Appendices

Appendix A - Final Mitigation and Environmental Commitments

Appendix B - Final Section 4(f) Evaluation

Appendix C – Response to Comments

APPENDIX A – FINAL MITIGATION AND ENVIRONMENTAL COMMITMENTS

Table A-1 lists the final mitigation measures/commitments for the Selected Alternative. For each commitment, the party responsible for implementing the commitment is identified (i.e. Federal Railroad Administration (FRA), Illinois Department of Transportation (IDOT), and/or Union Pacific Railroad (UPRR), and/or U.S. Forest Service (USFS)).

IDOT has committed to ensuring and overseeing all mitigation/commitment implementation in Table A-1 once the Project enters construction. Should FRA provide future financial assistance for construction of the Project, FRA will monitor compliance with these measures through FRA's oversight of the funding agreement associated with that financial assistance. Mitigation oversight will be performed in accordance with potential future agreements between FRA and IDOT, IDOT's contractual agreement with UPRR, or UPRR's separate independent obligation to obtain and comply with permits for work it performs on its property.

Table A-1 Mitigation Measures and Environmental Commitments for the Selected Alternative

No.	Resource	Mitigation Measure/Commitment	Responsible Party
1	Air Quality	State and local regulations regarding dust control and other air quality emission reduction controls will be followed during construction. In addition, BMPs will be used prior to, during, and after construction for dust suppression.	UPRR
2	Floodplains	UPRR will obtain local floodplain permits prior to construction.	UPRR
3	Floodplains	The UPRR will design the proposed or modified drainage structures in floodplains that drain an area over one square mile—including Grant Creek, Prairie Creek, and Unnamed Tributary to Kankakee River—per the IDNR-OWR Part 3700 rules (or Statewide Permit No. 12, where applicable), and these drainage structures and track improvements will result in an acceptable change in the capacity of the floodplain to carry flood waters, per IDNR-OWR Part 3700 rules (or Statewide Permit No. 12, where applicable).	UPRR

4	Floodplains	The UPRR will complete hydraulic studies during final design as part of the IDNR-OWR permit process. The final design will incorporate design measures to avoid, minimize, and mitigate any flood height increase in accordance with the IDNR-OWR permit process.	UPRR
5	Surface Water	The UPRR will use appropriate BMPs prior to, during, and after construction as part of the soil erosion and sediment control plan for the proposed Project included in the Storm Water Pollution Prevention Plan (SWPPP). The UPRR will remove debris and spoil according to state and local regulations.	UPRR
6	Surface Water	Water well or cisterns directly impacted by the proposed project will be properly abandoned in accordance with Illinois Department of Public Health requirements to minimize potential groundwater contamination. If a dwelling with an affected water well or cistern will remain after construction, the associated water well will be replaced, or other suitable alternative provided. UPRR will construct the new water well such that susceptibility to surficial contamination will be minimized (for example, by constructing the well in a deeper aquifer and by following water well code).	UPRR
7	Surface Water	The well identified by MNTP staff on MNTP property will be added to the design and construction plans to inform contractors of its presence.	UPRR
8	Surface Water	Construction the Selected Alternative will require a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges from construction sites. The UPRR will obtain permit coverage either under the Illinois Environmental Protection Agency General NPDES Permit for Storm Water Discharges from Construction Site Activities (General NPDES Permit No. ILR10), or under an individual NPDES permit.	UPRR
9	Noise and Vibration	The Project website will be used to inform residents regarding construction plans so they can plan around periods of changes in construction noise levels.	IDOT

10	Noise and Vibration	To minimize vibration impacts from the Selected Alternative, UPRR will use maintenance procedures such as regularly scheduled rail grinding, wheel truing programs, vehicle reconditioning programs, and use of wheel flat detectors.	UPRR
11	Noise and Vibration	Once details of the construction activities become available, the contractor will communicate with the affected communities regarding minimizing nighttime noise impacts at sensitive receptors.	UPRR
12	Vegetation and Habitat	Temporary impacts will be mitigated by restoring the ground surface to the preconstruction contour and planting exposed areas of soils with a cover crop to the extent practicable.	UPRR
13	Vegetation and Habitat	UPRR will mitigate temporary impacts to prairie habitat by grading areas of temporary impact to the original contour and then seeding according to Articles 250.05 and 250.06 of the IDOT Standard Specifications for Road and Bridge Construction. Permanent impacts will be quantified, and this information will be coordinated with IDOT's Bureau of Design and Environment. Any unavoidable impacts to prairies will be documented and mitigated in a Prairie Mitigation Plan. Under the 2004 ROD for the HSR Program, acre-for-acre in-kind compensation will be provided for both temporary and permanent impacts to prairie grade C+ (Noteworthy, Significant, or Exceptional) or above. In addition, a prairie mitigation plan will be prepared and implemented as part of construction. The Prairie Mitigation Plan will be coordinated with FRA, IDOT, Army Corps of Engineers, Fish and Wildlife Service, Illinois Department of Natural Resources, Environmental Protection Agency, and MNTP.	UPRR

14	Vegetation and Habitat	All areas and classes of prairie identified by the botanical survey (Chicago to St. Louis High Speed Rail Elwood to Braidwood (Tier 8) Natural Resources Update (Huff & Huff, 2024)) will be drawn on the contract plans to ensure impacts are avoided or minimized and coordinated with IDOT for review and approval. Significant, exceptional, and noteworthy prairies (Classes A, B, and C) will be avoided to the greatest extent practicable.	UPRR
15	Vegetation and Habitat	Measures to minimize the spread of invasive species will be implemented to meet Executive Order 13112, "Invasive Species." Measures to minimize the spread of invasive species during construction include rapidly seeding and revegetating bare soil with native/non-invasive species, cleaning construction equipment before entering areas near sensitive habitats, and actively managing invasive plants that become established during construction. These methods will be implemented, where practical, also in compliance with Illinois' state special provisions for controlling invasive species including the applicable portions of Section 107 of the IDOT Standard Specifications. Management to reduce invasive species during railroad operations includes the use of herbicides, manual cutting, and timely mowing of grass and forelands. Invasive species control will occur in railroad track areas near high-quality habitats such as MNTP, the DPSFWA, the Hitts Siding Prairie Nature Preserve, and the Joliet Army Ammunition Plant INAI site.	UPRR
16	Vegetation and Habitat	Disturbed areas will be reseeded with an appropriate native seed mix that contains forbs as well as grasses, where feasible. All seed mixes used on MNTP property will need to be reviewed and approved by MNTP.	UPRR
17	Wildlife Resources	Mitigation for wildlife habitat impacts including pollinators, migratory birds, grassland birds, and bald eagles includes reseeding temporarily disturbed areas with native/non-invasive species.	UPRR

18	Wildlife Resources	Areas impacted by construction in MNTP will be revegetated after construction is complete. For temporary construction easements within MNTP, prairie grasses or other vegetation that conforms to MNTP's long-term restoration desires will be used.	UPRR
19	Wildlife Resources	A prairie mitigation plan will be prepared and implemented as part of construction. The Prairie Mitigation Plan will be coordinated with FRA, IDOT, Army Corps of Engineers, Fish and Wildlife Service, Illinois Department of Natural Resources, Environmental Protection Agency, and MNTP. Any unavoidable impacts to prairies will be documented and mitigated in the Prairie Mitigation Plan. Under the 2004 ROD for the HSR Program, acre-for-acre in-kind compensation will be provided for both temporary and permanent impacts to prairie grade C+ (Noteworthy, Significant, or Exceptional) or above.	UPRR
20	Wildlife Resources	Tree clearing dates will be coordinated with the regulatory agencies to reduce potential impact to federally listed species and the bald eagle.	UPRR
21	Wildlife Resources	Surveys for ground bird nests within the construction footprint in MNTP will be completed by ecologists prior to construction in MNTP. Any ground bird nests found during the survey will be flagged for construction crews. UPRR will email FRA and IDOT the results of the ground bird nest survey.	UPRR
22	Wildlife Resources	To the extent practicable, UPRR will follow the Nationwide Standard Conservation Measures for Migratory Birds.	UPRR

