

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chicago, Illinois Field Office (ES)

230 S. Dearborn, Suite 2938

Chicago, Illinois 60604

February 27, 2017

Michael J. Weis
Site Manager
Fermi Site Office
U.S. Department of Energy
PO Box 2000
Batavia IL 60510

Subject: Biological Opinion for the Establishment of a Temporary Population of the Federally Threatened Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) within Suitable Habitat on U.S. Department of Energy (DOE), Fermi National Accelerator Laboratory (Fermilab) Property in Batavia, DuPage and Kane Counties, Illinois.

Dear Mr. Weis:

Pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C., 1531 et seq.) (Act), this document transmits the U.S. Fish and Wildlife Service's (FWS) biological opinion (Opinion) for DOE's Establishment of a Temporary Population of the Eastern Prairie Fringed Orchid on DOE/Fermilab Property in Batavia, DuPage and Kane Counties, Illinois.

We base this Opinion on information provided through a meeting between FWS, DOE, and Fermilab on August 30, 2016 at Fermilab, as well as telephone conversations and email correspondence with DOE and Fermilab, and published literature. A complete administrative record of this consultation is on file at the Service's Chicago Field Office.

The Conservation Recommendations provided within the enclosed biological opinion are designed to ensure successful establishment of the eastern prairie fringed orchid on DOE land.

We look forward to future cooperation with DOE and Fermilab to conserve our Nation's threatened and endangered species. If you have any questions, please contact Cathy Pollack of this office at 312-216-4731.

Sincerely,



Louise Clemency
Field Supervisor

cc: Rick Hersemann, DOE FSO
Ryan Campbell, Fermilab
Teri Dykhuis, Fermilab

BIOLOGICAL OPINION

**Effects to the Eastern Prairie Fringed Orchid
For the Proposed
Establishment of a
Temporary Population of the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
At the U. S. Department of Energy owned Fermilab Facility
Batavia, DuPage and Kane Counties, Illinois**

**Prepared for:
U.S. Department of Energy
PO Box 2000
Batavia IL 60510**

**Prepared by:
U.S. Fish and Wildlife Service
Chicago, Illinois Field Office,
230 S. Dearborn, Suite 2938
Chicago, Illinois 60604**

Introduction

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on the effects of the proposed Establishment within Suitable Habitat of a Temporary Population of the Eastern Prairie Fringed Orchid at the U. S. Department of Energy (DOE) owned Fermilab Facility Batavia, DuPage and Kane Counties, Illinois, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C., 1531 et seq.).

We base this Opinion on information provided through a meeting between FWS, DOE, and Fermilab on August 30, 2016 at Fermilab, as well as telephone conversations and email correspondence with DOE and Fermilab, and published literature. A complete administrative record of this consultation is on file at the Service's Chicago Field Office.

Consultation History

- On August 30, 2016, the Service met with staff from the DOE and Fermilab to discuss the proposed project and its effects to the species along with the consultation process.
- On October 14, 2016, February 3, 2017, and February 14, 2017, Fermilab staff provided to FWS additional information regarding habitat restoration work and potential introduction sites on the property.
- On February 23, 2017 the Service provided a draft biological opinion to Fermilab.

BIOLOGICAL OPINION

Description of the Proposed Action

Action Area

The action area includes suitable eastern prairie fringed orchid habitat on DOE property at Fermilab. Areas ranking the highest in suitable eastern prairie fringed orchid habitat and those where eastern prairie fringed orchid seed could be dispersed have been located and mapped (Appendix 1).

Project Description

Efforts will be undertaken to establish an eastern prairie fringed orchid population within suitable habitat at Fermilab. Land managers at Fermilab are interested in hosting an introduced population of eastern prairie fringed orchids for the purpose of providing suitable habitat, producing seed for other introduction efforts, and to support the genetic management of other Illinois populations. The intention is to host this introduction until such time as areas onsite hosting one or more eastern prairie fringed orchid populations may be converted to other uses as needed to ensure fulfillment of the DOE Fermilab mission.

Conservation Measures

Conservation measures are part of the proposed action; therefore, we consider them in the analysis of effects.

The DOE is required to manage federal lands as valued national resources. To that end, Fermilab has created an Ecological Land Management (ELM) Committee, which is Directorate-approved and chartered. The ELM Committee's purpose is to provide sound ecological advice, including recommendations on land management, to Fermilab.

