

There will be an overall increase in the total amount of mesic prairie, wet prairie, dolomite prairie, and sedge meadow through restoration. Many decades (perhaps centuries) of management will be required for these restorations to replace the existing native vegetation remnants in terms of species composition, diversity, and quality.

Alternative 1 - (Proposed Action)

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh.

Native vegetation remnants will not be rehabilitated or enhanced. Although these may decline in quality and species diversity, through lack of management and encroachment of woody species, there will be some benefits for these remnants because they will be surrounded by large areas of restored natural communities, which will provide opportunities for expansion of native plants and reduce the local seed sources for invasive plant species.

Populations of many native plant species will decline or be extirpated as woody species continue to encroach on native vegetation remnants. Most of the dolomite prairie and other prairie remnants will disappear as encroachment by invasive plants continues.

The total amount of native vegetation remaining on Midewin will decline, and the total amount of natural dolomite prairie and other natural communities on Midewin and in Will County will decline. Some of this decline will be from destruction or lack of management on private or other public land, in addition to the disappearance of remnants within the project areas.

Alternative 2 - Wetland Restoration with Valves on Drain Tiles

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh.

There will be limited rehabilitation and enhancement of approximately 130 acres of native vegetation remnants. This will emphasize removal of exotic species and prescribed burning, but native woody species will not be removed. These remnants are expected to respond positively, with increased flowering and seed production of native forbs, grasses, and sedges. Native woody plants will experience some declines because of burning and competition from invigorated native vegetation, but most larger woody plants will persist in and adjacent to these remnants for decades. An increased burning frequency may be required to prevent further encroachment by these native woody species. Although invasive exotic plant species will decline in these project areas, stands of native woody plants will provide habitat for re-infestation by exotic, bird-dispersed shrubs.

Populations of many native plant species will stabilize or increase as exotic species are removed from native vegetation remnants. The quality of the remnant dolomite prairie and native vegetation remnants will increase following regular management (including prescribed burning). Native plant species previously unrecorded from these remnants may appear or colonize as conditions improve. There will be an increase in the total amounts of mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh by limited rehabilitation and expansion of native remnants, and through large-scale restoration. The total amount of native vegetation remaining on Midewin will stabilize or increase, and the total amount of natural dolomite prairie and other natural communities on Midewin will stabilize or increase slightly. Native vegetation (including dolomite prairie) in Will County will continue to decline as a result of development or lack of management on private and other public land.

Alternative 3 (Preferred Action)

Approximately 600 acres of former agricultural land, fencerows, ditch banks, and successional

fields will be restored to native vegetation, including mesic prairie, wet prairie, dolomite prairie, sedge meadow, and marsh.

There will be rehabilitation and enhancement of approximately 130 acres of native vegetation remnants. This will emphasize removal of all woody species (both native and exotic) and prescribed burning, but there will be no enrichment by overseeding with additional species. These remnants are expected to respond positively, with increased flowering and seed production of native forbs, grasses, and sedges. Most stands of woody vegetation will be removed, and the remnants will become contiguous with the restored vegetation. Prescribed burning and hand cutting will be used to control resprouting and encroachment by all woody species. All woody species will decline in these project areas, reducing local sources for invasion or encroachment in restored or remnant native vegetation.

Populations of many native plant species will stabilize or increase as woody species are removed from native vegetation remnants. The quality of the remnant dolomite prairie and native vegetation remnants will increase following regular management (including prescribed burning). Native plant species previously unrecorded from these remnants may appear or colonize as conditions improve. The total amount of native vegetation remaining on Midewin will stabilize or increase, and the total amount of natural dolomite prairie and other natural communities on Midewin will stabilize or increase slightly. Native vegetation (including dolomite prairie) in Will County will continue to decline as a result of development or lack of management on private and other public land.

Alternative 4 (No Action)

There would be no immediate change in the amounts of native vegetation at either Blodgett Road or South Patrol Road sites. However, the size, quality, and species richness of these remnants may decline as a consequence of continued encroachment by non-native and invasive native plant species, in part caused by a lack of management and also resulting from the relative isolation and small size of these native vegetation remnants.

The former crop fields will continue to be colonized by a mixture of non-native and invasive native plant species. Perennial grasses and forbs will come to dominate these fields for a while; typical species include smooth brome, bluegrasses, redtop, and tall goldenrod. Eventually, woody species will spread out from the fencerows and other stands of trees and shrubs; likely woody invaders include autumn-olive, Amur honeysuckle, wild blackberry (*Rubus* spp.), black cherry, green ash, hackberry, Eastern cottonwood, and hawthorns (*Crataegus* spp.).

Populations of many native plant species will decline or be extirpated as woody species continue to encroach on native vegetation remnants. Most of the dolomite prairie and other prairie remnants will disappear as encroachment by invasive plants continues. The total amount of native vegetation remaining on Midewin will decline, and the total amount of natural dolomite prairie on Midewin and in Will County will decline. Some of this decline will be from destruction or lack of management on private or other public land, in addition to the disappearance of remnants within the project areas.

General Wildlife

Affected Environment

Blodgett Road - The marsh complex provides breeding, foraging and loafing areas for wetland wildlife species including waterfowl, amphibians, reptiles and aquatic mammals. The open, former croplands provide marginal habitat for grassland wildlife species. These grasslands are weedy with exotic species and lack the best structure for grassland wildlife species. The old fence lines and wooded strips along the marsh provide habitat for common edge wildlife species.

South Patrol Road - The open, former croplands presently provide little habitat as most of the fields have little vegetation. As weedy species grow up during the year, these areas will provide marginal habitat for grassland wildlife species. The old fence lines and wooded areas provide habitat for common edge wildlife species.

Environmental Consequences

Alternative 1 - Blodgett Road: Habitat in the marsh complex now providing breeding, foraging and loafing areas for wetland wildlife species would remain the same or possibly improve with the removal of woody vegetation adjacent to it. Edge wildlife species habitat would decrease with the removal of woody vegetation. Grassland and wetland wildlife habitat would increase and improve with the removal of woody vegetation and planting of native grassland and wetland plants. Alternative 1 would provide the greatest increase in grassland and wetland wildlife habitat and the greatest decline of edge species habitat.

South Patrol Road: The edge wildlife species habitat would decrease with the removal of woody vegetation. Grassland and wetland wildlife habitat would increase and improve with the removal of woody vegetation and planting of native grassland and wetland plants. Alternative 1 would provide the greatest increase in grassland and wetland wildlife habitat and the greatest decline of edge species habitat.

Alternative 2 - Blodgett Road: Habitat in the marsh complex providing breeding, foraging and loafing areas for wetland wildlife species would remain the same. Grassland and wetland wildlife habitat would increase and improve with the planting of native grassland and wetland plants. Edge wildlife species habitat would remain the same. Grassland wildlife habitat would be less than Alternative 1, since woody vegetation will remain.

South Patrol Road: Grassland and wetland wildlife habitat would increase and improve with the planting of native grassland and wetland plants. Edge wildlife species habitat would remain the same. Grassland wildlife habitat would be less than Alternative 1, since woody vegetation will remain.

Alternative 3 - Blodgett Road: Effects of Alternative 4 on wildlife species would be similar to the effects of Alternative 3.

South Patrol Road: Alternative 4 is very similar to Alternative 3. The edge wildlife species habitat would be identical to Alternative 3.

Alternative 4 - (No Action): Habitat for most wildlife species would not change over the short term. Some grassland birds would probably benefit, but only those that are not area-sensitive. Over time, these areas would probably degrade, as non-native plants take over the sites without further habitat management. Woody encroachment would increase habitat for edge species over time, but decrease the habitat for grassland and wetland wildlife species.

The following tables analyze the relative impact on wildlife species for each alternative.

Figure 5. Alternative Wildlife Impact Analysis - Blodgett Road

Alternative	Wetland Species	Grassland Species	Edge Species
1	+++	+++	--
2	+	++	=

3	+++	+++	---
4	=	+	=

Figure 6. Alternative Wildlife Impact Analysis - South Patrol Road

Alternative	Wetland Species	Grassland Species	Edge Species
1	++++	++++	----
2	+	++	=
3	++	+++	---
4	=	+	=

(=) -- same as existing, (+) -- increase in habitat, (-) -- decrease in habitat

Federal Threatened and Endangered Species

No Federally listed species (Endangered or Threatened) are known to occur within the Blodgett Road or South Patrol Road restoration areas. At present, neither project area contains habitat suitable for any Federally listed species. However, two federally listed species may be indirectly and positively impacted by the action alternatives through the creation of new habitat that could be colonized in the future. These species are Leafy Prairie Clover, *Dalea foliosa* (Endangered) and Eastern Prairie White-fringed Orchid, *Platanthera leucophaea* (Threatened). Populations of both species are present at different sites that are approximately 0.75 to 1.2 miles from the project area. Increase in potential habitat could increase the population size of these species at Midewin National Tallgrass Prairie. There is also potential for introducing both species into restored habitat.

Management Indicator (MIS) and Special Status Species

The Forest Service is required to address Management Indicator Species under current planning regulations (36 CFR 219) to gauge the effects of management activities implemented under land management plans. These are species whose well-being is considered an indication of the general health of the ecosystem. The standards and guidelines for Regional Forester Sensitive Species (RFSS) and other Management Indicator Species are being developed for Midewin's Land and Resource Management Plan. This environmental assessment will incorporate all applicable standards and guidelines for RFSS and MIS once they are approved through the planning process.

Affected Environment

Blodgett Road - The deep marsh and associated open water areas in the existing wetland complex provides breeding habitat for three state endangered and threatened birds: Common Moorhen, Pied-billed Grebe, and Least Bittern. The Least Bittern is also a Regional Forester sensitive species. Other Regional Forester Sensitive Species bird species known to use the former crop land portions for foraging or loafing include the Upland Sandpiper, Bobolink, Loggerhead Shrike, and Northern Harrier. The Blanding's Turtle, a Regional Forester sensitive species and Illinois state endangered species, is known from the marsh at this site. The population size is unknown, but probably not large. In addition, two Regional Forester sensitive species, Sullivant's coneflower and eared false foxglove, are each found in a different dolomite prairie remnant in the project area. Eared false-foxglove is also listed as Threatened by the Illinois Endangered Species Protection Board (1998b). In addition, this area contains habitat suitable for the following Regional Forester sensitive species: Crawe's sedge, Hill's thistle, Pitcher's Sandwort, Glade Mallow, Blazing-

star Stem-borer, Rattlesnake-master Stem-borer, King Rail, and Plains Leopard Frog. This species could occur in existing remnants of prairie and wetland communities (including dolomite prairie). None of these species were discovered in this area during endangered and threatened species surveys conducted over the past decade, but known populations are present within 1-2 miles of the Blodgett Road project area.

South Patrol Road - The Regional Forester sensitive species: Loggerhead Shrike, Bobolink, Northern Harrier and Upland Sandpiper are all known to use the open areas for foraging and loafing. This area is also adjacent to areas occupied the Plains Leopard Frog, and a small wetland at the east end of this project area is suitable foraging habitat for this amphibian.