23	Waters of the United States	UPRR will work to first avoid and minimize impacts to wetlands and surface water locations during final design. Unavoidable adverse wetland and surface water impacts will be subject to the applicable replacement ratios specified in 17 IAC Part 1090.50 (c)(8) and USACE regulations. The replacement ratio for unavoidable adverse impacts to wetlands with Floristic Quality Index of 20 or above or a Mean C-Value of 4.0 or above will be 5.5:1.0. Impacts to wetlands with a Floristic Quality Index of less than 20 or a Mean C-Value of less than 4.0 will be determined based upon the location of the wetland compensation site in accordance with the Illinois Wetland Preservation Act. Mitigation details, including the location of any mitigation, will be coordinated with the regulatory agencies during the permitting process.	UPRR
24	Waters of the United States	Wetlands will have a mitigation ratio of 1.5:1.0 in accordance with the IWPA. However, this mitigation ratio may be amended, depending on the proposed compensation site, unless the Floristic Quality index is 20 or above or the Native Mean C-Value is 4.0 or above.	UPRR
25	Waters of the United States	If wetland impacts occur within wetlands developed for prior mitigation, mitigation ratios will be higher and determined through coordination with the Corps.	UPRR
26	Waters of the United States	UPRR will hold a coordination meeting with USFS regarding hydrologic modeling assumption at Grant Creek prior to completing the hydrologic modeling for the project.	UPRR
27	Waters of the United States	UPRR will update the wetland delineation prior to Section 404 permitting to confirm quality and extent of wetland impacts.	UPRR

28	Threatened and Endangered Species	Conservation measures for the rusty patched bumble bee (*Bombus affinis*) foraging and nesting habitat will occur through the following: Worker Environmental Awareness Training (WEAT) will be performed prior to construction, clearing activities will be limited to those areas required for construction, and sensitive areas not needed for construction will be fenced prior to construction to alert workers and prevent accidental intrusions. WEAT training is offered by UPRR to contractors to increase environmental awareness. WEAT training covers special-status species conservation, species identification, compliance responsibilities, environmental monitoring and best management practices, regulatory permits, protective requirements, and mitigation measures.	UPRR
29	Threatened and Endangered Species	UPRR will minimize the footprint to minimize impacts to disturbed areas.	UPRR
30	Threatened and Endangered Species	UPRR and their contractors will coordinate forest clearing and adhere to seasonal work restrictions developed in consultation with regulatory agencies dates with the regulatory agencies to reduce potential impact to federally listed species and the bald eagle.	UPRR
31	Threatened and Endangered Species	UPRR will obtain an Incidental Take Authorization for the state-listed species, including the eryngium stem borer moth from IDNR for impacts to rattlesnake-master plant populations prior to construction.	UPRR
32	Threatened and Endangered Species	Tree clearing within medium or high-quality overwintering RPBB habitat will be conducted between August 1 and October 10.	UPRR
33	Threatened and Endangered Species	Ground disturbance within the RPBB High Potential Zone will avoid nesting season.	UPRR

34	Threatened and Endangered Species	Where avoidance is not possible, the area of disturbance will be minimized. To protect areas of habitat that will not be impacted but may be near construction activity, non-intrusion fencing will be installed to alert workers of sensitive natural areas. Signs will be posted at the edge of the habitat areas to minimize accidental intrusions into these areas. Temporarily impacted areas within the high potential zone will be seeded with native seed mixes following construction. To the extent practicable, the mixes will contain an assortment of plant species specific to the habitat type from the RPBB Midwest Plant Guide (Krill, 2024). Species that are RPBB superfoods should be prioritized.	UPRR
35	Threatened and Endangered Species	Foraging habitat will be established as mitigation for impacts to habitat within the high potential zone. A mitigation ratio of 1:1 restoration will be used. Mitigation will occur on a property yet to be identified. Several public lands occur within the project area, including Illinois Nature Preserves, MNTP, and Abraham Lincoln National Cemetery. IDOT will work with those agencies to identify an area that can be used for mitigation. Mitigation preference will be for within or adjacent to the high potential zone, with forested areas nearby that could provide winter habitat for the bee.	UPRR/IDOT
36	Threatened and Endangered Species	General avoidance and mitigation measure (AMM) 1: Ensure all operators, employees, and contractors working in areas of Indiana bat, NLEB, or TCBs suitable habitat are aware of all Transportation Agency environmental commitments, including all applicable AMMs.	UPRR/IDOT
37	Threatened and Endangered Species	Tree Removal/Trimming AMM 1: Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to the extent practicable to avoid tree removal/trimming in excess of what is required to implement the project safely.	UPRR

38	Threatened and Endangered Species	Tree Removal/Trimming AMM 2: Ensure tree removal/trimming is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree removal/trimming to ensure contractors stay within clearing limits).	UPRR
39	Threatened and Endangered Species	Tree Removal/Trimming AMM 4: Avoid conducting tree removal/trimming outside documented habitat for the Indiana bat, NLEB, or TCB beyond 100 ft of the road/rail surface during the NLEB pup season. The pup season is June 1st to July 31st.	UPRR
40	Threatened and Endangered Species	Tree removal for trees that are suitable habitat for the NLEB and TCB will occur between November 1st through March 31st.	UPRR
41	Threatened and Endangered Species	Temporarily disturbed areas adjacent to the decurrent false aster population in MNTP will be reseeded with native seed mix.	UPRR
42	Threatened and Endangered Species	Silt fence or exclusion fencing will be placed around decurrent false aster populations when construction is occurring within 50 feet of the proposed Project limits to reduce the possibility of accidental impact.	UPRR
43	Threatened and Endangered Species	No work shall occur outside the Action Area where decurrent false aster has been documented.	UPRR
44	Threatened and Endangered Species	No borrow/waste/use sites shall occur in the area decurrent false aster has been documented.	UPPR
45	Threatened and Endangered Species	Disturbed areas will be reseeded with native prairie mix.	UPRR

46	Transportation	Roadway detours will be developed in coordination with key stakeholders. The roadway detours will outline which crossings will be closed and for how long they are expected to be closed. Key stakeholders listed in the prior commitment will be given the opportunity to review and comment on the plans prior to implementation.	UPRR
47	Transportation	Prairie Creek Bridge construction will be completed in phases to always keep at least one track open. The contractor will establish exact phases.	UPRR
48	Transportation	At the private crossings, temporary full crossing closures will either not occur or be brief and infrequent since there is no alternative access to the property served.	UPRR
49	Community and Land Use	The project team will develop and implement a plan for community coordination during construction. UPRR will meet with all directly affected property owners prior to construction to discuss construction.	UPRR, IDOT
50	Community and Land Use	The Nicor Gas Line will be shown on all design and construction plans. During design and construction, UPRR will coordinate with Nicor to establish BMPs for protecting the gas line during construction.	UPRR
51	Community and Land Use	Mitigation for temporary impacts to INAI sites includes reseeding disturbed areas. All disturbed areas will be reseeded with an appropriate native seed mix that contains forbs as well as grasses, where feasible. Seed mixes used within MNTP will be coordinated and approved by MNTP staff.	UPRR
52	Community and Land Use	To prevent direct access to the UPRR right-of-way, the existing fence along the UPRR right-of-way adjacent to Archer Park will be retained or relocated within the Project footprint.	UPRR
53	Cultural Resources	No mitigation for cultural resources is identified for the Selected Alternative.	FRA, IDOT, UPRR
54	Parks and Recreation	UPRR will design and install temporary signage to educate visitors on changing conditions to MNTP trails during construction.	UPRR