The ELM Committee has produced an Ecological Land Management Plan (Plan) for the years 2017 through 2020. This Plan is based on four guiding principles: 1) Support Global Initiatives (climate change mitigation and adaptation, biological diversity), 2) Protect Ecologically Sensitive Areas, 3) Promote Conservation and Restoration, and 4) Encourage Ecological Research within DOE Fermilab property (Fermilab 2016). The ELM Plan further provides goals which embody the Guiding Principles. These goals are to:

- Manage Fermilab lands in ways that sustain and restore biodiversity, promote ecosystem services, and mitigate the effects of climate change.
- Educate Fermilab community about ecologically sensitive areas.
- Reduce the threat of invasive species.
- Monitor, manage, and possibly introduce threatened and endangered species at Fermilab.
- Expand buffer habitat around sensitive areas and create wildlife corridors to connect off-site natural areas and isolated remnants with core Fermilab habitat.
- Improve the condition and function of existing wetlands and waterways.
- Improve structural diversity in habitat communities to meet wildlife needs.
- Evaluate new methods of land management for potential improvements in biodiversity trends.
- Focus wildlife conservation efforts on Chicago Wilderness priority species found at Fermilab, including smooth green snake, little brown bat, red-headed woodpecker, rusty-patched bumblebee, and monarch butterfly.
- Encourage ecological research at Fermilab.

The Plan also includes recommendations to use all proven land management methods to maximize habitat heterogeneity across the entire site in order to increase biodiversity. These land management methods include prescribed burning, mowing, conservation haying, and conservation grazing.

Open land at Fermilab is currently benefitting from the ongoing natural areas management conducted by Fermilab staff.

In an effort to identify specific areas at Fermilab that would provide the most suitable habitat for the eastern prairie fringed orchid, the ELM Committee staff have conducted a Floristic Quality Analysis and generated Floristic Quality Indices identifying and mapping the highest quality areas suitable for eastern prairie fringed orchid seed dispersal (Appendix 2). Soil type, hydrologic factors, and probability of future physics development were also considered.

Status of the Species

Species Description

The eastern prairie fringed orchid grows from an underground tuber to a height of 20 to 100 centimeters (cm) (8 to 40 inches) with an upright leafy stem and flower cluster. Leaves sheath the stem and are 8 to 20 cm (3 to 8 inches) long, lance-shaped, and larger toward the base of the stem. The single flower spike, or inflorescence, supports 3 to 40 white flowers. The flowers have a 3-part fringed lip and a nectar spur 2 to 5.5 cm (about 1 to 2 inches) long.

Life History

Flowering begins from late June to early July and lasts for 7 to 10 days. The inflorescence, which supports the blossoms, often rises just above the height of the surrounding prairie canopy. Night flying hawkmoths pollinate the nocturnally fragrant flowers. The more exposed flowers are more likely to be visited by the hawkmoth pollinators but then are at risk of being eaten by deer. Visiting hawkmoths receive pollen at the base of their proboscises as they ingest nectar from the flower's long nectar spurs. Seed capsules mature over the growing season and disperse seed in late August or September.

Research suggests that this orchid requires a symbiotic relationship with specific soil mycorrhizae for successful seedling establishment. The orchid root system requires this fungal association for proper water and nutrition uptake. The eastern prairie fringed orchid is a disturbance-adapted species meaning that disturbance or early-successional vegetation stages are critical for seedling establishment.

Status and Distribution

In 2014 a rangewide population viability assessment for the eastern fringed prairie orchid was conducted based on data collected from 2008 to 2014 (USFWS 2014 unpublished data). This analysis indicates that range-wide there are currently 98 extant populations of which 9 are highly viable, 32 moderately viable, 55 of low viability, 1 population believed to be extirpated (since 2007), and one population unable to be included due to the lack of sufficient data to determine viability. Currently in Illinois there are 35 existing eastern prairie fringed orchid populations.

Analysis of the Species Likely to Be Affected

This Opinion considers adverse effects to the eastern prairie fringed orchid as a result of the proposed action. No critical habitat has been designated or proposed for this species.

