Biological Assessment

for

Midewin National Tallgrass Prairie

Land and Resource Management Plan

USDA Forest Service
Midewin National Tallgrass Prairie

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Prepared by:

Eric Ulaszek, Horticulturist, Midewin Tallgrass Prairie
William Glass, Wildlife Biologist, Illinois Dept. of Natural Resources

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I. Introduction:

This document is an evaluation of the effects of the selected alternative (Alternative 4) on Federal Threatened and Endangered Species known to occur on Midewin National Tallgrass Prairie (Midewin) or on immediately adjacent lands.

Federal Threatened and Endangered species are those plant and animal species formally listed by the U.S. Fish and Wildlife (FWS) under authority of the Endangered Species Act (ESA) of 1973, as amended. An endangered species is defined as one in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as one likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

All species listed as Endangered or Threatened by the FWS, and which could occur within the boundaries of Midewin, were examined. This list of species was developed through consultation with the US Fish and Wildlife Service (Barrington, Illinois Field Office). Seven species were excluded from further analysis, while three species (leafy prairie-clover, eastern prairie white-fringed orchid, and bald eagle) were brought forward for further analysis.

1. Leafy prairie-clover (*Dalea foliosa*) is Endangered, known from Midewin, and was analyzed.

2. Eastern prairie white-fringed orchid (*Platanthera leucophaea*) is Threatened and known from adjacent property. There is similar habitat on Midewin and there is a likelihood that this species occurs at Midewin. For these reasons, this species was analyzed further.

3. Hine's emerald dragonfly (*Somatochlora hineana*) is Endangered and was excluded from further analysis because surveys for this species have failed to locate any at Midewin or in the immediate vicinity. Appropriate high quality habitat for this insect is absent from Midewin.

4. American burying beetle (*Nicrophorus americanus*) is Endangered and was excluded from further analysis because surveys for this species have failed to locate any at Midewin or in the immediate vicinity. This species may be considered for reintroduction in the future.

5. Lakeside daisy (*Hymenoxys herbacea*) is Threatened and was excluded from further analysis because surveys for this species have failed to locate any at Midewin or in the immediate vicinity. This species may be considered for reintroduction in the future as appropriate habitat is established.

6. Karner blue butterfly (*Lycaeides melissa samuelis*) is Endangered and was excluded from further analysis because surveys have failed to locate any at Midewin. There is no high quality habitat for this insect at Midewin, and the larval food plant, wild lupine (*Lupinus perennis*), is not found at Midewin.

7. Indiana bat (*Myotis sodalis*) is Endangered and was excluded from further analysis since this species is not known to occur at Midewin, which appears to be north of the normal breeding range.

8. Mead's milkweed (*Asclepias meadii*) is Threatened and was excluded from further analysis since its not known from Midewin or the immediate vicinity. This species may be considered for reintroduction in the future as appropriate habitat is established.

9. Prairie bush-clover (*Lespedeza leptostachya*) is Threatened and was excluded from further analysis since its not known from Midewin or the immediate vicinity. This species may be considered for reintroduction in the future as appropriate habitat is established.

10. Bald eagle (*Haliaeetus leucocephalus*) is Threatened and occurs on Midewin as an occasional migrant visitor. Bald eagles are also known to winter in some years along the Des Plaines River to the north and west of Midewin. For these reasons, this species was analyzed further.

II. Affected Environment

A. Leafy Prairie-clover (*Dalea foliosa*) Federally Endangered

Leafy prairie-clover is a short-lived, herbaceous perennial that occurs in dolomite prairies, limestone barrens, gravel prairies, and cedar glades (Baskin and Baskin 1973; NatureServe 2000a; USFWS 1996; Schwegman and Glass, unpublished date). In dolomite prairies, leafy prairie clover is largely restricted to specific microhabitats, where the soil is between 4 cm and 45 cm deep over bedrock, and the areas are not excessively dry or inundated for long periods during the growing season (USFWS 1996). The natural range includes northern Illinois, central Tennessee, and North-central Alabama (USFWS 1996). The northern Illinois populations are the only ones in the Midwest, and are separated from those in Tennessee and Alabama by over 400 miles.

Leafy prairie-clover plants begin growth in March or April, flower (in northern Illinois) from July 25th to September 9th (Swink and Wilhelm 1994), with seeds ripening by early October (USFWS 1996). The seeds have physical dormancy and those of some populations may respond to mechanical scarification (Baskin and Baskin 1998; USFWS 1996). Burning may increase germination and recruitment by removing duff, creating patches of exposed soil, and reducing competition (USFWS 1996). Like many other short-lived perennials, there is a persistent soil seed bank (USFWS 1996), and individual seeds may survive for up to eight years before germination (Baskin and Baskin 1998). Recruitment of seedlings requires sufficient soil moisture (USFWS 1996).

Loss of habitat through development was the biggest cause of decline in leafy prairie-clover, and some sizable populations (primarily in Tennessee) remain unprotected. Many sites were destroyed by rock and gravel quarries, while others were converted to industrial or commercial uses. Browsing and grazing by native herbivores (white-tailed deer, eastern cottontail) and livestock (cattle) have been identified as specific threats to leafy prairie-clover (Schwegman and

Glass unpublished; USFWS 1996). Midewin staff have observed herbivory on leaves and shoots from insect larvae (Lepidoptera). Because the plant's crown and growing points are near the surface, individual plants may be vulnerable to damage from prescribed fire. Prescribed burns conducted in fall may lead to plant mortality, as soil exposure in winter can increase the likelihood of frost heaving (USFWS 1996). Lack of management is also a threat, as shading by encroaching woody plants eliminates leafy prairie-clover (USFWS 1996). At least one historical population (in Kankakee County) was lost because of over collecting (USDA Forest Service 2000a).

Historic and Current Range

Leafy prairie-clover was known from a number of river valleys within the Central Till Plains (Des Plaines, Kankakee, Fox, Illinois and Rock river valleys). Although leafy prairie clover was known from a number of sites, it was probably very localized in distribution because it was restricted to a relatively rare community, dolomite prairie. A few populations were also present in prairies on calcareous, gravelly stream terraces along the Rock, Fox, and Illinois rivers; these sites were probably associated with dolomite prairies, and all have been destroyed (Bowles and Jones 1992).

The greatest concentration of the dolomite prairie in northern Illinois was found in the Kankakee and lower Des Plaines river valleys. Presently, leafy prairie clover is only found within the lower Des Plaines River Valley within the entire Midwest. Five natural populations are known within this area; a sixth has not been observed in at least a decade, and the habitat at this site is now highly degraded (Illinois Department of Natural Resources [IDNR] 2001). There have been two attempts to establish new populations in suitable dolomite prairie habitat (one at a historically-known locality), but currently, plants are only present at one site (W. Glass, personnel communication). The largest populations are located along the lower Des Plaines River Valley within the Southwestern Great Lakes Morainal Section (Keys et al. 1995). Most of the populations are on public property, with the exception of the portion on private property adjacent to Midewin and another small population in the Southwestern Great Lakes Morainal Section. The populations within public ownership are protected and being managed. The populations in private ownership are presently safe, but could be threatened by land use changes. The populations of this species within the lower Des Plaines River Valley appear stable.

Occurrence and Trends at Midewin

Based on mapped soils, approximately 1,375 acres of Midewin was once dolomite prairie. Leafy prairie-clover may have been found throughout these dolomite prairies where the microhabitat conditions were appropriate. Most of these areas are no longer dolomite prairie, having been converted to pasture, hayland, crop fields, roads, and railroads; only 120 acres of dolomite prairie is now present on Midewin.

At Midewin, leafy prairie-clover is restricted to a small area at the northwest corner of National Forest land. Most of the population (>75%) probably lies on adjacent private property. This population occurs in degraded dolomite prairie in 4-20 cm of soil over bedrock. This prairie community was grazed in the past, but has been free of livestock since at least the 1980s and possibly since the 1940s. Associated vegetation at this site include a mixture of native and non-native species, including *Poa compressa* (non-native)*, Penstemon hirsutus, Sporobolus*

heterolepis, Hypericum perforatum (non-native)*, Andropogon gerardii, Ambrosia artemisiifolia, Daucus carota* (non-native)*, Eupatorium altissimum, Solidago riddellii, Allium cernuum, Solanum carolinense* (non-native)*,* and *Rosa carolina*. There has been limited control of exotic plant species at this population of leafy prairie-clover, primarily hand removal of common teasel (*Dipsacus sylvestris*) and sweet-clovers (*Melilotus* spp.).