Environmental Consequences

Consequences Common to All Action Alternatives

Habitat for deep water marsh birds (Pied-billed Grebe and Common Moorhen) would remain the same. Potential habitat for breeding, loafing and foraging for the Least Bittern, King Rail, Blanding's Turtle, and Plains Leopard Frog would increase with restoration of the former crop fields to native vegetation. The restoration work may increase movement between wetlands and increase colonization into other wetlands for both the Blanding's Turtle and the Plain's Leopard Frog. Colonization of both species into the South Patrol Road restoration area will also become possible. Potential habitat for loafing and foraging would increase for Upland Sandpiper, Bobolink, Loggerhead Shrike and Northern Harrier through the complete removal of woody vegetation. Existing open habitat would be improved for these species through native plant restoration from crop lands. Conversion of crop fields to native vegetation may provide some breeding habitat for these birds. Potential habitat for King Rail would increase, as wet prairie and sedge meadows will be restored in all action alternatives.

Potential habitat for the Sullivant's Coneflower, Eared False-foxglove, Crawe's Sedge, Hill's Thistle, Pitcher's Sandwort, Glade Mallow, Blazing-star Stem-borer, and Rattlesnake-master Stem-borer will increase with prairie and wetland restoration.

Alternative 1 - The effects would be as described above, however, Alternative 1 would provide the maximum habitat restored in former agricultural fields, since all fencerows would be removed and the areas incorporated into the restoration. However, habitat in native vegetation remnants would continue to decline in quantity and quality; these remnants might become unsuitable for species of conservation before restored habitat becomes suitable, resulting in the loss of habitat and perhaps some populations.

Alternative 2 - The effects would be similar to those described above. In addition potential habitat for loafing and foraging may slightly increase for Upland Sandpiper, Bobolink, Loggerhead Shrike and Northern Harrier, through the selective removal of woody vegetation at Blodgett Road. Habitat for loafing and foraging would stay the same for Upland Sandpiper, Bobolink, Loggerhead Shrike and Northern Harrier at South Patrol Road. Habitat for listed plants and insects in native vegetation remnants will increase because of management (prescribed burning and selective removal of exotics). Because a greater amount of encroaching woody vegetation will remain, however, the habitat will not improve as quickly as under alternative 3.

Alternative 3 -The effects would be similar to those described above, but Alternative 3 provides the most habitat for grassland birds, prairie plants, and insects because of the combination of restoration and management of the native vegetation remnants.

Alternative 4 - (No Action) Current habitat for sensitive species would not change over the short

term with the exceptions of upland sandpiper, bobolink, northern harrier and loggerhead shrike. Over time, as invasive woody plants (both native and exotic) encroach, these habitats will become unsuitable for any of these species of concern.

Figure 7. Summary of Effects (by Alternative) on Regional Forester Sensitive Species and State-listed Species

Common Name <i>Scientific Name</i>	Status	Alternative			
		1	2	3	4
Crawe's Sedge <i>Carex crawei</i>	RFSS	+	++	+++	-
Hill's Thistle* <i>Cirsium hillii</i>	RFSS, ST	+	++	+++	-
Pitcher's Sandwort* <i>Minuartia pitcheri</i>	RFSS, ST	-	+	++	-
Glade Mallow* <i>Napaea dioica</i>	RFSS	-	=	++	-
Sullivant's Coneflower <i>Rudbeckia fulgida sullivantii</i>	RFSS	=	++	+++	--
Earleaf False-foxglove <i>Tomanthera auriculata</i>	RFSS, ST	-	++	+++	---
Upland Sandpiper <i>Batramia longicauda</i>	RFSS, SE	+	+	++	-
Northern Harrier <i>Circus cyaneus</i>	RFSS, SE	++	++	+++	--
Bobolink <i>Dolichonyx oryzivorus</i>	RFSS	+	+	++	-
Blanding's Turtle <i>Emydoidea blandingii</i>	RFSS, ST	++	++	+++	=
Common Moorhen <i>Gallinula chloropus</i>	ST	=	=	+	=
Least Bittern <i>Ixobrychus exilis</i>	RFSS, SE	+	+	+	+
Migrant Loggerhead Shrike <i>Lanius ludovicianus migrans</i>	RFSS, ST	+	+	+	-
Blazing-star Stem-borer (moth)* <i>Paipapema beeriana</i>	RFSS	+	++	+++	--
Rattlesnake-master Stem-borer (moth)* <i>Paipapema eryngii</i>	RFSS, SE	+	++	+++	--
Pied-billed Grebe <i>Podiceps podilymbus</i>	ST	=	=	+	=
King Rail* <i>Rallus elegans</i>	RFSS, ST	+	++	++	-

Plains Leopard Frog* <i>Rana blairi</i>	RFSS	+	+	+	-
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Other Regional Forester sensitive and state-listed species that may be positively impacted by the action alternatives include Glade Quillwort (*Isoetes bulteri*), False Mallow (*Malvastrum hispidum*), Hairy Valerian (*Valeriana edulis* var. *edulis*), Red-veined Leafhopper (*Aflexia rubranura*), Henslow's Sparrow (*Ammodromus henslowii*), and Short-eared Owl (*Asio flammeus*). These benefits will occur through restoration of mesic prairie and mesic dolomite prairie habitats.

Hairy valerian occurs in calcareous moist prairies. After restoration, suitable tracts of restored prairie should be present in the South Patrol Road area. These sites would be suitable for colonization by or introduction of this species.

Glade quillwort occurs in dolomite prairies; it requires a specialized microhabitat that consists of small temporarily flooded depressions in thin soil over dolomite bedrock. Existing dolomite prairies in the project area do not contain this microhabitat. Following restoration, however, there may be some microhabitats within the Blodgett Road restoration areas. These sites would be suitable for colonization by or introduction of this species.

False mallow occurs in dolomite prairies; at present, existing dolomite prairies in the project area are unsuitable for this species. Following restoration, however, there is likely to be areas of dolomite prairie at Blodgett Road where competition is low because of thin soil. These sites would be suitable for colonization by or introduction of this species.

The red-veined leafhopper occurs in mesic prairie and mesic dolomite prairie where its food plant, prairie dropseed (*Sporobolus heterolepis*) is often dominant. Introduction of prairie dropseed into restored prairies in these project area will create suitable habitat for this insect. This leafhopper may be unable to colonise the restoration area, so an introduction may be necessary.

Henslow's sparrows are locally common on nearby public lands (Goose Lake Prairie). Midewin also has a growing population and the action alternatives should provide more habitat through prairie restoration. Weedy, fallow fields resulting from the no-action alternative should also provide some temporary breeding habitat, as least until these fields become invaded by shrubs.

The short-eared owl is currently known as a migrant and winter resident. Restoration to prairie and wetlands (all action alternatives) will improve foraging habitat and may provide more potential breeding habitat. Both the action and no-action alternatives would provide additional habitat; although the weedy, fallow fields created by the no-action alternative would be only temporary.

Under the no action alternative, the positive impacts outlined above would not take place. With time and succession, negative impacts on the species currently known from the project areas may decrease, some having significant impacts on the populations at Midewin National Tallgrass Prairie and adjacent public lands.

Social and Economic Factors

Recreation and Visual Quality

Affected Environment

At the present time there is no recreation access at the Blodgett Road site. The South Patrol Road area has been open to deer hunting from October 1 through mid January during the past three

years. To date, no other recreation opportunities have been available in this area. However, during the past two years South Patrol Road has served as a portion of the route used for public planning tours and the area has been visible to the public participating on these tours. Scenery Management System objectives are being developed as part of the Midewin Land and Resource Management Plan.

Environmental Consequences

Alternative 1 -

- **Blodgett Road-** Alternative 1 would have no direct, indirect, short-term or adverse effects on existing or future recreation opportunities in this area. No recreation opportunities currently exist and the actions proposed would not preclude future recreation opportunities in the area. The restoration of this area would provide long-term and beneficial effects by providing a unique interpretive opportunity for potential future public use. Additional long-term effects of the proposed actions would enhance visual quality by restoring the area to a more natural-appearing environment by reducing the amount of non-native species and filling in drainage ditches.
- **South Patrol Road** - The direct, short-term and adverse effects of Alternative 1 would be the displacement of some deer hunters who have hunted in this area over the past three years. In addition, depending on the timing of the restoration work and the noise level of equipment used, the restoration work that occurs over the next few years may also have a direct and indirect effect on the quality of the hunting experience. The noise may impact hunters directly and may also disturb deer that frequent the area, thus impacting potential hunter success rate. Deer hunting opportunities would be adversely affected in both the short and long-term as a result of loss of deer habitat.

Midewin staff are presently identifying interim trail opportunities outside of the perimeter fence on the west side of Midewin. The direct, short-term effects of Alternative 1 may restrict potential interim trails in the immediate future. The restoration work, however, would provide a unique interpretive opportunity as a feature alongside any interim trail located in this area. The long-term beneficial effects of Alternative 1 would also provide this unique interpretive opportunity for potential future public use. The activities proposed would not have any effect on or preclude any future recreation opportunities in this area. If South Patrol Road continues to be used for public tours, then Alternative 1 would provide a unique opportunity for the public to view on-going restoration work at Midewin.

Short-term effects of the proposed actions would be adverse effects of the visual quality of the area as a result of manipulation of the vegetation and landscape. However, the effect would be minimal as the area is not presently open to the public. Additional long-term effects of the proposed actions would enhance visual quality by restoring the area to a more natural-appearing environment by reducing the number of non-native plant species, removing old fence rows, and filling in the main east-west drainage ditch.

Alternative 2 - The effects would be similar to those listed in Alternative 1. However, Alternative 2 would not enhance the visual quality to point that Alternative 1 would, as this alternative proposes that ditches would be blocked and slowly fill in over time, rather than being filled in as part of the restoration process.

Alternative 3 - The effects would be similar to those listed in Alternative 1. However, Alternative 3 would not enhance the visual quality as much as Alternative 1, but would do more enhancement than Alternative 2. This alternative would fill in the main east-west drainage ditch at the South Patrol Road site, thereby restoring the area to a more natural-appearing landscape.

Alternative 4 - - (No Action)

- **Blodgett Road** - Alternative 4 would have no effects on any existing recreation as no recreation opportunities currently exist, and would not preclude any future recreation opportunities in this area.
- **South Patrol Road** - Deer hunting would continue in this area, and the area may be considered for possible interim trail locations. The visual quality of the area would not be enhanced to a more natural-appearing landscape.

Environmental Justice

Executive Order 12898 (February 11, 1994) directs federal agencies to focus attention, identify and address as appropriate, disproportionately high and adverse human health human and environmental conditions in minority communities and low-income communities. The principle behind environmental justice is simple: people should not suffer disproportionately because of their ethnicity or income level.