The rusty-patched bumblebee (*Bombus affinis*) is known to occur on the Fermilab site. This species was observed in the Main Ring prairies in the 1990s and was last vouchered September 2014 in Prairie 15 (Miesle 2015; Franzen 1993). The effective date for the final rule to list the rusty patched bumble bee as endangered is currently March 21, 2017. Introducing eastern prairie fringed orchid seed at Fermilab is expected to have no effect on the rusty-patched bumblebee.

Environmental Baseline

Status of the Species within the Action Area

Currently, there is neither a plant nor a population of the eastern prairie fringed orchid on Fermilab grounds, however extensive potential habitat exists.

Factors Affecting the Species Environment within the Action Area

Habitat loss is a prime factor in the rarity of the eastern prairie fringed orchid. Large areas of habitat suitable to the eastern prairie fringed orchid are present within the action area. Additionally, these areas are routinely managed by Fermilab staff to encourage optimum native plant growth through prescribed burning, invasive species control, and deer population control. Each of these land management practices are known to be beneficial to the eastern prairie fringed orchid.

Effects of the Action

Effects of the Action on the Eastern Prairie Fringed Orchid

In order to create an introduced eastern prairie fringed orchid population, seed would be collected from nearby existing populations for dispersal within suitable habitat at Fermilab. Collecting eastern prairie fringed orchid seed from its original population would negate that seed from contributing genetic material to the donor population. Each seed capsule can contain upwards of 3,000 seeds. It is anticipated that one to ten seed capsules may be taken from donor populations for dispersal at Fermilab annually for at least 5 years as long as the donor populations are not seed limited as decided each season by the USFWS (USFWS 2017).

Recent research suggests that augmenting established eastern prairie fringed orchid populations with genetic material (pollen or seed) from another eastern prairie fringed orchid population increases the change in unique alleles and increases negative inbreeding at the receptor population leading to an increase in genetic diversity and thus benefitting that population (Ellwanger 2016). The establishment of an eastern prairie fringed orchid population, even temporarily, at Fermilab provides a net conservation benefit to the species for the following reasons: 1) it would provide suitable habitat which is believed to be a limiting factor for the species, 2) it would provide genetic exchange among other existing populations, 3) it would potentially serve as a seed and pollen source for further augmentations and reintroductions at other sites, and 4) it would provide an opportunity to educate the public in consideration of the eastern prairie fringed orchid and other federally threatened and endangered species.

If the efforts to establish an eastern prairie fringed orchid population are not successful, or if efforts are successful but the site is returned to the baseline condition of zero, the knowledge gained would be beneficial in the conservation of the species by learning what may have led to either the successful or unsuccessful results in introducing the species into suitable habitat and thus may aid in the recovery of the species.

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. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to section 7 of the Act.

Conclusion

After reviewing the current status of the eastern prairie fringed orchid, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, we conclude that the Establishment within Suitable Habitat of a Temporary Population of the Eastern Prairie Fringed Orchid at the DOE owned Fermilab Facility, as proposed, is not likely to jeopardize the continued existence of the eastern prairie fringed orchid. No critical habitat has been designated for this species; therefore, none will be affected.

Regulations define "jeopardize the continued existence of a species" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." We must analyze how the proposed action and potential effects could impact reproduction, number, and distribution of the eastern prairie fringed orchid.

Collecting eastern prairie fringed orchid seed from one or more donor populations for dispersal at Fermilab would not, directly or indirectly, appreciably reduce the likelihood of survival and recovery of the species for the following reasons: 1) Only 10% of seed capsules from a donor population would be collected leaving adequate seed to sustain the donor population. 2) All seed capsules for donation would not be collected from any one specific population unless the population produced over 100 viable seed capsules (10% of 100 seed capsules = 10 seed capsules). 3) Only a small portion of the extant eastern prairie fringed orchid populations would be affected by seed collection for dispersal at Fermilab. Further, the baseline condition at DOE Fermilab is zero eastern prairie fringed orchid individuals, therefore a subsequent return to the baseline condition of zero is not expected to reduce appreciably the likelihood of both the survival and recovery of the listed species. The eastern prairie fringed orchid currently survives within 98 populations range wide with Illinois supporting 35 of these 98 populations. The eastern prairie fringed orchid seed will only be harvested from Illinois populations.