The Midewin population was discovered in October 1997 and has fluctuated from 178 to 114 plants (B. Molano-Flores, personal communication; E. Ulaszek, observations on 7 August 2001). There appears to be a gradual decline since 1999, and two subpopulations on National Forest land (each consisting of 1-2 plants) have disappeared since monitoring began (one in 2000, the other in 2001). Because leafy prairie-clover plants elsewhere have gone dormant for at least one growing season before reappearing (Schwegman and Glass unpublished), some of these individuals may still be present.

B. Eastern Prairie White-fringed Orchid (*Platanthera leucophaea*) Federally Threatened

Eastern prairie white-fringed orchid is a herbaceous, perennial monocot that ranges from Nova Scotia, southern Ontario, and Ohio west to Wisconsin, southeastern Iowa, and eastern Oklahoma (Gleason and Cronquist 1991). The eastern prairie white-fringed orchid occurs in wet and mesic tallgrass prairie, sedge meadows, fens, bogs, wet hay meadows, and moist abandoned fields (NatureServe 2000b). These communities are usually dominated by a diverse mixture of native grasses, sedges, and forbs, but this species has been documented from more degraded habitats, including wet meadows and hayfields dominated by exotic grasses; these degraded sites may not provide long-term habitat for viable populations (Bowles and Bell 1999).

This orchid grows from a compact tuber; evidence suggests that individual plants are dependent on a mycorrhizal association (the fungus *Rhyzoctonia*) for survival. Individual plants may be long-lived perennials (up to 30 years), but some plants have been known to die following the third year after initial flowering (Bowles et al. 1992; Case 1987). Seedlings may not be visible aboveground while intitially dependent upon their mycorrhizal associate and mature plants may enter dormancy for a growing season (Bowles et al. 1992; Case 1987). A disturbance regime appears important for seedling establishment and to induce flowering; this regime may include prescribed fire during the dormant season (NatureServe 2000b). Eastern prairie white-fringed orchid flowers in northeastern Illinois from June 22nd to July 22nd (Swink and Wilhelm 1994). This orchid is pollinated by nocturnal hawk-moths (family Sphingidae) (USFWS 1999). Seed capsules ripen and disperse seed in late August and early September (USDA Forest Service 2000b).

A number of threats to this species have been identified (USDA Forest Service 2000b; USFWS 1999). Habitat destruction has been responsible for historic declines, primarily through conversion of prairie to agricultural land. Known sites have been degraded through hydrological alterations (draining or flooding) and suppression of fire. Woody encroachment and competition from invasive grasses and herbs may result from fire suppression or lack of management. Cutting hay in midsummer prevents development of seed capsules, and can prevent seed production and dispersal in entire populations. However, mowing may help control invading woody species. Herbivory by cattle and deer are reported as threats. Some populations of this

orchid have persisted under intensive grazing and mowing, but numbers more typically decrease under these conditions. The lack of suitable pollinators has been identified as a threat to some populations. Insufficient size of preserves may result in declines or extirpation of pollinators, and insecticides may eliminate or reduce populations of pollinating insects. Introduction of incompatible genetic material between populations may also pose a threat by increasing the possibility of outbreeding depression (Havens and Bradford, unpublished report). Commercial horticulturists, orchid fanciers, and wildflower gardeners may reduce or extirpate populations by removing orchid plants.

Historic and Current Range

Eastern prairie white-fringed orchid was formerly widespread in the low prairies of the Central Till Plains Division and throughout the northern two-thirds of Illinois (Sheviak 1974). Historic records are known from at least thirty-three Illinois counties, although this species is now present within only nine counties, perhaps with less than twenty-five extant populations remaining (Herkert 1991). Currently, in the Central Till Plains Section this species is found in Grundy, Henry, Iroquois, and Will counties in Illinois, each represented by a single population (IDNR 2001). Two of these four sites are within the Prairie Parklands. Three of the populations are either in public ownership or have some form of permanent protection. The private site has the largest population, and has some informal protection from the landowners. Another site within the Prairie Parklands has been the recipient of seed release program, but as of 2001, there is no evidence of an established population (W. Glass, IDNR, personal communication). Two of the Central Till Plains populations are large, one is medium-sized, and one is relatively small. It has proven difficult to determine population trends for this orchid because there are often great fluctuations from year to year. These fluctuations often occur in response to climatic conditions (precipitation of the previous growing season) and management (e.g., prescribed burning) (USFWS 1999). Nearly all the remaining Illinois populations are on protected sites, with most in public ownership. Many of these sites undergo active management, and the orchids are the subject of research and monitoring. There is also an intensive effort to enhance some existing populations and establish new populations at suitable sites.

Occurrences and Trends at Midewin

At Midewin, historic habitat was based upon 85% of the upland prairie soils and 85% of the hydric soils, which would have included mostly wet-mesic prairie habitat. These percentages exclude areas (approximately 15% in each case) that were either too dry or too wet for this species. Based on the preceding assumptions, the total amount of suitable habitat for the eastern prairie white-fringed orchid once present on Midewin is estimated at 13,581 acres. The orchid was probably not evenly distributed throughout this habitat; instead, population distribution was likely controlled by disturbance history (especially fire), soil-moisture gradients, dominant plant species, and stochastic factors associated with successful pollination, seed production/dispersal, and suitable microhabitats for seedling establishment. Most of Midewin is no longer suitable for this species, as most prairie habitat has been converted to pasture, hayland, crop fields, roads, railroads, warehouses, and manufacturing areas. Less than 150 acres of prairie is now present on Midewin, and much of this is not currently suitable for the eastern prairie white-fringed orchid because of fire exclusion, woody encroachment, and hydrologic alterations.

Eastern prairie white-fringed orchid has not been found on Midewin, although there have been specific surveys for this plant in suitable habitat. A population of this orchid, however, is present on adjacent IDNR land, and individual plants occur within 100 feet of the IDNR/Midewin boundary. Plant communities containing the eastern prairie white-fringed orchid are contiguous from IDNR land onto Midewin, and Midewin staff consider it likely that individual plants from this population could have occurred on National Forest land in the recent past and may occur unrecorded in this area at present.

C. Bald Eagle (*Haliaeetus leucocephalus*) Federally Threatened

The bald eagle is a large, diurnal raptor (Accipiteridae) that is widespread in North America. The breeding range is from Alaska and northern Canada south to Florida and extreme northwestern Mexico. Nesting birds are rare or absent from large portions of this range, primarily in the southwestern USA, the Great Plains, the lower Midwest, many mountainous regions, and heavily settled or urbanized areas. In winter, there is considerable withdrawal of bald eagles from the northern portions of the breeding range, but some wintering concentrations occur northwards to coastal Alaska and the upper Midwest. Breeding or wintering bald eagles are usually found near open water, including permanent lakes, rivers, and oceans, but migrants may occur in a variety of habitats (Buehler 2000).

Bald eagles feed mostly on fish, but have been recorded feeding on a wide variety of other birds, mammals, and reptiles (Buehler 2000; USFWS 1983). Carrion is an important component of the diet, especially dead fish (Buehler 2000). Nesting pairs build large nests of branches, twigs, and other vegetation, often re-using the nests; the nests are placed in large trees, on cliffs, or on the ground in areas where disturbance is unlikely (Buehler 2000; Grub and Eakle 1987; Peterson 1986). Nesting bald eagles are easily disturbed by human activities; they prefer to nest at least 1.0 km from human residences and are known to have abandoned or relocated nest sites to avoid human disturbance (Peterson 1986). Wintering habitat is usually along lakes, rivers, or seacoasts that remain open (ice-free) throughout the winter. Winter roosting sites, however, are usually located in trees growing in hollows or valleys, largely because such sites allow the birds to conserve heat during cold weather (Havera and Kruse 1988; Stalmaster and Gessaman 1984; USFWS 1983). These roosting sites are also vulnerable to human disturbance (Buehler 2000; Stalmaster and Gessamen 1984), and roost use has declined after the construction of nearby houses (Havera and Kruse 1988).