The proposed action and the alternatives to it affect Forest Service lands on the Midewin National Tallgrass Prairie in Will County, Illinois. The area is fairly affluent: Will County ranks 10th in the Illinois in per capita income, with a poverty rate of 6%, where statewide the rate is 12%. Approximately 11% of the total population in Will County is minority, compared to 17.8% statewide. Since the early 1970's the economy of the area has steadily changed from a manufacturing base to a more service-oriented economy. There is no evidence that this proposal would disproportionately affect any minority or low-income communities. This proposal deals with converting former agricultural land to native wetland or prairie based on resource conditions and capabilities.

Cultural Resources

Affected Environment

The 271 acres of the Blodgett Road and 559 acres of the South Patrol Road project areas have been used for agricultural purposes since the mid-nineteenth century. Land in these areas were drained to benefit agricultural production during the late nineteenth and early twentieth centuries. Specifically, the great majority of farmland drainage in Will County appears to have occurred between 1880 and 1914. As a result of this drainage activity and the concomitant cultivation, the soils of these areas have been repeatedly disturbed for over 150 years. Excavating drainage ditches and laying drainage tiles impacted only the areas in the immediate vicinity of the activity; the remainder of the area remains undisturbed, with the exception of plowing, disking, and planting.

The types of archaeological sites likely to be present within these project areas include Euro-American farmsteads dating from the mid-nineteenth to the mid-twentieth centuries, as well as prehistoric Native American sites. There is also the possibility of sites or features associated with the WW II-era Kankakee Ordinance Works, or the later Joliet Arsenal being located in the study areas. During the archaeological inventory of these two project areas, four archaeological sites were recorded, all of which consisted of the remains of mid-nineteenth to mid-twentieth century Euro-American farmsteads. Of these four heritage resources, three are considered to be potentially eligible for inclusion on the National Register of Historic Places (NRHP) and will be avoided during all planned project-related activities. The fourth site, a late nineteenth to early twentieth century farmstead is not considered to be eligible. It has been previously impacted by earth-disturbing activities and would be able to contribute only a limited amount of information regarding the history and agricultural development of MNTP.

Environmental Consequences

Alternative 1 - Four heritage resources were recorded within the project areas. Three have been determined to be potentially eligible for inclusion on the National Register of Historic Places (NRHP) and will be avoided during all planned project-related activities. The fourth heritage resource is not considered to be significant and does not have to be avoided. This alternative will have no effect on heritage resources.

Alternative 2 - No earth-disturbing activities are proposed in this alternative, therefore, there will be no effects on heritage resources.

Alternative 3 - All heritage resources will be avoided during planned project-related activities, and there will be no effects on heritage resources.

Alternative 4 - (No Action) There will be no effects on heritage resources.

Economics

It is estimated that it will cost approximately \$1.3 million dollars over five years to successfully restore the 830 acres at these two sites. If an action alternative is selected, partial funding would come from Forest Service appropriated funds. Additional funds would come from the following organizations that have already committed funds or in-kind services totalling \$551,000 towards this wetlands restoration project, pending a decision implementing an action alternative: Illinois DNR Conservation 2000, Northeastern Illinois Wetlands Conservation Fund, Grand Victoria Foundation, Dr. Scholl Foundation, Donnelly Foundation, Siragusa Foundation, McCormick Foundation, and one private donor. To complete the project the remaining funds would either come from further Forest Service appropriations or grants from non-profit organizations.

After the land was transferred to the Forest Service from the Army, existing leases for agriculture production on 110 acres at the Blodgett Road site and 488 acres on the South Patrol Road site were continued as special use permits. As described in the Illinois Land Conservation Act, agriculture special use permits will not be authorized beyond the year 2016, unless needed for wildlife habitat or resource management. Any rental fees collected from such special uses are collected into a special fund to be used for prairie improvement work at Midewin, with 25% of funds collected to be paid to Will County for roads and schools. At Blodgett Road 110 acres was under Forest Service special use permit for \$10.96 per acre or a total of \$1,206 in 1998. In 1999, 316 acres at South Patrol Road were under a special use permit for \$140.63 per acre for a total of \$44,543.

Environmental Consequences

Under any of the action alternatives, up to \$1.3 million dollars would be needed to complete wetland restoration. Funding would come from a mix of federal appropriations, funds collected from previous agriculture special uses, and from a group of partners and donors.

If the No Action alternative was implemented, it is possible that agriculture special use permits could be resumed for the next fifteen years and an estimated total \$668,309 (in 1999 dollars) could be collected from special use fees over 15 years, and 25% of that would be deposited to Will County for use on roads and schools.

Cumulative Effects

The area of consideration for cumulative effects includes Will County, Illinois. Will County covers

543,043 acres of land. It is estimated that this region is about 46 percent cropland, 9.9 percent urban, 30.4 percent pasture and other grasslands, 2.7 percent open water, 3.1 percent wetland, and 7.7 percent forest. The county includes the watersheds of the Kankakee, Des Plaines, and Calumet rivers; the Kankakee and the Des Plaines rivers are the only two major rivers in the county. The landscape of Will County is primarily open farmland with a large concentration of urban land along the northern borders, and smaller urban concentrations are present along the Des Plaines River corridor and major transportation routes. Will County has one of the largest concentrations of open grassland in the state of Illinois, however much of the crop fields and grasslands in the northern portion of the county are rapidly being converted to urban land uses (residential subdivisions and commercial complexes).

At present, USDA Forest Service administers approximately 15,000 acres within the Midewin National Tallgrass Prairie and is expected to receive up to 4,000 additional acres through transfer from the Army. Nearly two-thirds of MNTP is currently in row crop or hay production. The remaining land is pasture, abandoned fields, fencerows, abandoned home sites, structures built for Joliet Army Ammunition Plant (JOAAP), and remnants of native vegetation (forest, prairie, and wetlands).

Past activities that occurred on all JOAAP land prior to 1940 include timber cutting, wetland drainage, and conversion of natural vegetation to row crop fields, pasture and hayfields. Most of these activities continued under the Army, but industrial areas were also constructed on several tracts. The Army also improved existing roads and added infrastructure such as railroads, roads, power lines, security fences, buildings, drainage ditches, reservoirs, wells, water towers, and water lines to support the ordnance plant.

Present and potential future activities at Midewin include prescribed burning, exotic species control, hydrologic restoration, natural community restoration, grassland bird habitat management (including grazing by livestock), continued row crop production, stream rehabilitation, building demolition, hazardous materials cleanup, bison and elk reintroduction, scientific research, environmental education, trails and recreation facilities construction, and road removal. The precise locality, timing, and feasibility of some activities are dependent on the final land and resource management plan, which will be completed later in the year 2000. Present and future activities on the former Joliet Arsenal that may impact restoration activities at Midewin include development of two industrial parks, management of lands at the Lincoln National Cemetery, and construction and operation of the Will County Landfill.

Soils

Cumulative Effects of Action Alternatives - Actions in the past that have affected soils and hydrology included installation of drain tiles, ditches, and continuous cultivation of crops or use as pastures. Cultivation also meant application of commercial fertilizers and pesticides. Future actions that were considered are continuation of agriculture special use permits for row crop cultivation and pasture. Under alternatives 1 and 3 there will be a disturbance of soil when drain tiles are excavated, ditches are filled, or fencerows are cleared and leveled. Soil erosion and oxidation will be reduced after a perennial cover of grasses and sedges is established. Accumulation of organic matter in the soil will trap carbon and nutrients that are now released to the environment from the cultivated soils. Use of agricultural pesticides and fertilizers will be eliminated, improving the quality of ground water and surface water runoff. Alternatives to this proposed action will not have significant impacts to the soils in the project area.

Wetlands

Past activities in Will County which have probably affected wetlands include: conversion of natural vegetation to cropland and pasture, grazing, mowing of grassland for hay, construction of drainage

ditches, installation of drainage tiles, fire suppression, erosion and sedimentation from agricultural activities, timber cutting, introduction of non-native animal and plant species, and development of an urban area and rural communities with transportation and energy transmission infrastructure.

In the foreseeable future, it is likely that the amount and quality of wetlands in Will County will continue to decline, especially on private lands. However, it is likely that some of these wetlands will become protected by expansion of state, county, and municipal conservation lands in Will County.

Present or reasonably foreseeable future activities on Midewin which may affect federal endangered wetlands include: restoration of native vegetation, restoration of natural hydrology, removal of invasive, non-native plant species, grazing of livestock, re-introduction of bison and elk, scientific research and environmental education, and construction and use of trails. Most, if not all of these activities will either have positive and neutral impacts on existing wetlands. The amount of wetlands on Midewin is expected to increase from 1,077 acres to 3,435-5,820 acres in the foreseeable future. The quality of existing wetlands is expected to increase, as past sources of degradation (agricultural runoff, hydrological alteration) are corrected and the wetland management continues.

The three action alternatives will impact wetlands in a positive manner, although to varying degrees. Alternatives 1-3 will restore at least 500 acres of former agricultural fields to wetlands, increasing the existing amount of wetlands on Midewin by 150%. Alternatives 1 and 3 will result in fill of existing wetlands in drainage ditches in order to achieve restoration of different types of wetlands over larger areas, and alternative 2 will allow long-term processes to modify and eliminate the ditch wetlands. Long term, these projects could contribute from 9.7-16.6% of wetlands restored at Midewin. The restored wetlands will be dominated by associations of native wetland and wet prairie plants. Alternative 2 will contribute to the enhancement and rehabilitation of 92 acres of existing wetlands (18 acres at South Patrol Road and 74 acres at Blodgett Road). This alternative will improve conditions for almost 8.5 % of existing wetlands at Midewin.

Alternative 4 (no action) will not have any positive effects on wetlands at Midewin. A few wetlands may develop in former agricultural fields as drainage ditches and tiles become blocked by erosion, tree growth, or sinks. However, these wetlands will be of low quality, and will probably be dominated by a few species of invasive exotic and native plant species. The native wetland remnants will also continue to decline, as woody plants invade and shade out native sedges, grasses, and forbs.

Hydrology

The proposed action will have no significant cumulative effect on the Des Plaines of Kankakee Rivers because the project areas and the actions are negligible in comparison to the watershed areas and impacts of the river basins. The proposed action will have minor cumulative effects on Prairie Creek and Grant Creek as described below. Future management of the Midewin will include extensive additional projects comparable to the proposed action. Taken together, such projects may have significant cumulative impacts on the receiving waters. The proposed action will have direct and cumulative impacts on the marsh that receives runoff from the Blodgett Road area and the minor stream that carries runoff from the South Patrol Road area into Prairie Creek.

Discharge to downstream areas will become less responsive to precipitation, as restored drainage systems and watersheds will retain precipitation for longer periods. The balance of increases and decreases in evapotranspiration will probably be a general increase in evapotranspiration during spring and early summer. Consequently, the project areas will contribute smaller peak flows to downstream areas, and water levels in the streams or marshes downstream will generally be lower during spring and early summer. Water quality in receiving bodies will improve due to decreased

loads of sediment and agricultural chemicals. Bank erosion in the minor stream below the South Patrol Road area will be reduced by the reduction in peak flows. Water quality in the marsh connected to Blodgett Road area will improve, with less sediment and agricultural runoff. The water levels in the marsh will fluctuate less in response to precipitation during spring and summer.