55	Section 4(f)	IDOT will provide a lump sum payment to MNTP for restoration activities to mitigate for the permanent use of MNTP land. This payment may be used for a variety of restoration activities within MNTP, including but not limited to creating wetlands, restoring prairies, collecting seeds or planting vegetation. FRA will calculate the lump sum by multiplying the acres of land needed for long-term use by the current market value of one acre in a wetland bank at the time of the transaction. The payment will be issued when construction begins. MNTP will provide IDOT and FRA with status reports annually by February 1 on the implementation of this mitigation beginning when the funds are issued and concluding when the funds are fully expended.	IDOT, FRA, USFS
56	Section 4(f)	Areas impacted by construction in MNTP will be revegetated after construction is complete. For temporary construction easements within the MNTP, prairie grasses or other vegetation that conforms to MNTP's long-term restoration plans will be utilized.	UPRR
57	Section 4(f)	Regulated substance issues that may arise in the construction phase will be managed in accordance with the current IDOT *Standard Specifications for Road and Bridge Construction and Supplemental Specifications* and "Recurring Special Provisions" or the UPRR *Hazardous Material Policies, Procedures and Policies.* Depending on the context, UPRR will decide on the appropriate specification to use.	UPRR
58	Regulated Substances	Accidental spills of hazardous materials and waste during construction or operation of the transportation system will require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment will not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills affecting these resources. Prior to the start of construction, an emergency response plan will be prepared by UPRR or its contractor for use during construction of the selected build alternative.	UPRR

59	Regulated Substances	Further environmental studies will be conducted if the proposed improvements require excavation adjacent to a property identified with a REC or requires excavation, including subsurface utility relocation, for an easement on state or state jurisdiction right-of-way.	UPRR
60	Regulated Substances	In some cases, the portion of the Selected Alternative that involves the REC will be risk managed and not require additional assessment. If the affected property containing the REC will be a full take, then the property will be ineligible to be risk managed. If risk management is not possible, further environmental study will be required. Specifically, a Preliminary Site Investigation will be needed to determine the nature and extent of possible contamination.	UPRR
61	Regulated Substances	Prior to the acquisition of property or a temporary or permanent easement by the state, and prior to construction, a Preliminary Site Investigation will be performed at each affected property containing an REC to determine the nature and extent of the waste present in state or state jurisdiction right-of-way.	UPRR
62	Regulated Substances	Pre-demolition building surveys will be conducted prior to building demolitions to ensure proper abatement (including appropriate regulatory notifications in accordance with National Emission Standards for Hazardous Air Pollutants.	UPRR
63	Aesthetic Environment and Scenic Resources	The UPRR right-of-way will be revegetated with a ground cover at the end of construction.	UPRR

APPENDIX B – FINAL SECTION 4(F) EVALUATION

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Final Section 4(f) Evaluation

B1. Introduction and Overview

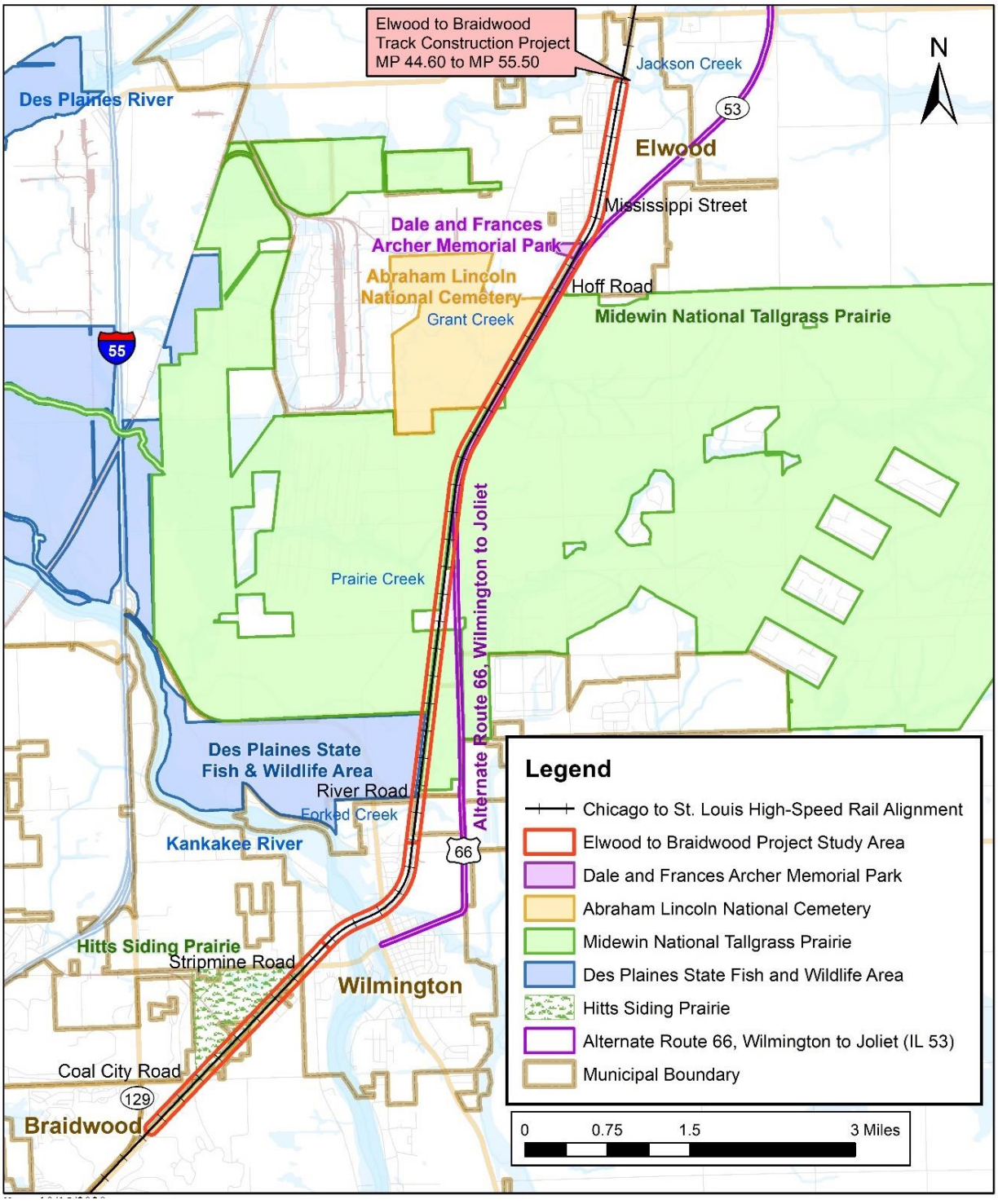
This Final Section 4(f) Evaluation has been prepared to comply with the United States Department of Transportation (USDOT) Act of 1966 (23 U.S.C. § 138 and 49 U.S.C. § 303) and its implementing regulations codified at 23 C.F.R. Part 774.

The Illinois Department of Transportation (IDOT) proposes to construct improvements to the existing mainline of the Union Pacific Railroad (UPRR) between Elwood and Braidwood in Will County, Illinois. The proposed Elwood to Braidwood Track Construction Project (proposed Project) considers a no -action alternative and two build alternatives. The proposed Project is one component of the Chicago to St. Louis High-Speed Rail Corridor Program (HSR Program). Exhibit B1 shows the proposed Project location; the proposed project study area is highlighted in red on the map. This Final 4(f) Evaluation concludes that Alternative 1B (Selected Alternative) has the least overall harm to 4(f) resources, after consideration of feasible and prudent avoidance alternatives and all possible planning to minimize harm.