A number of threats to bald eagles have been identified (Buehler 2000; Havera and Kruse 1988; USFWS 1983). Habitat destruction and shooting have been responsible for historic declines. Bioaccumulation of pesticides, lead, and other pollutants have been the cause of severe declines during the middle 1900s, primarily through direct poisoning of birds or impairment of reproduction. Occasional shooting, collisions with powerlines, and poisoning from pesticides and pollutants all remain threats. Human disturbance of nesting and roosting birds is also a threat, as is loss of habitat.

Historic and Current Range

Bald eagles were formerly widespread in Illinois and the Midwest, nesting bald eagles were concentrated along major rivers and lakes (Havera and Kruse 1988). Although the bald eagle was probably extirpated as a breeding bird from Illinois before 1900 (Havera and Kruse 1988), a few

pairs may have attempted nesting into the early 1900s (Mattsson 1988). Since 1950, there have been increasing wintering concentrations of bald eagles along the locks of the Mississippi and Illinois rivers, primarily because the open water allowed for the eagles to continue feeding on gizzard shad and other fishes concentrated near the locks and dam. Illinois now supports a substantial number of wintering eagles (Havera and Kruse 1988). Nesting eagles began to recolonize Illinois in the 1970s and now nest annually, although not all nests are successful. There have been at least fifty active or attempted nests in Illinois since 1990. Most nesting attempts are made in close proximity to major rivers (Illinois, Mississippi, Rock) or large impoundments (Crab Orchard Lake, Rend Lake) in southern or western Illinois (IDNR 2001).

Occurrences and Trends at Midewin
No historic or recent records exist for bald eagles breeding or wintering at Midewin. Midewin does lie within the historic breeding and wintering ranges of bald eagles for Illinois. There are pre-1940 late spring and summer records of bald eagles from northern and East-central Illinois that probably refer to nesting pairs (Mattsson 1988). One or two pairs of bald eagles may have nested at Midewin prior to the middle 1800s, perhaps in wooded areas near the Kankakee or Des Plaines rivers. At present, bald eagles do not nest in northeastern or East-central Illinois (IDNR 2001), probably a consequence of insufficient habitat and human population density and disturbance. Small numbers of bald eagles winter in northeastern Illinois, primarily along the lower Des Plaines River; from one to several eagles are present annually (Havera and Kruse 1988). Before the conversion of the lower Des Plaines River into a commercial waterway, it may not have been suitable for wintering bald eagles; most of the ice-free areas now present are a consequence of locks, dams, and barge traffic. The Kankakee River also provides potential winter habitat, but eagles are rare winter visitors along this river, which often freezes over. The closest winter eagle roost to Midewin is in LaSalle County, forty miles west of Midewin.

Migrating bald eagles occur throughout Illinois (Bohlen 1989) and have been recorded at Midewin. Both immature and adult bald eagles have been recorded at Midewin, usually one bird per season (fall or spring). Observations have been made during March, April, October, November, and early December (Midewin staff and volunteers). Most birds are only observed once, either as they fly over the site, or while perched near a stream or wetland. Midewin does not contain suitable wintering or breeding habitat, largely because of the intensity of past and present human disturbance on Midewin and adjacent lands. All wetlands, streams, ponds, and impoundments on Midewin freeze over during the winter and cannot support foraging bald eagles.

III. Effects Analysis

A. Actions:

The action and direction proposed in the Land and Resource Management Plan (Prairie Plan) includes the following activities:

1. Infrastructure from the Army and pre-Army land uses will be removed, and the sites will be rehabilitated. This includes the removal of roads, railroad berms, buildings, and some bunkers.

Where possible, original land contours and soils will be restored. Approximately seven miles of administrative and public roads will remain.

2. Midewin supports only 400 acres of native vegetation at present, all consisting of small remnants that have survived amid agricultural and industrial uses. The acreage of these vegetation types will be increased by restoration in areas not currently supporting native vegetation (Table 1). Restoration of native vegetation will not be a random process, but instead will be matched with sites based on their likely natural vegetation before 1830, before extensive conversion to agricultural use. The proposed distribution, structure, and composition of the natural vegetation is based on information from county soil maps, General Land Office surveys, existing native vegetation remnants, and ecological surveys of similar sites. Restoration will require time, and is limited by the amount of seed and other plant materials, funding, staff time, seasonal conditions, and ecological change. For many of these vegetation types, it may take years or even decades before hydrology, soils, vegetation structure, species composition, and other ecological processes approach pre-1830 conditions.

A substantial portion of Midewin will be managed as habitat for area-sensitive grassland birds. In the immediate future, the vegetation of these areas will be dominated by Eurasian cool-season grasses, and grass structure will be managed by grazing and mowing (including hay cutting) during appropriate seasons. Other grassland wildlife and even some native plants are likely to be a component of these grasslands. Long-term research may enable Midewin staff to manage restored prairie to meet the habitat needs of the birds that require short and medium-stature grasslands.

Table 1. Approximate acreage of Vegetation and Habitat types, historic, present, and proposed.

Vegetation/Habitat Type	Pre-1830	Present	Proposed
Dolomite Prairie	1375	116	1375
Upland Typic Prairie	8620	3.7	3750
Wet Typic Prairie	4845	26.3	3080
Sedge Meadow	570	20.4	365
Marsh	285	57.9	180
Seep	>10	0.6	>7.5
Savanna	500	24.9	490
Woodland/Forest	430	150	425
Built-up and Developed	0	850	570
Cropland	0	3000	0
Agricultural Grasslands	0	2800	6560
Successional Vegetation	0	8950	<50

In addition to planting seed and plant materials, specific activities associated with restoration will include prescribed burning, grazing, mowing, invasive species control, tile removal, filling ditches, cutting of fencerows and other successional stands of woody vegetations, restoring land contours, and stream restoration. Many species no longer present on Midewin will be re-established to restore ecosystem processes such as pollination, herbivory, soil aeration, seed dispersal, and parasitism that are likely to be essential to restore a diverse tallgrass prairie ecosystem.

Some of these activities will occur only during specific seasons; mowing and hay-cutting will be limited to the periods when grassland birds are not nesting. Other activities, such as prescribed burning, may occur throughout the year provided there are appropriate fuels. A diversity of fire treatments is required to meet management prescriptions and to approximate natural conditions (Anderson 1990; Anderson 1997; McClain and Elzinga 1994).

3. Environmental education, interpretation, and research will continue and expand. The education and interpretive elements will help the public understand ecosystem restoration and management, including the importance of preserving specific species. Research will provide guidance for restoration and management at Midewin, including management of listed species.

4. Agricultural uses will continue, but row crops will be gradually phased out. Livestock grazing and cutting of grass hay will become management tools to maintain habitat structure for grassland birds. The application, timing and intensity of these tools will be conducted to meet habitat objectives.

5. Significant cultural heritage sites will be protected. These include prehistoric sites, 1830-1940 homesteads, and cemeteries.

6. Midewin will eventually become open for recreation uses. At present, approximately 2500 acres are open for deer hunting, and the same amount will be open for turkey hunting in spring 2002. There are also three miles of interim trails, and guided tours of Midewin. As Arsenal cleanup and rehabilitation continue, more of Midewin will be open for recreation use. Trails and activities will be gradually phased in, given limitations of funding and cleanup schedules. Proposed recreation activities include hiking, nature viewing, on-trail bicycling, cross-county skiing, on-trail horseback riding, hunting, and specialized camping opportunities.

There will be public access points around the perimeter of Midewin, which will serve as trailheads for a network of trails (Table 2). Where possible, trail corridors will follow previous disturbance created by existing infrastructure. Many trails will be for hiking only, and will probably consist of mowed paths less than six feet in width. Multi-use, equestrian, and bicycle trails will be wider (8-14 feet), and the surface will consist of limestone chips or other improved substrate. More intensive development and facilities will occur at the visitor center, administrative site, and seed production beds (totaling approximately 570 acres); these areas will include parking lots, buildings, paved trails, and demonstration gardens; they will not be suitable habitat for any Threatened or Endangered species.