Air Quality

Actions in the past, present and that will continue in the future which affect air quality in Will County include emissions from a variety of industries, automobile traffic and agricultural burning. Over the next five years Midewin is also proposing to occasionally prescribe burn approximately 500 acres per year of land within the Prairie for resource management. Burning of woody debris piles implemented following air quality mitigation measures as proposed in Alternatives 1 and 3 and will not have significant effects to air quality and will not contribute to exceedance of the 1-hour Ozone or violate any air quality standards in Will County. Alternatives 2 and 4 will have no effect to cumulative air quality in Will County.

Hazardous Materials

The cumulative effects of all past, present or reasonably foreseeable future actions within the former Joliet Arsenal would not significantly affect hazardous material stability, immobility or migration, with the possible exception that the migration of sulfate contaminated groundwater in the current M1 Groundwater Management Unit may be slowed to an unpredictable extent. This slowing of migration is not a negative impact.

Vegetation and Natural Communities

Past activities in Will County which have probably affected vegetation and natural communities include: conversion of natural vegetation to cropland and pasture, grazing, mowing of grassland for hay, fire suppression, erosion and sedimentation from agricultural activities, timber cutting, drainage of wetlands, extirpation of large ungulates (elk, bison), introduction of non-native animal and plant species, and development of a urban area and rural communities with transportation and energy transmission infrastructure.

Most of the remaining native vegetation in Will County has been identified by the Illinois Natural Areas Inventory and subsequent surveys. Less than 0.2% of Will County consists of high-quality remnants of natural communities. Most of Will County's non-agricultural and non-developed land is dominated by exotic and invasive native plant species. Although many (perhaps most) native vegetation remnants are either already protected or likely to become protected in the foreseeable future, some will probably be destroyed by agricultural activities, urban sprawl, or other development.

Present or reasonably foreseeable future activities on Midewin NTP which may affect native vegetation and natural communities include: restoration and management of native vegetation, restoration of natural hydrology, removal of invasive, exotic plant species, grazing of livestock, reintroduction of bison and elk, and construction and use of trails. Most, if not all of these activities will either have positive and neutral impacts on existing wetlands. The amount of land dominated by native vegetation on Midewin NTP is expected to increase from 330 acres to 6,505-11,980 acres in the foreseeable future. Most of this increase will be the result of restoration on former agricultural lands. The quality of existing natural communities is expected to increase, as these areas are managed (prescribed burning and removal of exotic species).

The three action alternatives will impact native vegetations in a positive manner, although to varying degrees. Alternatives 1-3 will restore 500 acres of former agricultural fields to native vegetation (including wetlands), increasing the existing amount of native vegetation on Midewin

NTP by almost 200%. Long term, these projects could contribute from 5-10% of the native vegetation restored at Midewin NTP. These restorations will be dominated by associations of native prairie, dolomite prairie, sedge meadow, and marsh species. Alternatives 2 and 3 will contribute to the enhancement and rehabilitation of approximately 100 acres of existing natural communities in both project areas.

Alternative 4 (no action) will not have any positive effects on native vegetation or natural communities at Midewin NTP. Former agricultural fields will become dominated by a mix of aggressive native and invasive exotic plant species. The natural community remnants will also continue to decline, as woody plants invade and shade out native grasses, sedges, and forbs.

General Wildlife

Past activities in Will County that have had effects on wildlife are similar to those discussed for Special Status Species below. Not all of these activities have adversely affected all wildlife species; for example, elimination of large predators has allowed for population increases of smaller predators, such as raccoon and coyote. Some, perhaps most of the wildlife species present on private land in Will County, are likely to decrease, largely because of habitat destruction. However, it is likely that some habitat for these species will become state, county, and municipal conservation lands in Will County. Near Midewin large segments of land is owned by corporations and is used as buffer for industrial parks. This land is essentially left alone and provides early successional and edge species habitat.

Present or reasonably foreseeable future activities at Midewin which may impact wildlife include: restoration of native vegetation, restoration of natural hydrology, removal of invasive, non-native plant species, grazing of livestock, reintroduction of bison and elk, and construction of trails.

The action alternatives will impact some wildlife positively, others negatively. Wildlife that will be negatively impacted includes primarily edge species. Wildlife that will be positively impacted includes wetland and grassland species. Edge species are much more common in Will County and the general area than wetland and grassland species. The no-action alternative would impact grassland wildlife species positively by providing additional habitat.

Edge species such as raccoons, opossum, cardinal, indigo bunting, American robin and catbird would be negatively impacted by the action alternatives. These species are fairly common at Midewin National Tallgrass Prairie, and in Will County and the surrounding area. Nearby corporate lands, Army land at the Army Training Area, and state land at nearby state parks and conservation areas provide extensive habitat for these species. These species tend to be ubiquitous and declines at Midewin National Tallgrass Prairie should not drastically impact their populations.

Wetland species such as waterfowl, muskrats, frogs, toads and turtles are not common at Midewin and the surrounding area due to the extensive wetland loss from development and agriculture. Wetland restoration in the action alternatives at Midewin will provide significant increase in habitat for these species. There is little chance for wetland restoration to occur on areas outside Midewin within Will County. What wetland restoration that is done is frequently for mitigation purposes or for fishing, and these types of wetlands seldom are functional or of high quality for wetland wildlife. Wetland restoration in the action alternatives will have a significant positive impact on wetland wildlife species.

Grassland wildlife species such as savannah sparrow, grasshopper sparrow and smooth green are not common in the surrounding area due to conversion of prairie to agricultural land. Some of these species are still somewhat common at Midewin National Tallgrass Prairie due to past cattle grazing. Midewin provides some of the only remaining habitat for these species and some of the only land that can be converted to grassland in Will County and the surrounding area. There is little

chance of prairie or grassland restoration to occur other than at Midewin National Tallgrass Prairie. What prairie and grassland restoration that is done is seldom managed for grassland wildlife. Prairie restoration in the action alternatives would provide high quality habitat for grassland wildlife. Grassland planting in the no-action alternative would provide some habitat for grassland wildlife, but not of as high a quality as prairie restoration.

In the no action alternative the positive impacts outlined above would not take place. With time and succession, negative impacts on the wetland and grassland species currently known from the project areas may decrease, some having significant impacts on the populations at Midewin National Tallgrass Prairie and the surrounding area.

Regional Forester sensitive and state-listed species

Past activities in Will County which have probably affected federal endangered species, Regional Forester sensitive species, and state-listed species include: conversion of natural vegetation to cropland and pasture, grazing, mowing of grassland for hay, fire suppression, erosion and sedimentation from agricultural activities, timber cutting, drainage of wetlands, extirpation of large ungulates (elk, bison) and large predators (gray wolf, puma, and black bear), introduction of non-native animal and plant species, and development of a urban area and rural communities with transportation and energy transmission infrastructure. Not all of these activities have adversely affected these species. For example, upland sandpiper habitat on pastures was maintained by livestock grazing. Some, perhaps most of the species of concern present on private land in Will County are likely to decrease, largely because of habitat destruction. However, it is likely that some habitat for these species will become state, county, and municipal conservation lands in Will County.

Present or reasonably foreseeable future activities on Midewin which may affect federal endangered species, Regional Forester's sensitive species, and state-listed species include: restoration of native vegetation, restoration of natural hydrology, removal of invasive, non-native plant species, grazing of livestock, reintroduction of bison and elk, and construction and use of trails.

The action alternatives will impact federal endangered species, Regional Forester's sensitive species, and state-listed species in a positive manner. The no-action alternative may impact these species in a negative manner through habitat succession and degradation.

Neither the leafy prairie-clover (Federal Endangered) or the eastern prairie white-fringed orchid (Federal Threatened) occur within the project areas. Both species, however, may benefit from the action alternatives as they create habitats (dolomite prairie and wet prairie) that will eventually become suitable for these species. Populations for both species on and adjacent to Midewin are small and additional habitat could increase the long-term persistence of viable populations.

Both Sullivant's coneflower and earleaf false-foxglove would benefit from the additional habitat created in the action alternatives. Further benefits would occur in alternatives 2 and 3 because their known habitats would be managed so as to benefit these species. This habitat would not be managed under Alternative 1, but management of this habitat is required to maintain viable populations of these species at Midewin. Populations for both species at Midewin are small and additional habitat would increase the long-term persistence of viable populations.

Potential habitat for Crawe's sedge, Hill's thistle, Pitcher's sandwort, and glade mallow would increase under all action alternatives. Some existing habitat, however, would not be managed under Alternative 1 and could gradually become unsuitable for these species. As these species are not present in the project areas, there would be no direct, adverse impacts on known populations from the no-action alternative. Populations for all four species on and adjacent to Midewin are small and localized; additional habitat would increase the long-term persistence of viable

populations.

The upland sandpiper is known to nest sporadically in some locations of Will County, but only regularly at Midewin National Tallgrass Prairie. Midewin has the most stable and largest population in the State of Illinois. The action alternatives will create some marginal habitat for upland sandpipers through prairie restoration. Considered with nearby grazed short-grass areas (preferred habitat) these prairie areas will become more important in maintaining a stable population of upland sandpiper.

The northern harrier has been known to nest at Midewin sporadically and is a regular migrant and winter resident. Midewin National Tallgrass Prairie has the most stable population in the area. The action alternatives will create high quality nesting and foraging habitat through prairie and wetland restoration. The addition of these tracts with existing grassland areas at Midewin National Tallgrass Prairie will increase preferred habitat for northern harriers. These increases may make Midewin more favorable for northern harriers and nesting may become more regular.

Loggerhead shrikes are known to use the project areas for foraging. They nest in adjacent areas. Restoration to prairie should slightly improve the quality of foraging over the present habitat. Loggerhead shrikes prefer short-grass habitat, but will use taller grass habitat at times. There may be a positive impact on the loggerhead shrike population if one of the action alternatives is implemented.

The bobolink is known to nest at Midewin National Tallgrass Prairie on a regular basis and Midewin probably has one of the largest populations in the state of Illinois. The action alternatives will create high and medium quality nesting and foraging habitat through prairie and wetland restoration. The addition of these tracts with existing adjacent grassland areas and disjunct areas will increase the total habitat for bobolinks and help maintain a stable population.

Blanding's turtle is known to occur at Midewin, probably in small numbers. The action alternatives will probably have a positive influence through the creation of new wetlands. Alternatives 2 and 3 will also improve existing habitat for this species. The new wetlands may allow the Blanding's turtle to increase with more stable populations in the future.

The least bittern has been known to breed at Midewin, probably in small numbers. Populations in Will County and the surrounding area are probably small, but their secretiveness makes population estimates difficult. The action alternatives will probably have a positive influence through the creation of new wetlands. The new wetlands may allow this species to increase with more stable populations in the future.