Please refer to Sections 6.1.1 through 6.1.9 of the Draft Section 4(f) evaluation for information on the following Section 4(f) definitions and processes:

- 6.1.1 Regulatory Context
- D6.1.2 Roles and Responsibilities of Participants
- D6.1.3 Section 4(f) Applicability
- D6.1.4 Section 4(f) Use Definition
- D6.1.5 Feasible and Prudent Avoidance Alternative
- D6.1.6 All Possible Planning
- D6.1.7 Least Overall Harm
- D6.1.8 Exceptions to Section 4(f)
- D6.1.9 De Minimis Impact

Exhibit B1. Proposed Project Location Map



The proposed project study area is 9.59 miles long, covers almost 310 acres, and includes the following elements for the two build alternatives evaluated in the Environmental Assessment (EA):

- A second track added from Elwood to Wilmington (Milepost [MP] 44.60 to MP 51.88) and from Wilmington to Braidwood (MP 53.19 to 55.50), creating one continuous second mainline track from Elwood to Braidwood (MP 44.60 to 55.50).
- A maintenance access facility, which would consist of a 10-foot-wide road paralleling the track within the railroad right-of-way for the full proposed Project length.
- Replacement of the Prairie Creek Bridge, including the addition of a second track across the bridge at MP 49.50.
- At-grade crossing improvements at Mississippi Street (in Elwood), Hoff Road, Joliet Arsenal (private crossing), Damien Mills Road (private crossing), and River Road to accommodate the second track, as well as the closure of a private crossing at MP 47.82.
- Drainage and culvert improvements throughout the proposed project study area.
- Positive Train Control signaling.
- Urban- and rural-style fencing in selected areas.

This Final Section 4(f) Evaluation provides the analysis to support FRA's determinations necessary to comply with the provisions of 49 United States Code (USC) 303, hereinafter referred to as Section 4(f). To demonstrate FRA's compliance with Section 4(f), this Final evaluation and the Draft Section 4(f) Evaluation:

- Describe the requirements associated with Section 4(f).
- Identify the properties protected by Section 4(f) in the proposed project study area.
- Determine whether the proposed Project would result in a use as defined in 23 CFR § 774.17 of these properties.
- Assess potential feasible and prudent alternatives to avoid the use of the properties.
- Identify measures to minimize harm and evaluate their reasonableness as a means of incorporating all possible planning to minimize harm in terms of the preservation purpose of the statute.
- Present a least overall harm analysis for alternatives that would result in the use of Section 4(f) properties.

B2. Purpose and Need

As described in Chapter 1 of the EA, IDOT proposes to construct improvements to the existing mainline of the UPRR between Elwood and Braidwood in Will County, Illinois.

The FRA chose the "tiered" approach to satisfy NEPA requirements for this HSR corridor:

- Tier 1: The first step is a broad, programmatic analysis of the environmental consequences of alternatives documented in a Tier 1 Environmental Impact Statement (EIS). The Tier 1 EIS for this Program was completed in 2012.

- Tier 2: The Tier 1 EIS is followed by more detailed Tier 2 environmental reviews, focused on specific projects and improvements. The proposed Project between Elwood to Braidwood is being covered by this Tier 2 EA and Section 4(f) evaluation.

The purpose of the HSR Program between Chicago and St. Louis, as stated in the 2012 Tier 1 EIS, is to enhance the passenger transportation network in the corridor by improving high-speed passenger-rail service, resulting in a more balanced use of different corridor travel options by diverting trips made by automobile and air to rail.

The needs outlined in the 2012 Tier 1 EIS for the Chicago to St. Louis HSR Corridor Program were as follows:

- Because of inadequate rail capacity and deficiencies in the existing rail infrastructure, there is currently a modal imbalance within the corridor. Rail travel represents only 1.3 percent of the 51 million annual person trips within the Chicago to St. Louis Corridor, while automobile travel comprises 97.5 percent of these trips. The other two modes, air, and bus, comprise only 1.1 percent and 0.2 percent, respectively.

- Between 2007 and 2010, on-time performance for rail passenger service between Chicago and St. Louis ranged from 38 percent to 75 percent.

- The single track between Joliet and St. Louis cannot accommodate existing and projected freight and passenger train traffic, resulting in travel time delays and the inability to increase passenger rail service.

- The new Joliet Intermodal Terminal will double the number of freight trains using the Chicago to St. Louis Corridor from six to 12. The number of freight trains is projected to increase to 22 by the year 2017, which could affect the performance and capacity for high-speed passenger rail.

- From 2007 to 2010, rail passenger ridership between Chicago and St. Louis has increased 34 percent. (Over this same period, ridership on the state-supported trains between Chicago and St. Louis increased by 72 percent.)

- Automobile and bus travel between Chicago and St. Louis is limited primarily to Interstate 55 (I-55). Travel on this one route can often be unreliable because of traffic congestion, weather, roadway construction, and accidents, all of which can substantially increase travel times.

- Automobile travel, which represents 95.5 percent of the trips within the corridor, is the least safe mode of transportation when compared to air, rail, and bus travel. Therefore, there is a need to provide safer alternative modes of transportation along the corridor.

- Although air travel has the shortest travel times and is the safest mode of transportation, additional travel time must be considered for passage through airport security and travel to and from the airport. In addition, air travel is vulnerable to weather conditions, which can result in major delays and cancelled flights. Also, there is currently no direct air service from the central part of the corridor to St. Louis, and air travel provides little service to intermediate destinations.

The purpose of the proposed Project (Tier 2) is to implement the Elwood to Braidwood section of the Chicago to St. Louis HSR Program, as set forth in the 2012 Record of Decision (ROD).

The specific needs of the proposed Project are as follows:

- Improve deteriorating or functionally obsolete components.
- Improve maintenance efficiency. In conjunction with additional train frequency, the project needs to improve maintenance access to reduce maintenance time and maintenance interference with train operations. Regular inspections or repairs require on-track access for the transport of equipment and material. Without maintenance access, maintenance delays result from not getting track time issued by the dispatcher to transport equipment and materials and perform the work. More frequent trains would reduce the available time a dispatcher could allow equipment, materials, and workers on the track without interfering with train operations. More work would have to be done at night to avoid interfering with train operations, which affects worker safety. A suspension of service for on-

track equipment originating from Braidwood could consume as much as 8 hours of track time. During 8 daytime hours, up to five HSR trains could be affected.

- Address the Prairie Creek Bridge at MP 49.52, which is functionally obsolete and past its useful life.
- Discourage pedestrians from crossing the tracks between grade crossings in urbanized areas.
- Address drainage deficiencies along the entire project area.

B3. Project Alternatives

The EA evaluated three alternatives: the No-Build Alternative, Build Alternative 1B and Build Alternative 2A. Build Alternative 1B is the Selected Alternative and is described below. Please refer to the EA and Draft Section 4(f) Evaluation for additional information about the No Build Alternative and Build Alternative 2A.

B3.1. Selected Alternative

Section 3 of the Finding of No Significant Impact (FONSI) identifies Build Alternative IB as the Selected Alternative. As described in Section 2.3 of the EA, Build Alternative 1B includes the following elements:

- A second mainline track would be constructed parallel to the existing track.
- The grade of the existing main track would be revised for 0.26 miles.
- A 10-foot-wide maintenance access facility with associated driveways (connecting to local roads) and turnarounds at endpoints along entire section length would be constructed.
- North of Damien Mills Road (MP 49.91), the maintenance access facility would be constructed on the west side of the existing track. South of Damien Mills Road, the access facility would be constructed on the east side of the existing track. The maintenance access facility would be used for equipment access during construction and future maintenance to help ensure on-time performance and service outcomes consistent with the HSR corridor. Tubular steel gates would be installed at the entrance to all access facility driveways to prevent trespassing by non-railroad motorized vehicles and discourage trespassing in general.
- A retaining wall would be constructed for approximately 1,500 feet on the west side of the proposed maintenance access facility, at MP 48.15. The purpose of the retaining wall is to avoid affecting an existing gas line that parallels the tracks.
- Two sections of earthen berm would be constructed to avoid and minimize impacts to the parallel NRHP-listed Illinois Route 53 (IL-53) (Alternate Route 66).