Table 2. Proposed Recreation Features

Feature	Amount
Public Access Points	8
Roads (miles; both administrative and public)	28
Trails (miles; hiking only)	20
Trails (miles; hiking and bicycling)	7
Trails (miles; hiking and equestrian)	5
Trails (miles; multi-use; hiking, bicycling, and equestrian)	17
Trails (total miles)	49

B. Cumulative Effects:

Cumulative effects area
The geographic area considered in this analysis is the Central Till Plains Section, Prairie Parkland Province, Prairie Division (Keys Jr. et al. 1995). This Ecological Unit encompasses the Grand Prairie Natural Division of Illinois (Schwegman et al. 1973) and the Grand Prairie Natural Division of Indiana (Homoya et al. 1985). For the leafy prairie-clover, the cumulative effects area has been expanded to include that portion of the lower Des Plaines River Valley that occurs within the adjacent Southwestern Great Lakes Morainal Section (Keys Jr. et al 1995) because of the concentration of known populations and dolomite prairie habitat.

Past Actions:
Past activities on private land which have probably affected Regional Forester's sensitive species and natural resources in the Central Till Plains Section, Prairie Parkland Province, Prairie Division (Keys Jr. et al. 1995) include: conversion of natural prairie grasslands to agricultural uses (row crop fields, pastures, and hayfields); drainage and agricutural conversion of wetlands; alteration of wetlands, streams, and riparian forests by agricultural runoff, stream channelization, and siltation; permanent extirpation of large mammals (except white-tailed deer); fragmentation of extensive natural habitats, suppression of the natural fire regime; introduction and displacement of indigenous biota by non-native wildlife, invertebrates, and plants; conversion of permanent, large agricultural grasslands (pastures and hayfields) to row crop fields; development of transportation, energy-delivery, and communication infrastructure; conversion of all openland (including agricultural, ruderal, and natural lands) for industrial, commercial, and residential uses; and quarrying and mining of bedrock, coal, gravel, or sand desposits. Aside from coal mining, all of these activities have occurred on land now held by the USDA Forest Service at Midewin National Tallgrass Prairie. A major impact on Threatened and Endangered species at Midewin was the construction and operation of the Joliet Army Ammunition Plant. Adjacent public lands support a mix of forest, grassland, and wetlands; these have been impacted by the same kinds of activities, along with the addition of recreational uses.

Overall, the activities described above have caused drastic declines in populations of most species of native wildlife and plants. Many prairie plants and certain arthropods nevertheless were able to persist in roadsides, railroad right-of-ways, fencerows, native pastures, wetland hayfields, and pioneer cemeteries. Many grassland birds, small mammals, amphibians, and reptiles were also able to adapt to the agricultural landscape, utilizing large, permanent pastures and hayfields as replacement habitat for native prairie. Following World War II, further changes in the landscape use caused additional declines in both prairie wildlife and plant species. Removal of fencerows and replacement of fire with herbicides as a vegetation management tool effectively eliminated many persisting populations of prairie plants and prairie-dependent arthropods along right-of-ways and in field margins. Grassland birds declined in the last half of the twentieth century as permanent pastures and hayfields were converted to continuous production of cash crops (primarily corn and soybeans). Many of the remaining wetlands were drained and converted to row crop production. Hayfields were converted from grasses and clover to alfalfa, which requires cutting at the peak of the grassland bird nesting season, thereby rendering much potential habitat unsuitable for breeding birds. By the early 1990s, the average

pasture size in Illinois had declined to 20 acres, well below the minimum required by most area-sensitive grassland birds (Glass 1994; Herkert 1997). By the 1990s, large concentrations of grassland and prairie wildlife (including most arthropods) in Illinois were restricted to large prairie preserves (*e.g.* Goose Lake Prairie State Park, Des Plaines State Fish and Wildlife Area) or areas managed with large permanent pastures (*e.g.* Joliet Army Ammunition Plant). Smaller remnants (often <5 acres) now protected as preserves often support only prairie plants, prairie-specific soil organisms, and generalist species. Most existing native habitat remnants are too small to support viable populations (or even one breeding pair) of some vertebrates, such as area-sensitive grasland birds.

Present or Reasonably Forseeable Future Actions:
Activities on private land which may have an impact on the leafy prairie-clover, eastern prairie white-fringed orchid, and bald eagle include the following: additional conversion of openland to residential, commercial, or industrial uses; continued alteration of wetlands, streams, and riparian forests by agricultural runoff, stream channelization, and siltation; development of new quarries for stone, sand, and gravel; atmospheric and climatic changes associated with pollution and/or global warming; fragmentation and destruction of remaining natural habitat; increased numbers of non-native species, both in numbers of individuals and number of species; and further development of transportation, energy-delivery, and communication infrastructure. Private lands in the Central Till Plains Section will continue to support a mix of agricultural, industrial, and commercial uses, interspersed with small amounts of grasslands, forests, wetlands, and prairie remnants. Nearby public lands will be indirectly affected by these impacts, with the addition of direct impacts from recreation-oriented activities. Some adaptable native wildlife species will continue to thrive under these conditions, for instance crows, raccoons, brown-headed cowbirds, and white-tailed deer. However, future activities will undoubtedly contribute to the decline of native species of grassland vertebrates, prairie plants, and remnant-dependent arthropods.

Some additional site-specific impacts are likely to come from increased urbanization and associated transportation use in surrounding portions of southwestern Will County. There will be impacts associated with development of adjacent industrial parks, a landfill, and the Lincoln National Veterans Cemetery, in addition to continuing impacts from nearby industry (refineries) along the lower Des Plaines River. These impacts include: air pollution; changes in stream flow and water quality; increases in generalist predators (gulls, crows, raccoons, opossums, rats); and loss of open land and potential buffer areas provided during the Army's tenure. Conversely, restoration and management at Goose Lake Prairie Natural Area and other protected areas containing remnants of native habitats will probably have positive impacts on Midewin. These areas will contribute to available habitat needed to maintain local populations of many grassland and remnant-dependent species.

Many external, uncontrollable threats may also impact the three listed species. For example, a newly established exotic species or a host shift by a native herbivore or pathogen could impact plant species or an organism on which these plants are dependent (insect pollinator, mycorrhizal associate). There are organisms (plants, animals, and microorganisms) for which preventative management or control may be difficult because of their life history, ecology or physiology. For example, introduced European earthworms (Lumbricidae) are now nearly ubiquitous in much of the northeastern USA, and have probably had substantial impacts on nutrient cycling and soil

structure in many natural habitats. Removal or eradication of these non-native earthworms is now considered impossible. Other uncontrollable impacts could include increased nutrients derived from air pollution, climatic change resulting from increased greenhouse gases, a catastrophic explosion at an adjacent industrial facility, and isolation of Midewin by surrounding urban sprawl. Shifts in plant species may impact animal species as well.

C. Conclusion:

1. Leafy Prairie-clover

After considering past, present, and reasonably forseeable future activities in the area, we conclude that the proposed action (implementation of the Midewin Land and Resource Management Plan) **is likely to adversely effect the leafy prairie-clover**, a federally endangered species, because individual plants could be injured or killed by management activities recommended in the *Leafy Prairie-clover Recovery Plan* (USFWS 1996). However, there are likely to be far greater benefits to this population and the species from the proposed action. We have reached this conclusion based upon the following analysis:

For Midewin:

All existing habitat for leafy prairie-clover (116 acres of dolomite prairie remnants) at Midewin would be restored and managed. In addition, approximtely 1,260 acres of dolomite prairie would be reconstructed in areas where dolomite prairie was formerly present, based on mapped soil types. This would create approximately 1,375 acres of dolomite prairie habitat, which would hold many microhabitats suitable for leafy prairie-clover. Restoration would also create habitat and conditions suitable for the expansion of the existing population. Certain specific actions are expected to enhance the species' situation at Midewin, including prescribed burning, control of invasive plant species, and establishment of new subpopulations in suitable, but presently unoccupied habitat. These actions are all recommended in the the *Leafy Prairie-clover Recovery Plan* (USFWS 1996), including the use of herbicide to control invasive plants in occupied habitat. Additional individual plants and subpopulations may appear from soil seedbanks following prescribed fire management.

Certain management activities, including prescribed burning, control of invasive plant species, and grazing could result in injury or death of individual plants of leafy prairie-clover. However, these activities are essential in the restoration and reconstruction of dolomite prairie habitats, and the benefits for leafy prairie-clover will outweigh the loss of a few plants. Prescribed burning should stimulate the recruitment of new plants from the soil seedbank, and control of invasive species should reduce competition on individual plants. Herbicide use in this species' habitat would only occur after the completion of further analysis; use would be restricted through timing, selection of appropriate herbicides, and application by certified individuals competant at identifying and avoiding adverse effects to non-target species. Herbicide use should reduce adverse effects from non-native plants known to invade dolomite prairie, including Eurasian bluegrasses (*Poa* spp.) and teasels (*Dipsacus* spp.) (USFWS 1996).