Potential habitat for blazing-star stem-borer, rattlesnake-master stem-borer, and plains leopard frog would increase under all action alternatives. Some existing habitat, however, would not be managed under Alternative 1 and could gradually become unsuitable for these species. As these species are not present in the project areas, there would be no direct, adverse impacts on known populations from the no-action alternative. Populations for all three species on Midewin are small and additional habitat would increase the long-term persistence of viable populations.

The common moorhen and pied-billed grebe have nested at Midewin on a regular basis in small numbers. The Blodgett Road Marsh is regularly used for breeding. These species only occur in small numbers within Will County. Alternatives 2 and 3 will not increase habitat for these species, but will maintain existing habitat. Some habitat may gradually disappear because of woody encroachment under Alternative 1.

In summary, the cumulative effects of all past, present and reasonably foreseeable actions would

not result in significant, adverse effects on federally listed threatened or endangered species or Regional Forester sensitive species, or, other state-listed species or general wildlife found within the project area or within Will County.

Recreation and Visual Quality

The cumulative effects of all past, present and reasonably foreseeable future actions would not significantly affect the provision of future recreation opportunities or the quality of the visual resources in these areas.

Cultural Resources

Cumulative effects analysis includes all known past actions, other present actions, and reasonably foreseeable future actions which might have an impact on the area under analysis. The area under consideration in this analysis is the Blodgett Road and South Patrol Road project areas. The primary heritage resource issue in this environmental analysis is the protection of archaeological sites and other properties which are historically significant, and the insurance that significant and potentially significant sites are not effected by the planned activity.

Past and Present Actions - Heritage Resource inventories of both these areas, as well as the remainder of Midewin, also known as the Joliet Arsenal, have been conducted since 1978 and heritage resources have been protected from potentially earth-disturbing activities since that date. However, prior to 1978 archaeological surveys designed to locate archaeological and historical sites were not routinely conducted prior to proposed land management activities.

For the proposed action and its alternatives, a heritage inventory plan was developed in consultation with the State Historic Preservation Office and significant heritage resource have been identified. Negative impacts to heritage resources to these resources that may result from project activities will be mitigated by using site avoidance. There will be no heritage resources impacted as a result of wetland restoration activities.

Alternative 1 - Four archaeological sites were recorded, all of which consisted of the remains of mid-nineteenth to mid-twentieth century Euro-American farmsteads. However, only three are considered to be potentially eligible for inclusion on the National Register of Historic Places (NRHP) and will be avoided during all planned project-related activities. This alternative will have no environmental effects on heritage resources.

Alternative 2 - This alternative will have no effect on heritage resources because no earth-disturbing activities will take place.

Alternative 3 - Same as Alternative 1.

Alternative 4 - This alternative will have no effect on heritage resources because no earth-disturbing activities will take place.

It is possible that significant heritage resources may also exist on adjacent private lands. Generally, these sites have not been protected in the past, and only cemeteries are expected to be protected in the future. On a national basis, the loss of heritage resources on non-public lands makes the preservation and protection of these non-renewable resources on federal lands even more important.

Future Actions - Heritage Resources have been taken into consideration in the wetland restoration activities in the Blodgett Road and the South Patrol Road project areas. They have been and will

continue to be protected as these projects progress through time. It is reasonably foreseeable that additional vegetative restoration or other earth-disturbing land management activities will occur in and around these two project areas in the future. It is anticipated that additional surveys (if needed) will be performed, and the use of mitigation measures such as site avoidance and site protection will be utilized. The result of implementing site protection/mitigation measures will be no cumulative effects to heritage resources during the activities described in Alternatives 1 through 3.

In sum, Alternatives 1, 2, and 3 (heritage resources identified and effects mitigated) when combined with past activities, other present and foreseeable future actions (including Blodgett Road and South Patrol Road wetland restoration activities) will have no effect on heritage resources. Only those heritage resources which have been inadvertently missed during past inventories (effects not mitigated), may be impacted by planned restoration activities. As indicated by past monitoring activities, the likelihood of missing heritage resources during inventories is certainly possible, but does not occur with any frequency. The types of sites which are likely to be missed are small and ephemeral (isolated finds), and are not likely to contain information which will add significantly to our understanding of the history or prehistory of northeastern Illinois. Impacts this type of site would result in minimal effects on heritage resources.

Irreversible and Irretrievable Commitment of Resources

There would be no effect on irreversible and irretrievable commitment of resources if an action alternative is implemented.

Compliance with Applicable Laws and Plans

The following list of laws, plans or policies were all referred to in comments received during the public comment period. The concerns or issues are addressed below:

Illinois Land Conservation Act - Section 2914 (b) (2) Initial Management Activities- authorizes management activities to further the four purposes of Midewin, prior to completion of a Land and Resource Management Plan, "in order to expedite the administration and public use of the MNTP". The purpose of this project, to restore wetlands and enhance native plant and animal species habitats, is aligned with purpose (1): "To manage the land and water resources... in a manner that will conserve and enhance the native populations and habitats of fish, wildlife, and plants", and with the intent of Midewin's enabling legislation.

Midewin Land and Resource Management Plan (LRMP) - While the LRMP is still being developed, the action alternatives considered in this environmental assessment all comply with the planning and decision criteria and are within the minimum wetlands restoration that will be considered in the final LRMP. The proposed wetland restoration project as described in all the action alternatives also complies with the four criteria for interim projects:

- This assessment evaluates the effect of any hazardous materials remaining from the Joliet Arsenal on the environment if this project is implemented.
- The proposed restoration will not interfere with Army cleanup operations.
- The proposed restoration does not represent an irretrievable commitment of resources.
- The activity represents a valid, existing right as provided by legislation.

The National Historic Preservation Act of 1966, National Environmental Policy Act of 1969, the Archaeological Resource Protection Act of 1979, (E.O. 11593 of 1971, and E.O. 1307 of 1997) have mandated federal agencies to take heritage resources into consideration when planning land management activities.

Clean Air Act - Illinois EPA burning permit: A burning permit will be obtained from Illinois EPA prior to burning woody debris piles.

Section 404 permit regarding wetlands - Prior to any work on existing wetlands (eg. filling in the ditch at South Patrol Road site), a permit will be obtained from the Army Corps of Engineers.

USDA Land Use Policy - Departmental Regulation 9500-3 (regarding conversion of prime farmlands). This regulation was designed to protect prime cropland, pastureland, rangeland, forest land, wetlands and floodplains from development. It does not preclude restoring lands which might be classified as prime farmland, back to wetlands, as both categories are to be protected from other types of conversion.

4. MONITORING

Monitoring would be conducted to evaluate the effectiveness of the wetlands restoration project.

Monitoring would be conducted by primarily using permanent photo points updated annually and random sampling inventory of the vegetation (broad-scale observation of different plots and disturbed grounds, e.g. fencerows, ditches).

Hydrological and soil monitoring will be performed periodically during the first three years following project implementation and less frequently thereafter and will include:

1. Inspection of sites where drain tiles were removed or disabled to detect concentrated surface or subsurface flow, erosion, or other aberrations.
2. Monitoring of soil moisture levels at vegetative monitoring points to record the extent, depth, or duration of ponding or saturation in comparison with previous observations.
3. Installation of monitoring wells at specific locations (e.g. vegetation monitoring points) or use of existing wells to detect changes in depth to water table.
4. Inspection of altered drainage ditches for signs of runoff (water depth or velocity) and erosion or sediment deposition.
5. Inspection of planted surfaces for signs of overland flow or erosion.
6. Collection of soil core samples at vegetative monitoring points to record changes in soil characteristics.

5. LIST OF PREPARERS and CONSULTATION WITH OTHERS

- Preparers
- Renee Thakali, Prairie Parklands Coordinator, Midewin National Tallgrass Prairie
- Eric Ulaszek, Horticulture Specialist, Midewin National Tallgrass Prairie
- Pat Welch, Recreation Planner, Midewin National Tallgrass Prairie
- Bill Mains, Environmental Engineer, Midewin National Tallgrass Prairie
- Karl Forge, Hydrologist, Midewin National Tallgrass Prairie

Consultation with Others

Bill Glass, Heritage Biologist, Illinois Department of Natural Resources

Jerry Paulson, Program Manager, The Wetlands Initiative

Bill Sluis, Botanist, The Wetlands Initiative

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MIDEWIN NATIONAL TALLGRASS PRAIRIE

Wetlands Restoration Project Areas

Data Source: Midewin GIS Database & IDNR GIS Database

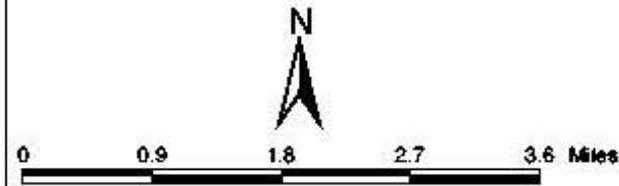
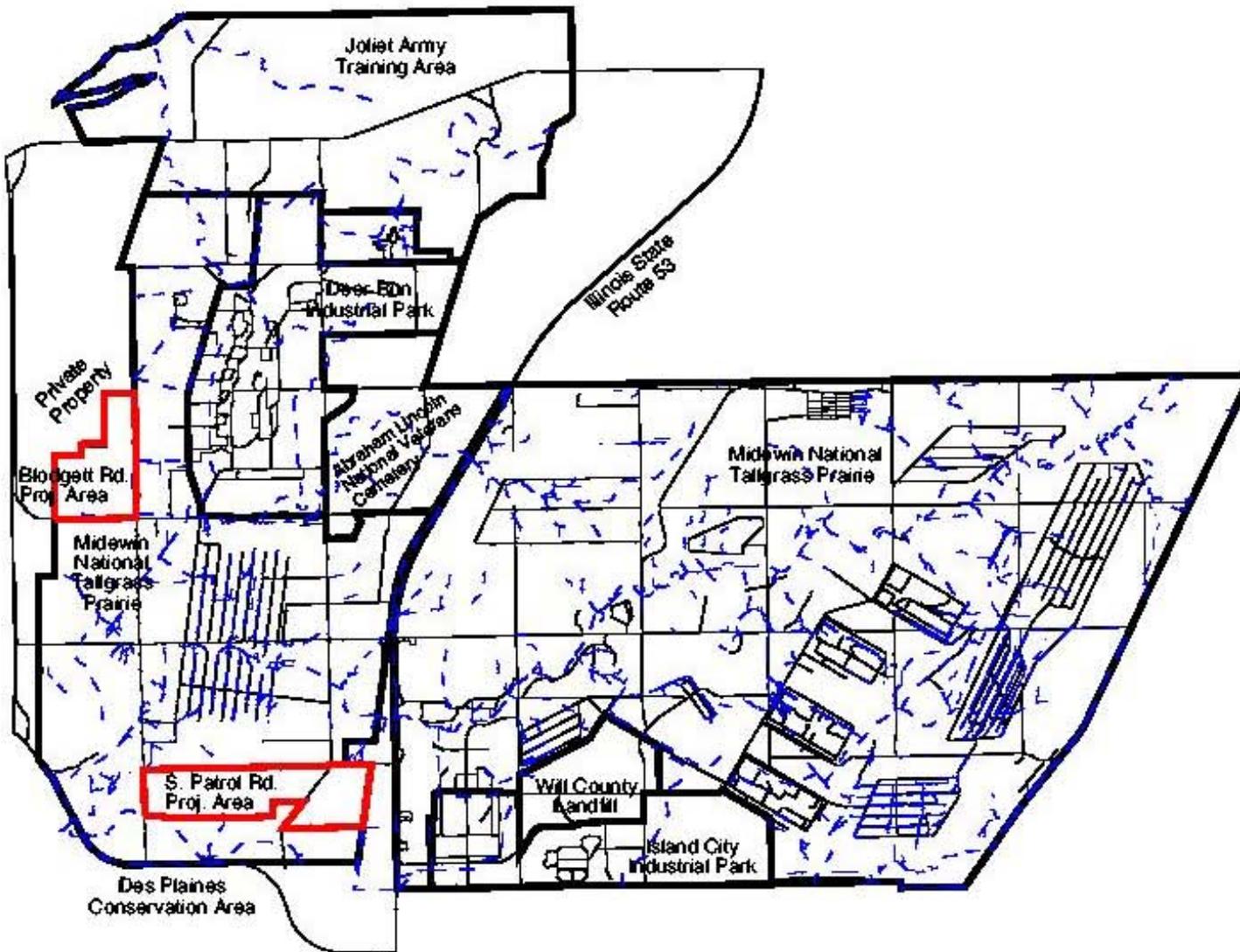
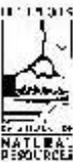
Map Developed By: Linda A. Sasamoto