For these reasons, we conclude that the proposed action, taken together with cumulative effects, would not directly or indirectly reduce the likelihood of both the survival and recovery of the eastern prairie fringed orchid by reducing the species' reproduction, numbers, or distribution.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service has identified the following action(s) that, if undertaken by the DOE Fermilab will further the conservation and assist in the recovery of the eastern prairie fringed orchid:

1. Prior to eastern prairie fringed orchid seed dispersal onto Fermilab grounds, Fermilab will identify the areas which support potential suitable habitat for eastern prairie fringed orchid seed dispersal.
2. Fermilab will GPS all locations of eastern prairie fringed orchid seed dispersal on DOE, Fermilab land.
3. Starting three years after initial seed dispersal, Fermilab staff will search the seeded areas for blooming plants during the eastern prairie fringed orchid's bloom period (around July 4th).
4. If blooming plants are found, Fermilab will work with the FWS to tag each individual plant with a numbered ID tag. At this time Fermilab will take demographic data on each blooming plant according to that already taken at other extant eastern prairie fringed orchid locations. This data includes measuring the height of the plant, counting the number of leaves, counting the number of flowers, noting insect or deer herbivory, and then hand pollinating using pollen from another nearby plant, or pollen from another nearby site.
5. If possible, DOE land management programs designed to sustain and restore biodiversity, and promote ecosystem services through prescribed burning, reducing the threat of invasive species, and deer population control should be maintained within the eastern prairie fringed orchid habitat as these programs assist in the recovery of this species by keeping the habitat suitable for successful eastern prairie fringed orchid seed germination and plant fitness.

The Service agrees to the following action(s) to further the conservation and assist in the recovery of the eastern prairie fringed orchid:

1. Prior to eastern prairie fringed orchid seed dispersal onto Fermilab grounds, the areas previously identified by Fermilab that support potential suitable habitat for the eastern prairie fringed orchid would be agreed upon by the FWS.
2. Seed will be provided by FWS to Fermilab staff with seed dispersal techniques demonstrated in the field in suitable habitat at Fermilab.
3. Starting three years from initial seed dispersal, the FWS will notify Fermilab of the eastern prairie fringed orchid's bloom period in order to start their search efforts for blooming plants.
4. Eastern prairie fringed orchid data sheets, numbered metal ID tags, and deer cages (if needed) will be provided to Fermilab staff by the FWS.
5. If blooming plants are found at Fermilab, the FWS will be contacted to determine the appropriate eastern prairie fringed orchid population to act as a pollen donor for cross

pollination of Fermilab plants. At that time, FWS will collect the donor pollen, transport it to Fermilab, and then instruct Fermilab staff in the use of the hand pollination technique.

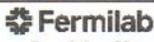
6. If Fermilab staff are unable to 1) search seeded areas each season, starting with the third year after initial seed dispersal, 2) record demographic information from blooming eastern prairie fringed orchid plants, or 3) are unable to hand pollinate blooming plants, then the FWS will be contacted by Fermilab prior to the bloom period to ensure the tasks are completed by FWS and that FWS has access to the pertinent areas.
7. It is understood that future DOE plans for Fermilab land may necessitate adverse impacts to an eastern prairie fringed orchid population (if successful establishment occurs) that returns the site to a baseline condition of zero eastern prairie fringed orchid plants. If this scenario is foreseen, the FWS will be contacted to remove all eastern prairie fringed orchid plants.