Under the proposed action, although grazing could be used as management tool for existing and potential reconstructed dolomite prairie, grazing has been identified as a potential negative impact on the leafy prairie-clover. Grazing can also have a negative impact by compacting the

soil. However, grazing could benefit the dolomite prairie community by removing competing species. While standards and guidelines in the Prairie Plan seek to avoid permanent adverse damage to these habitats and Threatened, Endangered, and Sensitive plant species from grazing, they retain grazing as a management tool to improve prairie habitat. Grazing in leafy prairie-clover habitat will require frequent monitoring and prompt responses to prevent adverse effects on the dolomite prairie habitat and populations of leafy prairie-clover. Such responses may include short-duration grazing and temporary caging of plants.

The proposed action has plans for hiking trails through dolomite prairie reconstruction areas, but the trails do not go near the existing habitat of the leafy prairie-clover; no equestrian or multi-use trails come within two miles of the existing population. This reduces the possibility of loss of individual plants, habitat damage, and invasive species transmission into dolomite prairie areas by off-trail equestrians or bicyclists.

Trails will bring more visitors to the reconstructed dolomite prairie and the concomitant possibility of impacting newly established populations of leafy prairie-clover, unless mitigated with signage or barriers. Two administrative roads also occur along strips adjacent to potential dolomite prairie reconstruction areas. These administrative roads are existing roads and portions will be available for hiking. However, no trails or roads lead directly to the leafy prairie-clover population. Without trails leading to the leafy prairie-clover, it is doubtful that many visitors would travel cross-country to these more remote sites and impact the leafy prairie-clover population.

Trail standards and guidelines in the Prairie Plan minimize impacts to threatened, endangered, and sensitive species, and discourage off-trail use (USDA Forest Service 2001). Following these standards and guidelines will mitigate for potential adverse effects from trails in the dolomite prairie areas.

For the Cumulative effects area:
Overall, Midewin has significant dolomite prairie habitat within the Central Till Plaines Section and lower Des Plaines River Valley portion of the Southwestern Great Lakes Morainal Section. With the addition of dolomite prairie restoration acreage, Midewin could become the most important area for the preservation of dolomite prairie and associated dolomite prairie plants, including the leafy prairie-clover.

Within the Central Till Plains Section, leafy prairie-clover is only found at Midewin. It may have occurred elsewhere along the lower Des Plaines River within the Central Till Plains, and there are historic records of leafy prairie-clover from along the Kankakee and upper Illinois rivers (Bowles and Jones 1992). There are also populations within the lower Des Plaines River Valley portion of the Southwestern Great Lakes Morainal Section. The Midewin population is the only known population within the Prairie Parklands.

The population at Midewin is quite important for the continued survival of leafy prairie-clover within the area of analysis, since there are so few extant populations. If leafy prairie-clover is successfully reintroduced into dolomite prairie reconstructions, the population at Midewin may become increasingly important, since the amount of total reconstructed acres will be greater than

the four other sites in Illinois combined. Implementation of the Prairie Plan standards and guidelines is not expected to result in a loss of species viability. If no actions were taken, it is likely that these benefits would not occur, and this population would continue to decline and perhaps disappear.

2. Eastern Prairie White-fringed Orchid

After considering past, present, and reasonably forseeable future activities in the area, we conclude that the proposed action (implementation of the Midewin Land and Resource Management Plan) **is likely to adversely effect the eastern prairie white-fringed orchid**, a federally threatened species, because individual plants could be injured or killed by management activities recommended in the *Eastern Prairie White-fringed Orchid Recovery Plan* (USFWS 1999). However, there are likely to be far greater benefits to this population and the species from the proposed action. We have reached this conclusion based upon the following analysis:

For Midewin:

The eastern prairie white-fringed orchid is not currently known to be present on Midewin. However, under the proposed action, all existing habitat for the eastern prairie white-fringed orchid (85 acres of typic prairie and sedge meadow remnants) at Midewin would be restored and managed. In addition, typic prairie and sedge meadow would be reconstructed in areas where these habitats formerly pexisted, based on mapped soil types. From these mapped areas, potential eastern prairie white-fringed orchid habitat was determined by adding 85% of the upland prairie acreage (15% of this habitat is assumed to be too dry) and 85% of the wet prairie/sedge meadow habitat (15% of this habitat is assumed to be too wet). This would create approximately 7,810 acres of habitat for this species and create habitat and conditions suitable for the expansion of the existing population. Given that one population of eastern prairie white-fringed orchid occurs adjacent to suitable habitat on Midewin, habitat restoration, management, and reconstruction activities are likely to result in this population expanding onto Midewin. Once present, additional specific actions are expected to enhance the species' situation at Midewin. These include prescribed burning, control of invasive plant species, and establishment of new subpopulations in suitable, but unoccupied habitat. These actions are all recommended in the the *Eastern Prairie White-fringed Orchid Recovery Plan* (USFWS 1999), including the use of herbicide to control invasive plants in occupied habitat. Also, additional populations may appear in suitable habitat following management.

Certain management activities, including growing-season prescribed burning, mowing, control of invasive plant species, and grazing may result in damge or death of individual plants of eastern prairie white-fringed orchid. These activities are essential for the restoration and reconstruction of the tallgrass prairie ecosystem, and their benefits for the eastern prairie white-fringed orchid are expected to outweigh any incidental loss. Prescribed burning should stimulate the recruitment of new plants and controlling invasive species should reduce competition on individual plants. Herbicide use in this species' habitat would only occur after the completion of further analysis; use would be restricted through timing, selection of appropriate herbicides, and application by certified individuals competant at identifying and avoiding adverse effects to non-target species. Herbicide use should reduce adverse effects from non-native plants known to invade the habitat of this orchid, including reed canary grass (*Phalaris arundinacea*) and Eurasian buckthorns (*Rhamnus* spp.) (USFWS 1999).

Under the proposed action, grazing could be used as a management tool for existing and potential reconstructed typic prairie. Grazing has been identified as having a potential negative impact on the eastern prairie white-fringed orchid, primarily through herbivory. Prolonged grazing can have a negative impact on prairie ecosystems by compacting the soil. However, grazing can benefit the tallgrass prairie community by removing competing species. While standards and guidelines in the Prairie Plan avoid permanent adverse damage to these habitats from grazing, they retain grazing as a management tool to improve prairie habitat. Grazing in eastern prairie white-fringed orchid habitat will require frequent monitoring and prompt responses to prevent adverse effects on typic prairie habitat and populations of eastern prairie white-fringed orchid. Such responses may include short-duration grazing and temporary caging of plants.

The proposed action plans for trails running through typic prairie reconstruction areas, but they do not come within 0.25 miles of the eastern prairie white-fringed orchid population. Trails within two miles of this population are hiking-only trails. This reduces the possibility for the loss of individual plants, habitat damage, or invasive species transmission into typic prairie areas by off-trail equestrians or bicyclists.

Trails will bring more visitors into restored and reconstructed prairie communities, with the possibility of impacting expanding or newly established populations of the orchid, unless mitigated with signage or barriers. The existing population is 0.75 miles from the nearest administrative road on Midewin. There are administrative roads at low densities throughout typic prairie reconstruction areas. These roads are existing roads, portions of which will be available for hiking. Without trails leading to the orchid population, it is doubtful that many visitors would travel cross-country across the property boundary and impact the population.

Trail standards and guidelines in the Prairie Plan minimize impacts to threatened, endangered, and sensitive species, and discourage off-trail use (USDA Forest Service 2001). Following these standards and guidelines will mitigate for potential adverse effects from trails in existing and reconstructed typic prairie areas.

For the Cumulative effects area:
Historically, typic prairie was the major natural community within the Central Till Plains Section. At present, there is very little high quality typic prairie left in this Section. In the Illinois portion of the Central Till Plains Section there are less than 200 acres of high quality typic prairie (White 1978). Even less probably occurs in Indiana. There is probably less than 5000 acres of prairie (both high quality and degraded but with a prairie component) within the Central Till Plains Section today.