Map Created On: September 15, 2000

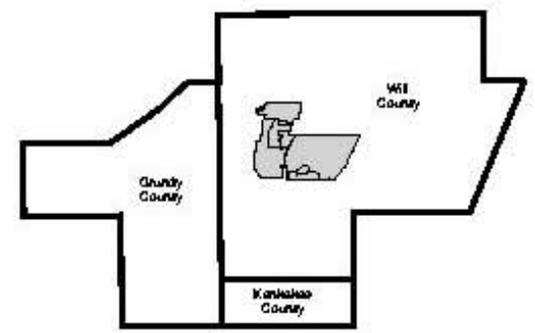
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USDA Forest Service
Illinois Dept. of Nat. Res.

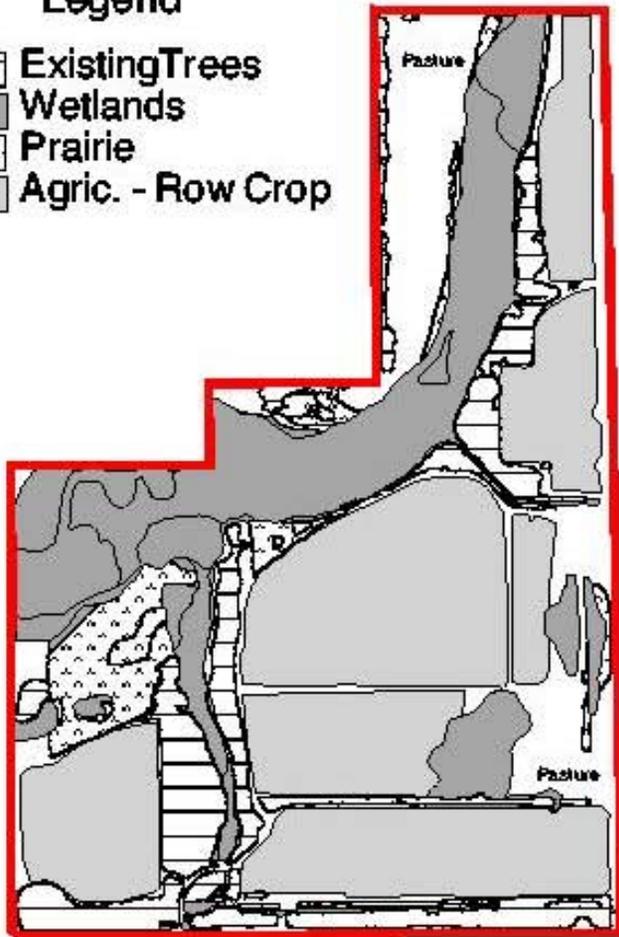


Midewin & Macrosite Boundaries



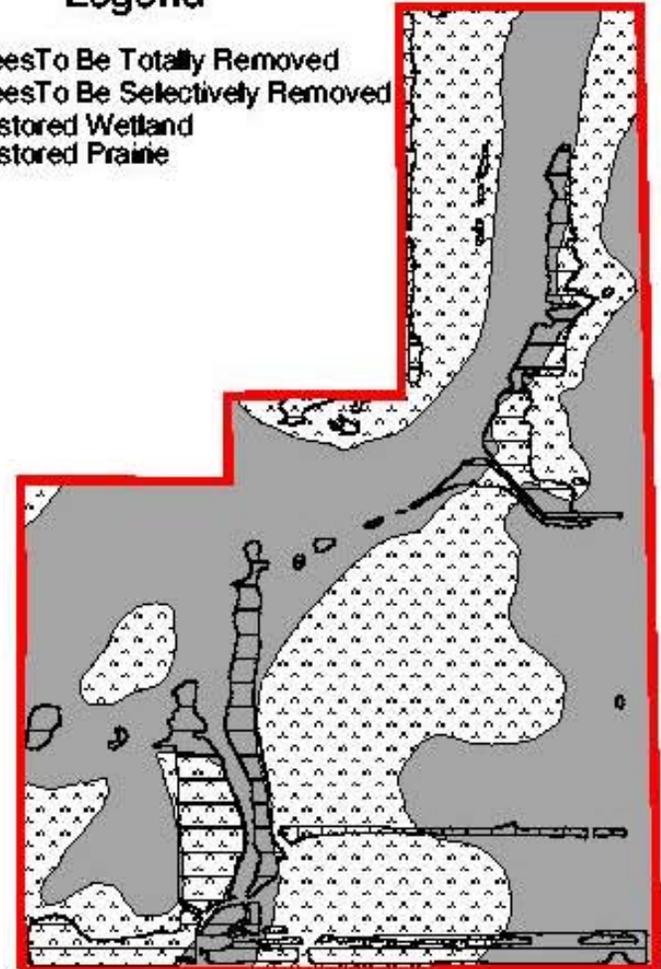
Blodgett Road - Existing Condition

- Legend**
- Existing Trees
 - Wetlands
 - Prairie
 - Agric. - Row Crop



Blodgett Road - Desired Condition

- Legend**
- Trees To Be Totally Removed
 - Trees To Be Selectively Removed
 - Restored Wetland
 - Restored Prairie

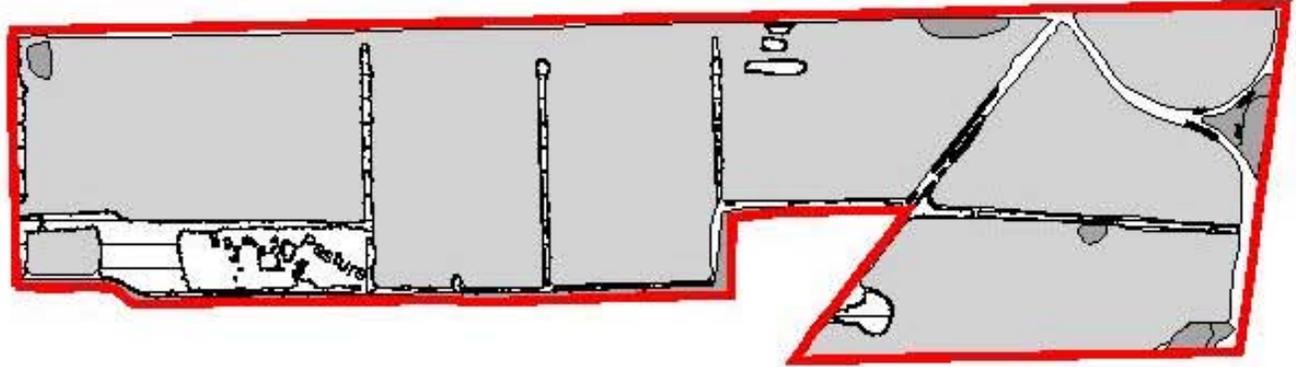


0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 Miles



South Patrol Road - Existing Condition

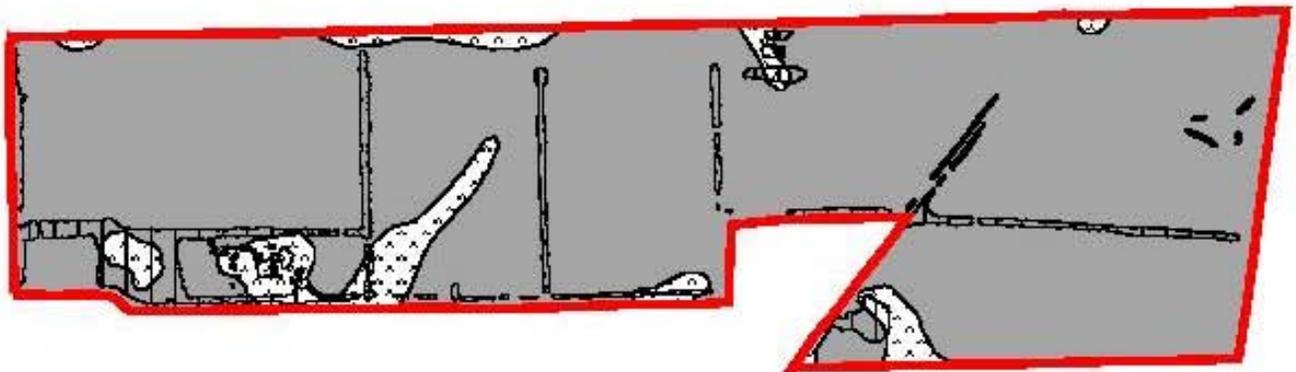
- Legend**
- Existing Trees
 - Wetlands
 - Agric. - Row Crop



0 0.2 0.4 0.6 0.8 1 Miles

South Patrol Road - Desired Condition

- Legend**
- Trees To Be Totally Removed
 - Restored Prairie
 - Restored Wetland



Appendix A

Desired Plant Species Lists for Restored Habitats

Blodgett Road and South Patrol Road Restorations

Plant species are listed alphabetically by scientific name. Nomenclature follows Swink and Wilhem (1994) for the most part; a few exceptions follow Gleason and Cronquist (1991) or Mohlenbrock (1986). Species lists are based on community descriptions by Glass (1994), White (1995?), White and Madany (1978), Sluis and Tanderich (2000), Swink and Wilhelm (1994), and The Wetlands Initiative (1991), plus field notes and observations by William D. Glass (Illinois Department of Natural Resources, Division of Natural Heritage) and Eric Ulaszek (USDA Forest Service) at Midewin National Tallgrass Prairie, DesPlaines State Fish and Wildlife Area, and other sites with similar physiognomy in Will, Grundy, and Kankakee counties, Illinois.