- A universal crossover would be added at three locations, signal improvements would be provided, a siding and associated turnout would be relocated for 0.55 miles, and an existing industrial siding turnout would be relocated.
- Six at-grade crossings would be revised.
- A new Prairie Creek railroad bridge and a maintenance access facility bridge span west of the Prairie Creek Bridge would be constructed.
- Previously abandoned 3,203 feet of track between Wilmington and Braidwood would be removed.
- HSR fencing along both sides of the tracks would be installed where not already provided.
- New or extended culverts would be constructed at 13 locations.

B3.2. Section 4(f) Resources

Five Section 4(f) resources are in the proposed project study area, which includes 500 feet on either side of the existing railroad right-of-way. The boundaries of all five resources are adjacent to the existing UPRR right-of-way. Table B1 lists the resources.

Table B1. Section 4(f) Affected Properties in Study Area

Section 4(f) Resource	Size	Official With Jurisdiction	Type Of Section 4(f) Property
Dale and Frances Archer Memorial Park in Elwood, Illinois (Archer Park)	18 acres	Village of Elwood	Walking path Open/green space Disc golf course (10 holes)
IL-53 (Alternate Route 66), Wilmington to Joliet	NRHP-listed IL-53 (Alternate Route 66) is 15.9 miles long	SHPO	Historic property listed in the NRHP
Abraham Lincoln National Cemetery	982 acres	US Department of Veterans Affairs, National Cemetery Administration; SHPO	All national cemeteries are considered eligible for the NRHP as a historic district regardless of age
Midewin National Tallgrass Prairie	18,225 acres	US Department of Agriculture, Forest Service	Wildlife refuge Public recreation area

Section 4(f) Resource	Size	Official With Jurisdiction	Type Of Section 4(f) Property
Des Plaines State and Fish Wildlife Area	4,950 acres	Illinois Department of Natural Resources, Division of Land Management	Public recreation area

These resources and Section 4(f) conclusions are described in more detail in the Draft Section 4(f) Evaluation. Table B2 summarizes the Section 4(f) properties discussed above and the types of Section 4(f) use and anticipated Section 4(f) approvals for each.

Table B2: Section 4(f) Use for Each Resource by Project Alternative

Section 4(f) Property	Project Alternative	Type Of Section 4(f) Use		Proposed 4(f) Finding
		Permanent Use (Acres)	Temporary Use (Acres)	
Dale and Frances Archer Memorial Park	1B	0	0	*No Use*
	2A	0	0	*No Use*
IL 53 (Alternate Route 66), Wilmington to Joliet	1B	0	0.6	*De minimis*
	2A	0	8.0*	Individual
Abraham Lincoln National Cemetery	1B	0.5	6.1	*De minimis*
	2A	0.3	3.6	*De minimis*
Midewin National Tallgrass Prairie	1B	6.0*	3.5	Individual
	2A	0	6.1*	Individual
Des Plaines State Fish and Wildlife Area	1B	0	0.9	*De minimis*
	2A	0	0.9	*De minimis*

B3.3. Avoidance Alternatives Analysis

Since neither of the build alternatives would avoid all Section 4(f) resources, an assessment of potential avoidance alternatives was required. Appendix B6 - Draft Section 4(f) Evaluation provides the full discussion of the following: (1) potential alternatives to the build alternatives that would avoid use of any Section 4(f) resources;

and (2) whether these avoidance alternatives are feasible and prudent. This section summarizes the results of the avoidance alternatives analysis.

B3.3.1. Avoidance Alternatives Considered

Four categories of avoidance alternatives were considered in the Draft Section 4(f) Evaluation, and are briefly summarized below:

- No-Build Alternative – Assumes that no changes are made to the area between Elwood and Braidwood. The existing single track will remain.
- Single-Track Alternatives – Use the existing single track between Elwood and Wilmington, where there are five Section 4(f) resources, and double track elsewhere. Several cultural and natural resources are between Elwood and Wilmington, of which the MNTP makes up 60 percent of neighboring property.
- Double-Track Alternatives –Use double track between Elwood and Wilmington where the five Section 4(f) resources are located. These alternatives were all developed to evaluate if moving the track and access facility could reduce or eliminate impacts to either MNTP or Historic Route 66. The six alternatives were named 1A, 2B, 3A, 3B, 4A, and 4B. All the alternatives were the same except for the area beginning just south of the DPSFWA just north of Forked Creek and ending north of Archer Park just north of Mississippi Street in Elwood. FRA considered four non-standard configuration options for each of the six double track alternatives.
- Alternate Rail Corridors – This alternative would move the passenger rail trains to an entirely new corridor.

B3.3.2. Avoidance Alternative Conclusions

FRA has determined there are no feasible and prudent avoidance alternatives. The full Avoidance Alternatives Analysis can be found in the Draft Section 4(f) appendix of the EA (see Section D6.6 of Appendix D6). Below is a summary of the findings that helped to reach this conclusion.

- The No-Build Alternative, although it would avoid the use of Section 4(f) resources, is not a feasible and prudent Section 4(f) avoidance alternative nor a reasonable alternative for minimizing harm to Section 4(f) resources because it would not meet the stated purpose and need.
- The Single-Track Alternative, although it would avoid the use of Section 4(f) resources, is neither a feasible and prudent Section 4(f) avoidance alternative nor a reasonable alternative for minimizing harm to Section 4(f) resources because it would compromise the proposed Project to a degree that would be unreasonable to proceed with the Project in light of its stated purpose and need.

- The Double Track Alternatives would not avoid the use of Section 4(f) resources, and none present a feasible and prudent Section 4(f) avoidance alternative. Each double track alternative would either have similar Section 4(f) uses to the build alternatives or compromise the proposed Project in such a way that would be unreasonable to proceed with the Project in light of its stated purpose and need.
- No feasible and prudent alternate railroad corridor exists that would bypass the proposed project study area.
- Creation of a new section of railroad to bypass the Section 4(f) resources within the proposed project study area is also not a feasible and prudent avoidance alternative because a new section of railroad would not avoid other Section 4(f) resources. No Alternative Rail Corridors are feasible and prudent.

B4. All Possible Planning to Minimize Harm

"All possible planning" as defined in 23 CFR § 774.17 includes all reasonable measures to minimize harm or mitigate for adverse impacts and effects. The cost of mitigation should be a reasonable public expenditure in light of the severity of the impact on Section 4(f) property, in accordance with 23 CFR § 771.105(e).

The design was reviewed to minimize harm to Section 4(f) properties. Impacts to Section 4(f) resources in the project study area would be mitigated as described in the next section. The mitigation commitments for Alternative 1B outlined in Appendix A of the FONSI. These mitigation commitments were established to minimize harm.

B5. Least Overall Harm Analysis

Because there is no feasible and prudent avoidance alternative, FRA may only approve the alternative that causes the least overall harm to Section 4(f) resources. FRA determines least overall harm based on assessing and balancing the following seven factors, which are discussed in the subsections below.

The following section reviews the multiple remaining alternatives that use one or more Section 4(f) resources, including alternatives that would eliminate or reduce the use of individual resources. The section (1) describes the alternatives considered in this analysis, (2) describes the efforts that were taken to minimize impacts to Section 4(f) resources, and (3) summarizes the results of the assessment of each of the seven least-harm factors.

B5.1. Alternatives Considered in the Least Overall Harm Analysis

There are no feasible and prudent avoidance alternatives. Therefore, Alternative 1B and Alternative 2A are being evaluated in the least overall harm analysis.

B5.2. Assessment of Least Overall Harm

This section addresses all seven least overall harm factors provided in 23 CFR § 774.3 for the two build alternatives, 1B and 2A.