Midewin currently has only a small amount of habitat that has enough of a typic prairie component to be considered prairie (85 acres). Most of this is highly disturbed, but even this small amount is important because of the rarity of the prairie habitat. Midewin has the potential to be an important, if not the most important typic prairie habitat within the Central Till Plains Section through restoration and reconstruction. The proposed action calls for 3,750 acres of upland typic prairie and 3,080 acres of wet typic prairie to be restored. These are substantial

amounts, especially since they will occur in huge blocks instead of isolated remnants. Implementation of the Prairie Plan standards and guidelines is expected to prevent any adverse effects on the eastern prairie white-fringed orchid and its habitat and is not expected to result in a loss of species viability.

Within the Prairie Parklands, there are just two populations of the eastern prairie white-fringed orchid (four in the Central Till Plains Section). Although Midewin presently lacks a population, there is an adjacent population in contiguous prairie habitat. Given the large scale of future typic prairie restoration and reconstruction at Midewin, there is considerable potential for a large population in the long term. This orchid has been successfully established in other prairie remnants and reconstructions in northeastern Illinois. If eastern prairie white-fringed orchid expands into Midewin or can be successfully established, then Midewin is likely to become one of the more important populations for this orchid within the Central Till Plains Section and Prairie Parklands.

Even if the eastern prairie white-fringed orchid fails to expand onto Midewin, or if restoration of this species on Midewin does not succeed, there will still be benefits. Enhancing and expanding prairie habitats adjacent to the existing orchid population will provide increased habitat for this orchid's pollinators. The restored areas will also replace land now infested with invasive plants with reconstructions of native communities, thus reducing sources for invasive plants that may encroach upon the existing orchid population. If no actions were taken, it is likely that these benefits would not occur.

3. Bald Eagle

After considering past, present, and reasonably forseeable future activities in the area, we have concluded that the proposed action (implementation of the Midewin Land and Resource Management Plan) is not likely to adversely effect the bald eagle, a federally threatened species. We reached this conclusion based upon the following analysis:

For Midewin:

Bald eagles do not currently use Midewin as breeding or wintering habitat. Any habitat suitable for bald eagles is marginal at best, largely because of past, current, and likely future human activities. Nearly all potential nesting and winter roost sites (forests and woodlands with large trees) are within 1 mile of current human activity, including roads, railroads, refineries, and an industrial park adjacent to Midewin. There are also Army inholdings requiring extensive cleanup; activities at some of these sites may be ongoing over the next two decades. Midewin's streams are not able to provide sufficient food sources for eagles, especially during the winter when these streams freeze over.

Bald eagles are expected to continue their occurrence on Midewin as rare migrants. Restoration, management, interpretation, research, and recreation activities are not expected to have any adverse impacts on migrating bald eagles. Portions of Midewin will remain suitable for migrant bald eagle to briefly stop, loaf, and perhaps feed with little human disturbance. Standards and guidelines in the Prairie Plan will protect bald eagles and their habitat on Midewin, should any use Midewin as a nesting or winter roost site.

For the Cumulative effects area:
Historically, bald eagles probably occurred as breeding birds near the major rivers of the Central Till Plains Section. This breeding population was probably eradicated before the middle 1900s by habitat destruction, shooting, and harassment. Wintering bald eagles were probably always rare, but are now a regular presence along portions of the upper Illinois and lower Des Plaines rivers where locks, dams, and barge traffic maintain open water.

Development patterns in the Central Till Plains leave little undisturbed habitat for winter roosts or nesting sites of bald eagles. Approximately 40 miles west of Midewin, one state park is used as a winter roost by bald eagles. This site has sufficient isolated areas where the eagles are protected from wind, extreme night temperatures, and human disturbance; it is also close to foraging habitat. A similar combination of factors does not occur in the Prairie Parklands, where public lands are interspersed with heavy agricultural, industrial, and residential development.

Given the degree of human activity on and around Midewin, it is unlikely that bald eagles would use Midewin as a nesting or roosting site. The Prairie Plan would not promote either beneficial or adverse impacts on bald eagles; there might be some minor benefits that would occur by providing migratory bald eagles with a temporary loafing site.

IV. Effects Determination:

This effects determination is based on the analysis above and includes implementation of the recommended species-specific mitigation measures (standards and guidelines), listed as follows:

Leafy Prairie-clover

Standards:

1. Follow recommendations for management in the *Leafy Prairie-clover Recovery Pla*n (USFWS 1996).

2. Plan project activities to avoid or minimize adverse impacts to leafy prairie-clover, particularly during the growing season from April 30th to October 30th.

Guidelines:

1. Evaluate all existing or restored dolomite prairie habitat for potential restoration or introduction of leafy prairie-clover.

2. Restore or introduce leafy prairie-clover into areas determined suitable.

Eastern Prairie White-fringed Orchid

Standards:

1. Follow recommendations for management in the *Eastern Prairie White-fringed Orchid Recovery Plan* (USFWS 1999).

2. Plan activities to avoid adverse impacts to eastern prairie white-fringed orchid particularly during the growing season April 1st to October 15th.

Guidelines:

1. Evaluate all existing or restored dolomite prairie, upland typic prairie, and wet typic prairie habitat for potential re-introduction of eastern prairie white-fringed orchid.

2. Restore or introduce eastern prairie white-fringed orchid into areas determined suitable.

Bald Eagle

Standards:

1. Follow recommendations for management in the *Northern States Bald Eagle Recovery Plan* (USFWS 1983).

Guidelines:

1. Protect migrating bald eagles on Midewin from disturbance.

2. If bald eagles establish nesting or roosting sites on Midewin, protect and manage these sites in accordance with the recovery plan for this species.

Summary:

The proposed action, implementation of the Prairie Plan, will adversely affect Leafy prairie-clover (*Dalea foliosa*) and Eastern prairie white-fringed orchid (*Platanthera leucophaea*), because individual plants of leafy prairie-clover or eastern prairie white-fringed orchid could be injured or destroyed in the course of management activities. The proposed action will have insignificant (cannot be meaningfully measured) and discountable (unlikely to occur) adverse effects on Bald Eagle (*Haliaeetus leucocephalus*). However, such actions will not put either species or populations on or adjacent to Midewin in jeopardy. Combined with past, present, and foreseeable future activities in the area the proposed action should provide substantial benefits to both plant species, and may lead to significant population increases for both species.

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United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Chicago Illinois Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010
847-381-2253 847-381-2285 (Fax)

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IN REPLY REFER TO

FWS/AES-CIFO

February 5, 2002

Mr. Don Meyer
Acting Regional Forester
USDA Forest Service
310 West Wisconsin Ave, Suite 580
Milwaukee, Wisconsin 53203

Dear Mr. Meyer:

This letter transmits the U.S. Fish and Wildlife Service's (Service or we) biological opinion on the proposed implementation of the preferred alternative for the Proposed Land and Resource Management Plan for Midewin National Tallgrass Prairie dated May 2001. Midewin National Tallgrass Prairie is located in Will County, Illinois. At issue are the potential effects implementation of the management plan may have on the eastern prairie fringed orchid (*Platanthera leucophaea*), a species federally listed as threatened, and the leafy prairie clover (*Dalea foliosa*), a species federally listed as endangered.

This biological opinion is based on information contained in your biological assessment received on December 13, 2001 (final version received on January 14, 2002); the Draft Environmental Impact Statement for Midewin National Tallgrass Prairie dated May 2001; a telephone conversation held on January 9, 2002 with Marcella DeMauro of the Will County Forest Preserve District; a field visit to Midewin held on December 13, 2001; an e:mail message received from Gerald Bade of the Rock Island Field Office of the Service dated July 17, 2001; a meeting held on January 14, 2002, among representatives of Midewin National Tallgrass Prairie and the Service; a telephone conversation with Renee Thakali of the Midewin National Tallgrass Prairie held on January 24, 2002; a telephone conversation with Eric Ulaszek of Midewin National Tallgrass Prairie held on January 29, 2002; telephone conversations held with Ron Abrant of the U.S. Army Corps of Engineers held on January 24 and 25, 2002; the recovery plan for the leafy prairie clover (U.S. Fish and Wildlife Service 1996); and the recovery plan for the eastern prairie fringed orchid (U.S. Fish and Wildlife Service 1999). The complete administrative record for this consultation is on file at the letterhead address.