Typic prairie is here used to characterize non-dolomite prairie within the project areas (White 1995). Within both areas, typic prairies will be restored on sites with more than 0.5 meters of unconsolidated material above the bedrock. Both project areas are on an outwash plain and the soils consist of silty and sandy loams with lenses of sand, gravel and clay. Many species otherwise restricted to dolomite prairies (< 0.5 meters to dolomite bedrock) occur in the typic prairies on the outwash plain of the DesPlaines and Kankakee rivers, presumably because of the abundant dolomite fragments present in the soil.

The presence and relative abundance of a given plant species within a habitat is indicated by an additive sign (+): + = rare; ++ = occasional to common; +++ = common to abundant. The desired abundance is based on similar sites, and does not apply to these habitats or species throughout their distribution. Not all species listed below will be present in planted seed mixes; some species are expected to colonize from adjacent areas. Some species may be introduced at different stages of restoration, as appropriate for the species' ecology. Many weedy natives and incidental exotics are expected to colonize these areas; they are not listed below, and are expected to decline or disappear as the restorations mature.

<i>Scientific Name</i>	Common Name	Typic Prairie		Dolomite Prairie		Sedge Meadow	Marsh
		Mesic	Wet	Mesic	Wet		
<i>Agalinis tenuifolia</i>	Slender False-foxglove		++		++	++	
<i>Alisma subcordatum</i>	Small-flowered Water-plantain		+		+	+	++
<i>Alisma trivale</i>	Showy Water-plantain				+		+
<i>Allium canadense</i>	Wild Garlic	++	+	++	++		
<i>Allium cernuum</i>	Nodding Wild Onion	+++	+	+++	++		
<i>Allium mutabile</i>	Glade Onion			+	+		
<i>Amorpha canescens</i>	Leadplant	+++					
<i>Amorpha fruticosa</i>	Indigo-bush				+		
<i>Andropogon gerardii</i>	Big Bluestem	++	+	++	+		
<i>Andropogon scoparius</i>	Little Bluestem	+++		+			
<i>Anemone canadensis</i>	Meadow Anemone	+	+++	+	++		

<i>Anemone cylindrica</i>	Prairie Thimbleweed	+					
<i>Antennaria plantaginifolia</i>	Large Pussy-toes	+		+			
<i>Apios americana</i>	Groundnut	+	++	+	++	+	
<i>Apocynum cannabinum</i>	Indian Hemp	+	+	+	+		
<i>Apocynum sibiricum</i>	Prairie Dogbane	+	++	+	++	++	
<i>Arabis hirsuta</i>	Hairy Rock Cress			+			
<i>Asclepias amplexicaulis</i>	Sand Milkweed	+					
<i>Asclepias hirtella</i>	Tall Green Milkweed	+					
<i>Asclepias incarnata</i>	Swamp (Marsh) Milkweed		+		++	++	+
<i>Asclepias sullivantii</i>	Prairie Milkweed	+++	++	++	++		
<i>Asclepias syriaca</i>	Common Milkweed	+		+			
<i>Asclepias verticillata</i>	Whorled Milkweed	+		++			
<i>Asclepias viridiflora</i>	Short Green Milkweed	+					
<i>Aster ericoides</i>	Heath Aster	+++		++			
<i>Aster laevis</i>	Smooth Blue Aster	+++					
<i>Aster oblongifolius</i>	Aromatic Aster			+			
<i>Aster oolentangiensis (= A. azureus)</i>	Sky-blue Aster	+					
<i>Aster prealtus</i>	Willow Aster		+		+	++	+
<i>Aster puniceus</i>	Red-stemmed Aster		+		+	+	
<i>Aster simplex</i>	Panicled Aster		+++		+++	++	+
<i>Aster novae-angliae</i>	New England Aster	++	+++	+	++	+	
<i>Baptisia lactea (= B. leucantha)</i>	White Wild Indigo	+++					
<i>Baptisia leucophaea</i>	Cream Wild Indigo	++					
<i>Bidens aristosa</i>	Swamp Marigold		++		+++	+++	+
<i>Bidens cernua</i>	Nodding Bur Marigold		+		++	++	++
<i>Bidens comosa</i>	Bur Marigold				+	+	+
<i>Bidens frondosa</i>	Beggar's-ticks		+		+	+	+
<i>Blephila ciliata</i>	Ohio Horse-mint	+		++			
<i>Boehmeria cylindrica</i>	False-nettle		+		+	++	+
<i>Brickellia eupatorioides</i>	False Boneset	++		++			
<i>Cacalia plantaginea</i>	Prairie Indian Plantain	+	+++	+	+++	+	
<i>Calamagrostis canadensis</i>	Bluejoint Grass		+++		++	+++	+

<i>Camassia scilloides</i>	Wild Hyacinth	++		++			
<i>Cardamine bulbosa</i>	Bulbous Spring Cress		+		+	+	
<i>Carex annectans</i>	Sedge		++		++	+	
<i>Carex bebbii</i>	Sedge		+			+	
<i>Carex bicknellii</i>	Prairie Sedge	++		++			
<i>Carex brevior</i>	Sedge	+	+	+	+		
<i>Carex buxbaumii</i>	Sedge		++		++	++	
<i>Carex comosa</i>	Sedge		+		+	++	+
<i>Carex crawei</i>	Crawe's Sedge	+	+	++	++		
<i>Carex cristatella</i>	Sedge		++		++	++	
<i>Carex frankii</i>	Sedge		+		+	+	+
<i>Carex granularis</i>	Sedge	+	++	+	++		
<i>Carex gravida</i>	Sedge	++		++			
<i>Carex haydenii</i>	Tussock Sedge		++		++	++	
<i>Carex hystricina</i>	Sedge		+		+	+	+
<i>Carex interior</i>	Sedge		+		+	+	
<i>Carex lacustris</i>	Lake Sedge		+		+	++	++
<i>Carex meadii</i>	Sedge	++					
<i>Carex pellita</i>	Sedge	+	+++	++	+++	+++	+
<i>Carex sartwellii</i>	Sedge		+		+	++	
<i>Carex scoparia</i>	Sedge		++		++	++	
<i>Carex squarrosa</i>	Sedge		+			+	++
<i>Carex stipata</i>	Sedge					+++	++
<i>Carex stricta</i>	Tussock Sedge				+	+++	
<i>Carex suberecta</i>	Sedge	++	+	++	+		
<i>Carex tetanica</i>	Sedge	+	++	+	++		
<i>Carex tribuloides</i>	Sedge		+		+	++	
<i>Carex trichocarpa</i>	Sedge		++		++	+++	+
<i>Carex utriculata</i>	Sedge					+	+
<i>Carex vulpinoidea</i>	Sedge		++		++	++	
<i>Ceanothus americanus</i>	New Jersey Tea	++		+			
<i>Chamaecrista fasciculata</i>	Partridge Pea	+++		+			
<i>Chelone glabra</i>	White Turtlehead		+		+	+	
<i>Cicuta maculata</i>	Water Hemlock		++		++	++	+
<i>Cirsium discolor</i>	Old Field Thistle	++	+	++	+		
<i>Cirsium hillii</i>	Hill's thistle	++		+			
<i>Claytonia virginica</i>	Spring Beauty	++		++	+		

<i>Comandra umbellata</i>	False Toadflax	+++		++			
<i>Coreopsis palmata</i>	Prairie Coreopsis	++					
<i>Coreopsis tripteris</i>	Tall Coreopsis	+++	+	+			
<i>Cyperus acuminatus</i>	Flatsedge				+	+	
<i>Dalea candida</i>	White Prairie-clover	+					
<i>Dalea foliosa</i>	Leafy Prairie-clover				++	+	
<i>Dalea purpurea</i>	Purple Prairie-clover	+++			++		
<i>Deschampsia caespitosa</i>	Tufted Hair Grass				+	+++	
<i>Desmanthus illinoiensis</i>	Illinois Bundle-flower	++	+	++			
<i>Desmodium canadense</i>	Showy tick-trefoil	+++			+		
<i>Desmodium illinoiense</i>	Illinois Tick-trefoil	+					
<i>Dodecatheon meadia</i>	Shooting-star	+++		+++			
<i>Echinacea pallida</i>	Pale Purple Coneflower	+					
<i>Eleocharis acicularis</i>	Spikerush					++	+
<i>Eleocharis compressa</i>	Flattened Spikerush	++	++	+++	++		
<i>Eleocharis erythropoda</i>	Spikerush		+		+++	++	+
<i>Eleocharis obtusa</i>	Spikerush				+		++
<i>Elymus canadensis</i>	Canada Wild Rye	+++	+	+++	+		
<i>Elymus riparius</i>	Riverbank Wild Rye		+	+	+		
<i>Elymus virginicus</i>	Virginia Wild Rye			+	++		
<i>Epilobium coloratum</i>	Willow-herb		+		++	++	+
<i>Equisetum arvense</i>	Field Horsetail	+	++	+	+		
<i>Equisetum laevigatum</i>	Prairie Horsetail	++	+	+			
<i>Erigeron strigosus</i>	Daisy Fleabane	++		+			
<i>Eryngium yuccifolium</i>	Rattlesnake-master	+++	+				
<i>Eupatorium maculatum</i>	Spotted Joe-pye Weed		++		++	++	
<i>Eupatorium perfoliatum</i>	Common Boneset		++		++	+++	+
<i>Euphorbia corollata</i>	Flowering spurge	+++		+			
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	+	+++	+	++		
<i>Fragaria virginiana</i>	Wild Strawberry	++	++	++			
<i>Galium boreale</i>	Northern Bedstraw		++		++	+	
<i>Galium obtusum</i>	White Bedstraw		+++	+	+++	+++	
<i>Gentian puberulenta</i>	Prairie Gentian	++					
<i>Gentiana andrewsii</i>	Bottle Gentian	+	++				+
<i>Geranium carolinense</i>	Carolina Cranesbill				++	++	