Factor 1: Ability to Mitigate Adverse Impacts to Each Section 4(f) Resource

This factor requires an analysis of how the effects of each alternative can be mitigated for each Section 4(f) resource.

Both alternatives have the ability mitigate adverse impacts to Section 4(f) resources. Alternative 2A includes tall retaining walls that would alter the viewshed while driving on IL 53 (Alternate Route 66)—resulting in an adverse effect determination related to its NRHP listing. FRA would take steps to resolve the adverse effect by entering an MOA if Alternative 2A were selected. The MOA would outline the mitigation measures to resolve the adverse effect. Build Alternative 1B does not require retaining walls in the area and would not adversely affect IL 53 (Alternate Route 66).

Impacts to MNTP would be mitigated for both Alternative 1B and 2A. A lump sum payment for restoration activities would mitigate for permanent uses of MNTP land by the railroad. This lump sum payment could be used to enhance the habitat within MNTP to offset the loss of land to the railroad. The impacts to MNTP would be greater with alternative 1B, so the lump sum payment would be greater to match the impact.

Impacts to ALNC could be effectively mitigated for both build alternatives. The areas needed for temporary easements would be restored after construction and the permanent easement around the culvert in ALNC would be maintained by UPRR.

Impacts to DPSFWA could be effectively mitigated for both build alternatives. The IDNR has completed a preliminary review of the project (see page 575 of Appendix D3 of the EA) and has outlined preliminary permit conditions for impacts to DPSFWA and state-listed species. These items will be finalized as the project moves into temporary easement acquisition and permitting with the IDNR.

Factor 2: Severity of Remaining Harm After Mitigation

Factor 2 analyzes the relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection.

The Section 4(f) permanent use to MNTP would be mitigated through a lump sum payment for restoration activities. With this mitigation, MNTP would still experience a permanent loss of park land, but the activities, attributes, and features of MNTP would not be severely harmed. The impacted park land includes a narrow strip parallel to the

existing railroad and highway corridor. With mitigation, the relative severity of remaining harm to MNTP would be moderate.

Since the area with ALNC would be restored after construction, there would be no remaining harm after mitigation for both alternatives.

Alternative 2A would cause permanent visual impacts on IL-53 (Alternate Route 66) related to high retaining walls. The high retaining walls would alter the experience of driving on Historic Route 66 since this visual feature has never been present. FRA would take steps to resolve the Section 106 adverse effect, but there are no mitigation options available that would restore the visual character of IL-53 (Alternative Route 66) if retaining walls are constructed. Therefore, the relative severity of remaining harm would be high/significant to IL-53 (Alternative Route 66).

Factor 3: Relative Significance of Each Section 4(f) Resource

This factor does not address the use of each Section 4(f) resource but rather is intended to help assess whether certain Section 4(f) resources are of greater significance than others. This analysis is necessarily qualitative and requires an element of judgment since it requires comparing unlike resources and their relative and comparative value to the community. Understanding how the OWJs value their respective resources is useful for this analysis. Each resource that would be affected by the proposed Project has a unique function and value.

IL-53 (Alternate Route 66)

IL-53 (Alternate Route 66) was listed in the NRHP (Reference Number 06000381) in March 2006 under Criterion A for its association with early and mid-20th century transportation and economic development in Illinois, and under Criterion C as an excellent example of early and mid-20th century road engineering as reflected by its 1926 two-lane and 1945 four-lane sections. It is a four-lane divided section of roadway in the proposed project study area between Elwood and Wilmington. In addition to its NRHP-listed status, FHWA designated IL-53 (Alternate Route 66) in 2005 as a National Scenic Byway under the National Scenic Byways Program. This Section 4(f) resource is considered to be of national significance.

Midewin National Tallgrass Prairie

MNTP is the first national tallgrass prairie ever designated in the United States and the largest conservation site in the Chicago Wilderness region. It is considered to be of national significance.

Des Plaines State and Fish Wildlife Area

The DPSFWA is a state public recreation area. The area that would be affected by the alternatives is typical of a state wildlife area and does not hold unique value above other state recreation areas in Illinois.

ALNC

The ALNC is a national cemetery with national significance.

Overall, IL-53 (Alternate Route 66), ALNC, and MNTP have the highest significance of the affected Section 4(f) properties. Neither of the build alternatives (with or without the non-standard design options) would avoid these resources, so this factor does not assist in the least harm decision.

Factor 4: Views of Official(s) with Jurisdiction Over Each Section 4(f) Resource

The following paragraphs summarize the views solicited or provided from OWJs over each Section 4(f) resource for which there would be a use with the proposed Project.

IL-53 (Alternate Route 66)

FRA consulted with the SHPO regarding the impact to IL-53 (Alternate Route 66). The SHPO concurred with FRA's finding that Alternative 1B would not have an Adverse Effect, while Alternative 2A would. The SHPO did not comment on the EA or Draft Section 4(f) Evaluation.

Midewin National Tallgrass Prairie

FRA has consulted extensively with the USFS about impacts to the MNTP.[1] FRA initially considered proposing a de minimis impact finding for impacts to MNTP, but after consultation with the USFS, determined that de minimis is not appropriate. In coordination meetings, USFS suggested alternatives for FRA to consider (which are discussed in Section 2.2 of the EA) and stated concerns related to the use of MNTP lands, including construction period impacts, long-term rail operational impacts (see Appendix D4 – Transportation), and cumulative impacts. The issues raised are addressed in the EA and appendices (Section 2.3.1 of the EA and Appendices D4 and G) and considered in this Draft Section 4(f) Evaluation. The alternatives developed and assessed in the Draft Section 4(f) Evaluation were based on suggestions made by USFS. In the May 20, 2017, letter received from USFS, officials indicated that they would have concerns with proximity impacts even if the proposed Project did not use MNTP lands. The May 20,

[1] Section D6.9 provides a detailed accounting of coordination with OWJs, including the USFS.

2017, letter from USFS did not indicate any preference among the build alternatives assessed in this Draft Section 4(f) Evaluation.

A July 24, 2018, letter from USFS outlined design preferences related to the project, however more recent communications from USFS indicates that these preferences are no longer valid.

A June 5, 2024, letter from USFS requested particular mitigation measures to address the anticipated Section 4(f) use. On October 2, 2024, FRA responded to USFS's requests and offered specific mitigation including a lump sum payment. Additionally, resource-specific mitigation would be included in the proposed Project as required by specific project permits (i.e., Section 404). (See Appendix F of the EA for the USFS letter and FRA's response.)

During the public availability of the EA, USFS asked for clarification on the location of dolomite prairies and the proposed infrastructure relative to their right-of-way. FRA transmitted a white paper to USFS to clarify the location of the maintenance access facility (see Appendix C of the FONSI for this white paper). Additionally, a report by the Illinois Natural Historic Survey (INHS) that discusses the absence of dolomite prairies in the proposed Project study area was shared with USFS (see Appendix C of the FONSI).

USFS staff attended the public meeting for the Project's EA and submitted a comment letter dated 8/6/25. The comment letter indicated that the surveys conducted in 2024 did not include an assessment of all USDA, Forest Service, Region 9 Regional Forester Sensitive Species (RFSS), and animal surveys had not been conducted since 2020.

Des Plaines State and Fish Wildlife Area

In October 2024, IDNR completed a preliminary CERP for the area within the DPSFWA needed by the proposed Project. On November 14, 2024, INDR concurred that 4(f) impacts to DPSFWA would be *de minimis* provided the CERP conditions will be followed.

The IDNR Des Plaines SFWA submitted a comment letter during the public comment period for the EA. The letter suggested using Hitt's Siding as a mitigation recipient to improve wetlands in the area if mitigation is warranted.

ALNC

FRA consulted with the SHPO regarding the impact to ALNC. The SHPO concurred with FRA's finding that there is no adverse effect to ALNC from the proposed Project. ALNC did not comment on the EA or Draft Section 4(f) Evaluation.