Formal consultation was requested by the Forest Service in a letter dated December 13, 2001, and was accepted by the Service on December 20, 2001. During the meeting held on January 14, 2002, the Forest Service agreed to expand the standard and guidelines as they apply to threatened, endangered and sensitive species. We have informally consulted on a number of smaller restoration projects proposed by the Forest Service at Midewin. We have concurred with their conclusion that the projects were not likely to adversely affect federally listed species.

Description of the Proposed Action

The U.S. Forest Service proposes to implement its preferred alternative described in the Draft Environmental Impact Assessment for the Midewin National Tallgrass Prairie Land and Resource Management Plan (USDA Forest Service 2001a and b). The Midewin National Tallgrass Prairie was formerly used by the U.S. Army for munitions manufacture and packaging. In addition to this activity the Army also conducted agricultural and grazing leases. As a result most of Midewin has been altered by human activities and little is dominated by native vegetation. Currently the Prairie supports 120 acres of dolomite prairie potentially suitable for the leafy prairie clover, and less than 150 acres of prairie potentially suitable for the eastern prairie fringed orchid. Under the preferred alternative 1,375 acres would be restored to dolomite prairie and about 7,300 acres would be restored to habitats potentially suitable for the orchid. Existing and restored habitats would be managed to maintain their species composition and function. Eventually Midewin will be opened to recreational uses including: hiking, on-trail bicycle riding, cross-country skiing, on-trail horseback riding, hunting, and specialized camping opportunities (USDA Forest Service 2001b).

The Forest Service proposes to use a variety of techniques to restore and manage the prairie. The Forest Service would use prescribed burning, herbicide applications, and mowing to maintain an open habitat structure, create microhabitats for eastern prairie fringed orchids and leafy prairie clover to become established and control alien invasive weeds. The Forest Service may use grazing in habitat potentially suitable for the eastern prairie fringed orchid (USDA Forest Service 2001b). Prescribed burns in dolomite prairie potentially suitable for the leafy prairie clover would not occur after April 30 or before October 15 of any calendar year, and would burn no more than 50 percent of the habitat known to be occupied by the leafy prairie clover (Ulaszek, 2002, pers.comm.).

During the meeting held on January 14, 2002, the Forest Service agreed to expand the standard and guidelines as they apply to threatened, endangered, and sensitive species. Specifically the Forest Service has proposed to implement the following guidelines to protect these species (Thakali 2002, pers. comm):

- Evaluate all existing or restored dolomite prairie habitat for potential restoration or introduction of leafy prairie clover.

- Evaluate all existing or restored dolomite prairie, upland typic prairie and wet typic prairie habitat for potential reintroduction of eastern prairie fringed orchid.

- Restore or introduce leafy prairie clover and eastern prairie fringed orchid into areas determined suitable.

- When using herbicides in leafy prairie clover or eastern prairie fringed orchid habitat apply approved herbicides with special care using wipe type applicators or other techniques to eliminate drift; survey the area and cover known plants near application area before herbicide application; use no pre-emergent herbicides; all personnel applying herbicide must be trained in identification of leafy prairie clover and eastern prairie fringed orchid.

- Locate new trails at least 25 yards away from known eastern prairie fringed orchid or leafy prairie clover plants, and close all trails located within 0.25 miles of plants during blooming season.

- Prior to livestock grazing in occupied or potential eastern prairie fringed orchid habitat, survey for presence of the plants and locate livestock fences at least 1/8 mile away from occupied habitat for these plants (Thakali, 2002, pers. comm.).

Status of the Species

The leafy prairie clover (*Dalea foliosa*) is a small short-lived herbaceous perennial in the legume or pea family (Fabaceae). It is known from 29 populations in Alabama, Tennessee and Illinois. The leafy prairie clover requires full sun and low competition, and occurs in limestone cedar glades, limestone barrens and wet-mesic dolomite prairie. To some degree fire maintains each of these habitats. In dolomite prairies, small microhabitat areas likely support plants, where the moisture regime is appropriate. Soils are very shallow, less than 18 inches (45 cm) in depth. Water penetrates to the bedrock, and during the winter months freezes causing some natural disturbance in the form of frost heave (USFWS 1996).

Seedling leafy prairie clover plants are routinely killed by frost heave and drought, and few individuals reach maturity. In a study that monitored individual plants, most plants died within their first year, and only 4.6 percent survived for 5 years. In addition, plants sometimes become dormant for a season or two, and then reappear. Although individual plants are short lived, seeds remain viable for at least 8 years. In addition, in Illinois over 70 percent of plants produced viable seed, and the number of seeds produced per flower head ranged between 5 and 429. Thus, in occupied (or recently occupied) habitat a large seed bank may exist. Seeds are likely distributed by the wind, gravity, birds or small mammals (USFWS 1996).

The recovery plan for the leafy prairie clover identifies certain areas as potentially important for the leafy prairie clover, and recommends that these areas be evaluated as potential recovery sites. One of the sites identified for Illinois was the Joliet Army Arsenal. The Arsenal has since been closed, and much of its former land holdings have been transferred to the U.S. Forest Service to become the Midewin National Tallgrass Prairie. If Midewin is successful in its attempts to restore dolomite prairie, then Midewin could become an important recovery site for the leafy prairie clover. In order for the leafy prairie clover to be reclassified to threatened status, the recovery plan recommends three populations ranked as high viability be protected and managed each in Alabama, and Illinois. In Tennessee the plan recommends 12 populations ranked as high viability. Restored populations should persist at high or moderate viability for a minimum of 10 consecutive years (USFWS 1996).

The federally threatened eastern prairie fringed orchid (*Platanthera leucophaea*) is a long-lived herbaceous perennial. The plant rises in a single stalk from an underground tuber. Linear leaves sheath the stalk, with basal leaves being larger. The flowering stalk extends above the leaves and may have from 5 to 40 creamy fringed flowers. The top flowers open last. Currently it is known from 59 populations in 6 states, mostly from Wisconsin, Illinois, Michigan and Ohio. It also occurs in Ontario, Canada. It occurs in tallgrass silt-loam or sand prairies, sedge meadows, fens, and occasionally sphagnum bogs. It seems to be adapted to some natural patch disturbances, or areas with dynamic disturbance regimes. The orchid occasionally colonizes successional habitats or recolonizes previously occupied areas. In large habitat areas with natural disturbance regimes, the orchid population shifts spatially over time. Seedling establishment requires development of mycorrhizae with soil-inhabiting fungi, and maintenance of habitat dominated by grass like species. The plants are very difficult to find unless they are in bloom. In some years, some plants may remain dormant, or following years of heavy bloom, may show reduced growth. The plants do not flower until they are about 5 years of age (USFWS 1999). In one study where individual plants were counted in a 1 meter square quadrat, vegetative (non-flowering) individuals were found to out number flowering individuals by eight to one (Bade 2001, in Litt).

The eastern prairie fringed orchid requires full sun for optimum growth and reproduction, and therefore is limited to habitats dominated by herbaceous species. Encroachment of woody vegetation is a threat to many populations. Populations are managed by using dormant season prescribed burning, and dormant season herbicide applications. The orchid populations seem to fluctuate greatly from year to year, and occasionally disappear. Though the orchid is adapted to dormant season disturbance, damage to the plants during the growing season may prevent sufficient food storage to produce a flowering bulb for the following year, and may prevent seed set if the flowering stalk is damaged. The seed capsules each contain thousands of minute seeds that are dispersed by wind (USFWS 1999).

The Service will consider removing the eastern prairie fringed orchid from the List of endangered and threatened species when 22 highly viable populations are distributed across the range of the species. Currently only six highly viable populations exist. The recovery plan identifies the Grant Creek, Will

County population of the orchid as being of moderate viability due to a small population size, small habitat patch size, and the habitat being in a late successional stage. Increasing the habitat area and population size should increase the viability ranking for this population (USFWS 1999).

Environmental Baseline

The leafy prairie clover occurs in small numbers on Midewin National Tallgrass Prairie in dolomite prairie (Ulaszek et al. 2002). The dolomite prairie potentially suitable for the leafy prairie clover on Midewin was recently damaged by inadvertent filling and construction traffic stemming from an adjacent industrial development, and unauthorized herbicide spraying along a railroad. These actions fall under the purview of a permit issued by the U.S. Army Corps of Engineers under their authority as described in section 404 of the Clean Water Act. The Corps has indicated that it intends to reinitiate section 7 consultation on these actions (Abrant 2002, pers comm.).