<i>Geum laciniatum</i>	Rough Avens		++		++	+	+
<i>Glyceria striata</i>	Fowl Manna Grass		++		++	+++	+
<i>Helenium autumnale</i>	Yellow Sneezeweed		++		++	+++	
<i>Helianthus grosseserratus</i>	Saw-toothed Sunflower	++	++	+	+		
<i>Helianthus pauciflorus</i>	Stiff Sunflower	+++					
<i>Heliopsis helianthoides</i>	False Sunflower	++					
<i>Heuchera richardsonii</i>	Prairie Alumroot	+++					
<i>Hierochloë odorata</i>	Vanilla Grass	+	++	+	++		
<i>Hypericum sphaerocarpum</i>	Round-fruited St. John's-wort	+	+	+++	+++		
<i>Hypoxis hirsuta</i>	Yellow Stargrass	+++	+	++			
<i>Impatiens capensis</i>	Orange Jewelweed				+	++	++
<i>Iris shrevei</i>	Blue Flag		++		++	+++	++
<i>Isoëtes butleri</i>	Glade Quillwort			+			
<i>Juncus dudleyi</i>	Rush		++		++	+++	
<i>Juncus interior</i>	Rush				+		
<i>Juncus torreyi</i>	Rush		+	+	+++	+	
<i>Lactuca canadensis</i>	Wild Lettuce	+		+			
<i>Lathyrus palustris</i>	Marsh Vetchling		++		+		
<i>Lathyrus venosus</i>	Veiny Pea	+		+			
<i>Leersia oryzoides</i>	Rice Cut Grass		+		++	++	+++
<i>Lemna minor</i>	Small Duckweed						++
<i>Lespedeza capitata</i>	Round-headed Bush-clover	+++		+			
<i>Liatris aspera</i>	Rough Blazing-star	++		+			
<i>Liatris pycnostachya</i>	Prairie Blazing-star	++					
<i>Liatris spicata</i>	Dense Blazing-star	+	++	+++	++	+	
<i>Lilium michiganense</i>	Turk's-cap Lily	+	++	+	++		
<i>Lippia lanceolata</i>	Fog-fruit		+		++	++	
<i>Lithospermum canescens</i>	Hoary Puccoon	++					
<i>Lithospermum incisum</i>	Fringed Puccoon			+			
<i>Lobelia siphilitica</i>	Great Blue Lobelia		+		+	++	++
<i>Lobelia spicata</i>	Pale Spiked Lobelia	+++		+++			
<i>Lycopus americana</i>	Common Water-horehound		++		++	+++	+
<i>Lycopus uniflorus</i>	Small Water-horehound		+		++	+	
<i>Lysimachia ciliata</i>	Fringed Loosestrife				+		

<i>Lysimachia lanceolata</i>	Lance-leaved Loosestrife	+					
<i>Lysimachia quadriflora</i>	Prairie Loosestrife		++		++	++	
<i>Lythrum alatum</i>	Winged Loosestrife		++		++	+++	+
<i>Malvastrum hispidum</i> (= <i>Sphaeralcea angusta</i>)	False Mallow			+	+		
<i>Mentha arvensis villosa</i>	Field Mint		++		++	+++	+
<i>Mimulus ringens</i>	Northern Monkey-flower		+		+	+++	++
<i>Minuartia patula</i> (= <i>Arenaria patula</i>)	Pitcher's Sandwort			+	+		
<i>Monarda fistulosa</i>	Wild Bergamot	+++		++			
<i>Muhlenbergia mexicana</i>	Marsh Satin-grass		+		++	+	
<i>Myosotis verna</i>	White Forget-me-not			+			
<i>Napaea dioica</i>	Glade Mallow		+		+		
<i>Nuphar advena</i>	Yellow Pond Lily						+++
<i>Nymphaea tuberosa</i>	White water Lily						+
<i>Oenothera biennis</i>	Common Evening Primrose	+		+			
<i>Oenothera pilosella</i>	Prairie Sundrops		++		++		
<i>Onosmodium hispidissimum</i>	Bristly Marbleseed	+		++			
<i>Oxalis violacea</i>	Violet Wood-sorrel	++		++			
<i>Oxypolis rigidior</i>	Smooth Cowbane	+	++	+	++	++	
<i>Panicum flexile</i>	Wiry Panic Grass			+			
<i>Panicum leibergii</i>	Prairie Panic Grass	++		+			
<i>Panicum oligosanthes scribnerianum</i>	Scribner's Panic Grass	++		++			
<i>Panicum virgatum</i>	Switchgrass	++	++	++	+		
<i>Parthenium integrifolium</i>	Wild Quinine	+++		+			
<i>Pedicularis canadensis</i>	Common Lousewort	++					
<i>Pedicularis lanceolata</i>	Fen Lousewort		++		++	++	
<i>Penstemon calycosus</i>	Smooth Beardtongue	++		+			
<i>Penstemon digitalis</i>	Foxglove Beardtongue	+++	+				
<i>Penstemon hirsutus</i>	Hairy Beardtongue			++			
<i>Penthorum sedoides</i>	Water Stonecrop		+		+	++	++
<i>Perideridia americana</i>	American Pimpernel	+		+++			
<i>Phlox glaberrima interior</i>	Marsh Phlox	+	++	+	++	+	

<i>Phlox pilosa</i>	Prairie Phlox	+++						
<i>Physalis virginiana</i>	Virginia Ground-cherry	+		+				
<i>Physostegia virginiana arenaria</i>	Prairie Obedient Plant	+++	+	++				
<i>Physostegia virginiana virginiana</i>	Marsh Dragonhead		+	+	++			
<i>Pilea pumila</i>	Clearweed						+	+
<i>Platanthera leucophaea</i>	Eastern Prairie White-fringed Orchid	+	++					
<i>Polygonum amphibium stipulaceum</i>	Water Smartweed		+		+	++	+++	
<i>Polygonum coccineum</i>	Scarlet Smartweed		++		++	++	++	
<i>Polygonum hydropiperoides</i>	Mild Water Pepper					+	+++	
<i>Polygonum ramosissimum</i>	Upright Knotweed			+	++			
<i>Polytaenia nuttallii</i>	Prairie Parsley							
<i>Potamogeton nodusus</i>	Pondweed							++
<i>Potamogeton pusillus</i>	Pondweed							+
<i>Potentilla arguta</i>	Prairie Cinquefoil	++		+				
<i>Potentilla simplex</i>	Field Cinquefoil	++		++				
<i>Prenanthes aspera</i>	Rough White Lettuce	++						
<i>Prenanthes racemosa</i>	Glaucous White Lettuce	++	++					
<i>Psoralea onobrychis</i>	French-grass	+	+					
<i>Pycnanthemum virginianum</i>	Mountain-mint	+++	+++	++	+++	+		
<i>Ranunculus longirostris</i>	White Water-crowfoot							+++
<i>Ranunculus scleratus</i>	Mud Crowfoot					++	+	++
<i>Ratibida pinnata</i>	Yellow Coneflower	+++		++				
<i>Rorippa palustris</i>	Marsh Yellow Cress		+		++	++	++	
<i>Rosa blanda</i>	Early Rose		+	+	+			
<i>Rosa carolina</i>	Carolina Rose	+++		+++				
<i>Rudbeckia fulgida sullivantii</i>	Sullivant's Coneflower	+++	++	++	+			
<i>Rudbeckia hirta</i>	Brown-eyed Susan	+++		++				
<i>Rudbeckia subtomentosa</i>	Sweet Coneflower	+	++	+	++			
<i>Ruellia humilis</i>	Hairy Wild Petunia	+		++				
	Common Arrowleaf						+	

<i>Sagittaria latifolia</i>						+		+++
<i>Satureja arkansana</i>	Low Calamint	++	++	+++	+++			
<i>Scirpus acutus</i>	Hardstem Bulrush		+		+	++		
<i>Scirpus atrovirens</i>	Green Bulrush		+		++	++		+
<i>Scirpus cyperinus</i>	Woolgrass		+		+	+		+
<i>Scirpus fluviatilis</i>	River Bulrush					+		+++
<i>Scirpus pendulus</i>	Red Bulrush	+	++	++	++	++		
<i>Scirpus pungens</i>	Chairmaker's Rush		+		+	++		+
<i>Scirpus validus</i>	Great Bulrush				++	++		+++
<i>Scutellaria epilobifolia</i>	Marsh Skullcaps				+	++		+
<i>Scutellaria lateriflora</i>	Mad-dog Skullcaps				+	+		++
<i>Scutellaria parvula</i>	Small Skullcaps	++		+++				
<i>Senecio pauperculus</i>	Balsam Ragwort	++	++	++	++			
<i>Silphium integrifolium</i>	Rosinweed	+++	+	+				
<i>Silphium laciniatum</i>	Compass-plant	+++						
<i>Silphium perfoliatum</i>	Cup-plant	+	++		++	+		
<i>Silphium terebenthinaceum</i>	Prairie Dock	+++	+					
<i>Sisyrinchium albidum</i>	White Blue-eyed Grass	+++		+++				
<i>Sium sauve</i>	Water Parsnip		+		+	+		++
<i>Smilacina stellata</i>	Starry Solomon's-seal	+		+				
<i>Solidago gigantea</i>	Giant Goldenrod		+		++	+		
<i>Solidago juncea</i>	Early Goldenrod	++	+	+++	+			
<i>Solidago nemoralis</i>	Old Field Goldenrod	+		+				
<i>Solidago riddellii</i>	Riddell's Goldenrod	+	+	++	+++	+		
<i>Solidago rigida</i>	Stiff Goldenrod	+++		++				
<i>Solidago speciosa</i>	Showy Goldenrod	+						
<i>Sorghastrum nutans</i>	Indian Grass	++		++				
<i>Sparganium eurycarpum</i>	Common Bur-reed							+++
<i>Spartina pectinata</i>	Prairie Cordgrass	+	+++	+	+++	+		+
<i>Spiranthes magnicamporum</i>	Great Plains Ladies' Tresses	++		+				
<i>Spirodela polyrhiza</i>	Great Duckweed							++
<i>Sporobolus heterolepis</i>	Prairie Dropseed	+++	+	+++				
<i>Stachys palustris homotricha</i>	Woundwort		++		++	++		
<i>Stachys tenuifolia</i>	Slender Hedge-nettle	++	+	++	+			

<i>Teucrium canadense</i>	American Germander	+	++	+	++	++	
<i>Thalictrum dasycarpum</i>	Smooth Meadow-rue		++		++	++	+
<i>Thalictrum revolutum</i>	Skunk Meadow-rue	+	++			++	
<i>Thelypteris palustris</i>	Marsh Fern		+			+	+
<i>Tomanthera auriculata</i> (= <i>Agalinis auriculatus</i>)	Earleaf False-foxtail	++		++			
<i>Tradescantia ohiensis</i>	Tall Spiderwort	+++	++	+++	+		
<i>Typha latifolia</i>	Common Cattail						+++
<i>Utricularia vulgaris</i>	Common Bladderwort						++
<i>Valeriana edulis ciliata</i>	Hairy Valerian	+	++			+	
<i>Verbena hastata</i>	Blue Vervain		++		++	+++	++
<i>Vernonia fasciculata</i>	Prairie Ironweed	++	++	+++	++	++	
<i>Veronicastrum virginicum</i>	Culver's-root	+++	++	++			
<i>Vicia americana</i>	American Vetch	++		+			
<i>Viola pedatifida</i>	Prairie Violet	++		++			
<i>Viola sororia</i>	Blue Violet	+	+	+	+		
<i>Zizia aurea</i>	Golden Alexanders	++	+++	++	++		

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