Factor 5: Degree to which Each Alternative Meets the Purpose and Need

Both of the Build Alternatives, 1B and 2A, equally meet the purpose and need of the proposed Project.

Factor 6: After Mitigation, the Magnitude of Impacts to Resources Not Protected by Section 4(f)

Table B**3** summarizes the impacts to resources not protected under Section 4(f) for the build alternatives. The level of impacts to natural resources and threatened and endangered species is similar for all alternatives.

When mitigation is considered, there are only minor differences among the quantifiable non-Section 4(f) impacts of the alternatives and their design options. The full list of final mitigation measures can be found in Appendix A of the FONSI.

Table B3. Impacts to other Resources by Least Overall Harm Alternative

Evaluation Measures	Alternative 1B (Build Alternative 1B)	Alternative 2A (Build Alternative 2A)
Wetlands	Both alternatives would affect approximately the same acreage of wetlands (~17-18 acres)	
Forest	Both alternatives would affect the same amount of forest (~9-10 acres)	
All Prairies	Would affect slightly more prairie than Alternative 2A	Would affect the least amount of prairie (~3.4 acres for each alternative)
High Quality Prairie and Native Prairies	Both alternatives would affect approximately the same quantity of high-quality prairie and native prairie remnants (~2-3 acres and ~1 acre, respectively)	
Northern Long-eared Bat Trees	Both alternatives would affect approximately the same acreage of northern long-eared bat trees (~12-14 acres)	
Rattlesnake Master Plants	Both alternatives would affect approximately the same acreage of rattlesnake master plants (0.33 acres)	
Loggerhead Shrike Trees	Both alternatives would affect between 30 and 50 trees each	
Rusty Patch Bumblebee Zones	Both alternatives would affect approximately the same acreage of rusty patched bumblebee high-probability zones (~17-22 acres)	
Visual Changes	When looking at visual changes to non-Section 4(f) resources, in general there would be the addition a second track, additional trains, the maintenance access facility, and revegetated slopes. There are no new vertical elements except retaining walls of varying heights within the UPRR right-of-way. The walls would vary in height and could be up to 24 feet tall. Continuous guardrail on adjacent roadways would be seen in some locations.	
Elwood Residential Displacements	Two residential detached garages currently encroaching on UPRR right-of-way would be removed in Elwood	
Elwood Business Displacements	No impacts	
Underground Gas Line Disruptions	Slopes affect gas line for 1.1 miles which would require retaining walls to protect	No impact
Damien Mills Road Area Industry Impacts	10-foot-wide right-of-way and 20-foot-wide temporary easement acquired west of tracks	10-foot-wide right-of-way acquired west of tracks
Wilmington Residential Impacts	8 to 20-foot-wide right-of-way acquired from homeowners along the UPRR	Same as 1B plus additional 15-foot-wide temporary construction easement at one home

Factor 7: Substantial Differences in Costs Among the Alternatives

Alternative 1B would cost $78 million in 2023 dollars. Alternative 2A would cost $117.8 million, a 51% increase of total project cost over Alternative 1B.

B5.3. Least Harm Analysis Summary

A summary of the least harm analysis can be found in Table B4 below.

Table B4. Summary of Least-Harm Analysis

Alternative	Factor 1: Ability to Mitigate Adverse Impacts to Each Section 4(f) Resource	Factor 2: Severity of Remaining Harm After Mitigation	Factor 3: Relative Significance of Each Section 4(f) Resource	Factor 4: Views of Official(s) with Jurisdiction Over Each Section 4(f) Resource	Factor 5: Degree to Which Each Alternative Meets the Purpose and Need	Factor 6: After Mitigation, the Magnitude of Impacts to Resources Not Protected by Section 4(f)	Factor 7: Substantial Differences in Costs Among the Alternatives
1B	All impacts can be mitigated to some extent. USFS: A lump sum payment for restoration activities would mitigate impacts. IL-53 (Alternative Route 66): No mitigation is needed. ALNC: The disturbed areas would be restored after construction.	USFS: Moderate remaining harm after mitigation IL-53 (Alternate Route 66): No remaining harm after mitigation ALNC: No remaining harm after mitigation	L-53 (Alternate Route 66), ALNC, and USFS have the highest significance of the affected Section 4(f) properties. Neither of the build alternatives would avoid these resources, so this factor does not assist in the least-harm decision.	Alternative 1B is viewed as having relatively less impact by the SHPO than the other alternatives. USFS views both build alternatives as having an individual impact to MNTP. The remaining OWJs expressed no preference between build alternatives.	Both Alternatives would equally meet the purpose and need of the proposed Project.	The level of impacts to non-Section 4(f) resources would be similar for both alternatives.	$78 million
2A	All impacts can be mitigated to some extent. USFS: A lump sum payment for restoration activities would mitigate impacts. IL-53 (Alternate Route 66): FRA would take steps to resolve the adverse effect if Alternative 2A were selected. ALNC: The disturbed areas would be restored after construction.	USFS: Moderate remaining harm after mitigation IL-53 (Alternate Route 66): High/significant remaining harm after mitigation due to permanent visual obstruction ALNC: No remaining harm after mitigation.		Alternative 2A is viewed by the SHPO as having more impact than 1B. USFS views both build alternatives as having an individual impact to MNTP. The remaining OWJs expressed no preference between build alternatives.			$117.8 million[2]

[2] The cost estimate for Alternative 1B was updated in 2023, and the cost estimates for 2A was increased by the same percentage.

B6. Coordination

The Draft Section 4(f) Evaluation outlines the coordination with OWJs prior to the publication of the EA. On July 9th, 2025, FRA made the Draft Section 4(f) Evaluation available for public review and comment concurrent with the EA review and comment period. During the review and comment period, IDOT posted notices at Des Plaines State Fish and Wildlife Area to advise the public of anticipated Section 4(f) impacts. After publication of the EA, the USFS requested information regarding the location of the maintenance access facility through MNTP. This request and FRA's response are included in Appendix C of the FONSI. On August 25, 2025, the Department of Interior (DOI) concurred with FRA's Section 4(f) use determinations. DOI's letter is also available in Appendix C of the FONSI.

B7. Findings and Conclusion

FRA has determined there is no feasible and prudent alternative that completely avoids the use of Section 4(f) properties, and that the project includes all possible planning to minimize harm to the Section 4(f) properties resulting from the transportation use.

Alternative 1B, or the Selected Alternative, is the Least Overall Harm Alternative. Alternative 1B has lower relative severity of remaining harm to 4(f) properties because it does not result in a permanent visual obstruction of IL-53 (Alternate Route 66), and it has a substantially lower cost than that of Alternative 2A.

Appendix C - Response to Comments

C1. Response to Comments
C2. Agency Comments
- MNTP Letter – August 6th, 2025
- USEPA Letter – August 8th, 2025
- USFWS Letter – August 8th, 2025

C3. Supplemental Materials
- C3.1 Program Management Technical Memo
- C3.2 INHS Report

C1. Response to Comments

Substantive comments and questions about the Project received during the August 2025 public meeting, and on regulations.gov during the July-August 2025 comment period on the EA are summarized below with responses. In addition to the comments below, letters responding to federal agencies are attached.

1. **Concern from USFS on location of maintenance access facility in MNTP.** See supplemental materials in this appendix.

2. **Request to extend the public comment period from August 8th to August 15th.** FRA granted the request and extended the comment period to August 15th, 2025.

3. **Request for additional wildlife surveys to be conducted for species occurring at MNTP with particular attention being paid to Regional Forester Sensitive Species (RFSS) and Illinois List of Endangered and Threated Species.** During the permitting phase prior to the start of construction, UPRR will conduct updated species surveys for RFSS species as required by USFS. This will include updated wildlife surveys focusing on RFSS. Once updated surveys are complete, UPRR will coordinate and summarize findings with USFS prior to the start of construction.