The eastern prairie fringed orchid occurs immediately adjacent to Midewin on property owned by the Illinois Department of Natural Resources, where individual plants occur approximately 100 feet from Midewin's boundary. The orchid is not known to occur on Midewin at the present time (Ulaszek et. al. 2002).

Effects of the Proposed Action

In terms of potential adverse affects to federally listed species, the Service is more concerned about efforts to manage occupied habitat than efforts to restore altered areas. Some proposed management techniques could adversely affect individual plants, though overall the effect should be to increase populations of both plants.

The leafy prairie clover should benefit from prescribed burning, because burning keeps the habitat open, removes duff, and may create microhabitats suitable for seed germination. However, plants are killed by frost heave, and the recovery plan for the species indicated that fall prescribed burns may increase frost heave. However, Ms. DeMauro (2002, pers comm.) indicated that frost heave may just be more visible following fall burns, and that fall burns may not lead to an increase in frost heave. Will County Forest Preserve sites are burned on a rotational basis and burning is done both in the spring and in the fall. Under this management, the total number of plants over the last several years has ranged between 1000 and 2500 plants.

The Forest Service proposes to gradually phase out agricultural activities, and no listed species inhabit areas currently used for agriculture. Therefore, cessation of agricultural activities will not affect listed species at Midewin.

The construction of trails could potentially remove eastern prairie fringed orchid or leafy prairie clover individuals. Members of the public using these trails could intentionally or accidentally harm individual plants as well. However, the Forest Service proposes to carefully place new recreational trails at least 25 yds away from known individuals of the leafy prairie clover and the eastern prairie fringed orchid, and to close trails within 0.25 miles of blooming individuals. The prairie clover is not known to be attractive to plant collectors. The eastern prairie fringed orchid could conceivably be sought by orchid fanciers, but is extremely difficult to locate unless it is in bloom, and the person trying to find the plant is close enough to actually see it. Closing trails within 0.25 miles of blooming orchids should reduce the chances that plants will be harmed by recreating members of the public.

The Forest Service does not currently plan (i.e., in the next 3-5 years) to allow grazing in dolomite prairie. In areas that may be inhabited by the eastern prairie fringed orchid, the Forest Service would search the area for plants when the orchid is in bloom, and then construct fences to keep livestock at least 0.125 miles from known plants. Though non flowering plants would likely be missed and it is possible that some eastern prairie fringed orchid plants would exist outside of the fenced areas, other individuals should be protected. In addition, the grazing would help reduce the overall ground cover, and may reduce competing species, thereby improving overall habitat conditions for the orchid.

The Forest Service proposes to use contact herbicides to control alien and native invasive species. Such invasive species, if left uncontrolled, may render the habitat unsuitable for the eastern prairie fringed orchid and the leafy prairie clover. They have proposed measures to protect individual plants. The Forest Service would use wipe type applicators and other methods to reduce the chances of non-target species being affected. In some cases individual eastern prairie fringed orchid or leafy prairie clover plants would be covered to prevent contact with herbicides. Staff applying the herbicides would be trained on the identification of the leafy prairie clover, eastern prairie fringed orchid, other sensitive species, and the target alien invasive weeds. No pre-emergent herbicides would be used. The use of herbicides is the only effective method known to control invasive woody brush such as common buckthorn (*Rhamnus cathartica*) or glossy buckthorn (*R. frangula*), and is the most effective method known to control reed canary grass (*Phalaris arundinacea*). Thus the use of herbicides is necessary to achieve the Forest Service's goals, and overall should improve conditions for the two federally listed plants.

Prescribed burning is used through out the upper mid-west to manage prairies. Orchid sites sometimes benefit from dormant season burns, and the subsurface tuber is not harmed by fires. The Forest Service proposes to burn no more than 50 percent of the habitat occupied by the leafy prairie clover, and only burn before April 30 or After October 15 of any given calendar year. Thus, the Forest Service has included adequate safeguards to protect young leafy prairie clover plants.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to this proposed action or are beyond the scope of this biological opinion (e.g., future consultations on specific projects whose impacts were not fully addressed by this opinion; future consultations on the granting of rights-of-way across Midewin, etc.) are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Because the action area considered in this biological opinion is federally owned, and all actions will require review to ensure that their impacts were addressed by this opinion, and may require separate consultation pursuant to section 7 of the Act, there are no cumulative effects.

Conclusion

The leafy prairie clover currently occurs in Alabama, Tennessee and Illinois. The recovery plan identified the Joliet Army Arsenal (portions are now the Midewin National Tallgrass Prairie) as a potential recovery site for one of three populations required in Illinois before the species may be down listed to threatened. The actions proposed by the Forest Service make it more likely that the action area will become a recovery site for this species, although individual plants may be harmed by some actions proposed (e.g., trail construction, herbicide application). The safeguards to protect this species proposed by the Forest Service make it extremely unlikely that sufficient number of individuals will actually be harmed to cause further decline in the species status. In actuality, the overall status of the species should improve as a result of implementing the Forest Service's management plan.

The eastern prairie fringed orchid is currently known from 59 populations mostly located in Wisconsin, Illinois, Michigan, and Ohio. Midewin is adjacent to the Grant Creek orchid population owned by the Illinois Department of Natural Resources. That population is currently considered to be of moderate viability. Increasing both the habitat patch size and the population size should increase the viability of this population. The Forest Service's proposed large scale mesic prairie restoration may result in the Grant Creek population achieving a high viability rating. Some proposed actions could harm individual plants (e.g., grazing, herbicide application, trail construction and use). However the Forest Service has developed safeguards to minimize the chances of that occurring.

It is our Biological Opinion that the proposed action is not likely to jeopardize the continued existence of the leafy prairie clover or the eastern prairie fringed orchid. If successful, the implementation of the Forest Service's management plan should contribute to the recovery of these two species.

Conservation Recommendations:

1) We recommend that the Forest Service set up permanent demographic monitoring plots for a subset of the population to monitor the impacts of prescribed burning and other management tools. As part of this demographic monitoring program, the Forest Service should monitor reproduction of these species. If there is a declining trend, then the Forest Service should monitor pollinator visitation and pollinator populations (among other factors) to determine the cause of these declines.

2) We recommend that the Forest Service monitor recreational use of sensitive habitats and enforce restrictions to stay on trails.

3) We recommend that the Forest Service carefully monitor the results of management techniques, and make changes based on the results of monitoring.

Reinitiation - Closing Statement

This biological opinion covers actions reasonably anticipated by the Midewin National Tallgrass Prairie Land and Resource Management Plan, and is therefore programmatic in nature. When site specific projects are developed, the Forest Service should evaluate and document in writing whether impacts to listed species have been fully addressed in this programmatic consultation, and reinitiate consultation if impacts were not fully addressed and a listed species may be affected (positively or negatively) by the proposed action. The Forest Service should seek the concurrence of the Service in its determinations. Projects whose scope and impacts are consistent with this opinion would be tiered to this opinion. The Service would send the Forest Service appropriate documentation on how the projects were addressed by this programmatic opinion, along with any required findings. The Forest Service does not need to seek the concurrence of the Service for projects that would have no effect on a listed species (e.g., maintenance of existing roads or signs located outside of potentially suitable habitat).

As provided in 50 CFR § 402.16, reinitiation of consultation is required if: (1) new information or monitoring reveals effects of the continued implementation of the Prairie Plan and projects predicated upon it may affect the listed species in a manner or to an extent not previously considered in this opinion; (2) the continued implementation of the Prairie Plan and projects predicated upon it is subsequently modified in a manner that may cause an effect to Federally listed species not considered in this opinion; (3) a new species, which occurs on or could be affected by actions on Midewin, is added to the List of endangered and threatened species; (4) critical habitat is designated for a listed species on Midewin National Tallgrass Prairie; (5) additional listed species are discovered or proposed for restoration on Midewin; (6) the listed species expand from their current locations into new locations not specifically addressed in this opinion; or (7) the Forest Service proposes management techniques not addressed in this opinion (e.g., grazing in dolomite prairie, different

methods to control herbicides, removing drain tile near listed species, etc.), which may affect federally listed species.

Thank you for your interest in the recovery of these two listed species. If you have any questions regarding this biological opinion, please contact Ms. Karla Kramer at (847) 381-2253 ext. 230.

Sincerely,

John D. Rogner

John D. Rogner
Field Supervisor

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