REINITIATION NOTICE

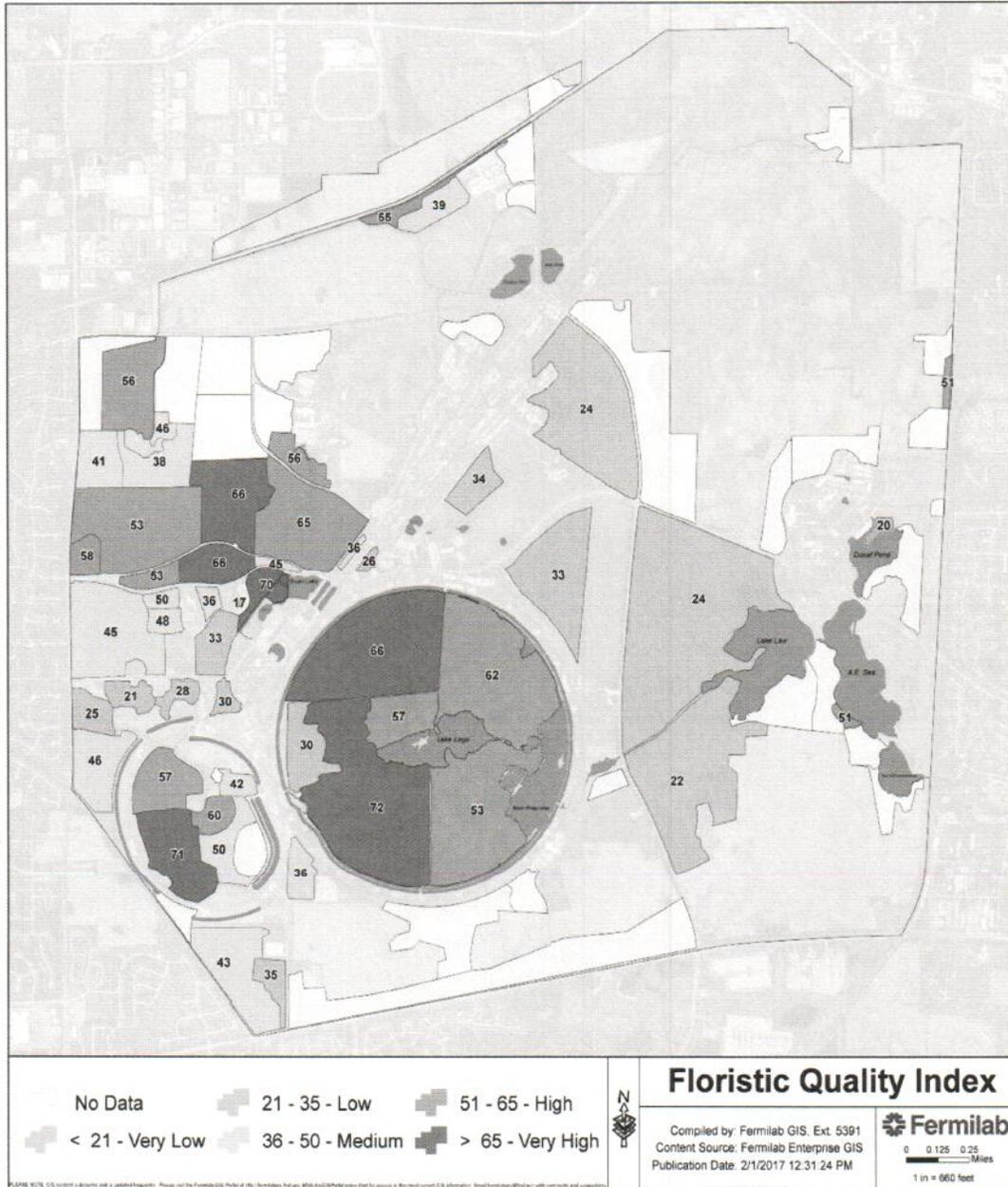
This concludes formal consultation on the proposed action. In accordance with 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.

Appendix 1



 Orchid Locations		<p style="text-align: center;">Potential locations for Eastern prairie fringed orchid at Fermilab</p> <p>Prepared by: Fermilab Ecology Compiled by: Fermilab GIS, Ext. 6391 Contact/Source: Fermilab Ecology GIS Publication Date: 11/2/2016 6:58:16 AM</p> <p style="text-align: center;"> 0 0.15 0.3 1 in = 2000 feet</p>
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Appendix 2



Literature Cited

- Ellwanger, C. 2016. Final Thesis. Genetic Monitoring and Conservation of the Eastern Prairie Fringed Orchid (*Platanthera leucopahea*). pp. 57.
- Fermilab 2016. Fermilab Ecological Land Management Plan Executive Summary (draft). Email from Ryan Campbell on Feb. 3, 2017.
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- Miesle, T. 2015. Bumblebee, honeybee and carpenter bee distribution in selected natural area sites at Fermi National Accelerator Laboratory. Unpublished Report to Fermi National Accelerator Laboratory.
- US Fish & Wildlife Service (USFWS) 2014. Eastern Prairie Fringed Orchid Population Viability Analysis. Unpublished data.
- US Fish & Wildlife Service (USFWS) 2017 (most recent version) Illinois Eastern Prairie Fringed Orchid Cross Pollination and Seed Dispersal Plan. pp 6.