4. **Concern was expressed about property acquisition and compensation for any property acquisition.** All right-of-way, permanent easement, and temporary construction easement purchases would be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Relocation Act) (42 USC Sections § 4601 et seq.), as amended, and the USDOT implementing regulations, 49 CFR part 24. The Uniform Relocation Act applies to all federal or federally assisted activities that involve the acquisition of real property or the displacement of residences or business. The Uniform Act requires that people whose real property is acquired receive just compensation for the property, and be treated fairly and equitably. The provisions of the State of Illinois Relocation Assistance Plan in accordance with the Uniform Relocation Act would not apply since there are no relocations. However, UPRR would coordinate with the residential property owners regarding the displacement of the detached garages that currently encroach on UPRR property.

5. **Concern was expressed about blocked crossings from increased train traffic.** As noted in the 2012 EIS Purpose and Need, the existing single track between Joliet and St. Louis cannot accommodate existing and projected freight and passenger train traffic. Construction of a second mainline track between Elwood and Braidwood construction would allow high-speed trains to pass freight trains operating in the corridor, reducing the number of trains stopped in crossings. During the construction phase, the Project team will coordinate with key

stakeholders on roadway detours, including local emergency service departments.

6. **Concern was expressed about increased train noise.** Operation of the selected alternative would contribute to additional passenger train noise, additional passenger train horn noise, an increase in passenger train speed, and shifts in track location. Freight traffic and associated freight noise levels are expected to increase regardless of the proposed Project; therefore, the increase in freight traffic was not considered part of the proposed Project noise. Appendix D1 in the EA discusses anticipated noise levels and sensitive receptors in more detail. Noise walls are not a recommended mitigation for the selected alternative because they could result in potential sight-distance and safety issues at-grade crossings as well as creating adverse visual impacts. Quiet zones could be applied for by the local jurisdiction. Within quiet zones, railroads do not need to routinely sound their horns when approaching at-grade crossings. The lead agency in designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks.

7. **Concern was expressed about increased train vibration.** Based on the general vibration assessment completed in the EA (Appendix D1), only one residential receptor would experience a vibration impact from the selected alternative. To minimize vibration impacts, UPRR would use maintenance procedures such as regularly scheduled rail grinding, wheel truing programs, vehicle reconditioning programs, and use of wheel flat detectors. More information on noise and vibration can be found in Appendix D1 of the EA.

8. **Concern expressed about habitat fragmentation and impacts to grassland birds from increased noise and vibration.** The proposed Project may impact wildlife habitats or species; however, the Project area is largely within an existing rail corridor. As noted in Section 3.3.2 in the EA, the selected alternative would result in minor habitat fragment due to permanent loss of habitat to expand the railroad corridor. Impacts to fragmentation and movement would be minimized by locating the improvements along existing disturbed areas and by using design enhancements such as natural-bottom culverts. IDOT conducted a literature review for adverse effects to grassland birds from the Selected Alternative. Potential adverse impacts to grassland species may include railroad-noise-related habitat disturbance. UPRR is committed to minimizing noise and vibration impacts by regularly maintaining track infrastructure and rolling stock. More information on wildlife resources can be found in Appendix D2.

9. **How will FRA and IDOT comply with the Migratory Bird Treaty Act?** The Selected Alternative will not result in a "taking" (killing, capturing, selling, trading, or transport) of protected migratory bird species as defined by the Migratory Bird Treaty Act (MBTA). Accordingly, FRA has no further obligations

under the MBTA. If this changes, FRA will coordinate with the U.S. Fish and Wildlife Service to determine the most appropriate course of action.

There are several environmental commitments in the FONSI that relate to migratory birds. These measures are included to promote environmental stewardship, and are not tied to MBTA compliance.

10. **Is the Project within suitable habitat for a dolomite prairie?** Per an Illinois Natural History Surveyor (INHS) Report completed in 2014, the Project area does not contain suitable habitat (dolomite prairie) or sites that may have once supported dolomite prairie. This report has been included in this appendix.

11. **What will the maintenance access facility be used for?** The maintenance access facility will be used by UPRR to conduct regular inspections and repairs. The maintenance access facility supports the project's purpose and need by reducing maintenance interference with train operations. A memo (attached within this appendix) was created to provide an overview of how MNTP land would be used for the Selected Alternative and to summarize minimization efforts that were ultimately dismissed. Given the topography of the project area, additional ROW within MNTP is needed for drainage ditches, culverts, and to support the fill slopes of the track. The full design can be found in Appendix A of the EA. Modifications to the design alternative were evaluated in attempt to minimize impacts to MNTP. The following modification options were considered and dismissed: reduced track spacing option, no maintenance access gravel path option, and move existing track option. All modifications were ultimately dismissed due to safety concerns, infeasible designs, and/or not meeting the purpose and need. See the attached memo for more details on dismissed design options.

12. **What data was used to support the claim that the HSR program will divert auto and air trips to train trips as stated in the Purpose and Need?** Transportation modeling of the corridor was done during the Tier 1 environmental document for full HSR Corridor. Ridership and mode share forecasts were developed using industry standard mode diversion models that have been previously used in other passenger rail forecasting studies in the U.S. The model was adapted for the Chicago – St. Louis corridor. More information on the transportation analysis for the program can be found in Section 6.1.4 of the Tier 1 EIS.[1]

13. **Request for updated wetland delineations and full compliance with the Clean Water Act and Interagency Wetland Policy Act.** The Project will follow applicable federal and state regulations, including Clean Water Act Section 404.

[1] https://idothsr.org/pdf/feis_vol_1/section_06.pdf

As part of the mitigation commitments described in Section 6 of the EA, Union Pacific Railroad (UPRR) will update the wetland delineation prior to Section 404 permitting to confirm quality and extent of wetland impacts. UPRR would work to avoid and minimize impacts to wetlands during final design and would mitigate in accordance with the Illinois Wetland Preservation Act and USACE regulations. More information on mitigations and commitments can be found in Section 6 of the EA and Appendix D.2.

14. **Requests Incidental Take Authorization for any state-listed species.** Per Section 6 (Mitigation Commitments) of the EA, UPRR would obtain an Incidental Take Authorization for the state listed species, including the eryngium stem borer moth from IDNR for impacts to rattlesnake-master plant populations prior to construction. Additionally, UPRR is committed to offering Workers Environmental Awareness Training (WEAT) to contractors to increase environmental awareness. WEAT covers special-status species conservation, species identification, compliance responsibilities, environmental monitoring, BPMs, regulatory permits, protective requirements, and mitigation measures.

15. **Was the EA developed under the new NEPA regulations published on July 3rd, 2025?** No, this EA was prepared in accordance with the Council on Environmental Quality's (CEQ) regulations for implementing NEPA (40 CFR parts 1500-1508) that were in effect at the time FRA initiated the Environmental Assessment and with FRA's NEPA implementing regulations at 23 CFR part 771 published October 29, 2018.

16. **Concern expressed for stream impacts.** Culvert design within UPRR right-of-way will meet UPRR and USACE standards. The Project team will work with MNTP to coordinate expected hydrologic conditions to ensure culverts are sized appropriately for the changing conditions. The proposed culverts at Grant Creek will be partially buried to have a natural stream bottom. Union Pacific will hold a coordination meeting with USFS regarding hydrologic modeling assumptions at Grant Creek prior to completing the hydrologic modeling for the project. To minimize potential impacts to surface waters in the proposed Project area, BMPs for the protection of surface waters will be strictly followed during the construction phase of the proposed Project. UPRR will obtain permits for construction in floodways of rivers, lakes and streams issued by the IDNR-OWR.

17. **Information was requested about impacts on Grant Creek and potential mitigation.** As of the 2021 Wetland Delineation Report (Appendix D.3.2), Grant Creek is an impaired waterbody for aquatic life that crosses the environmental survey corridor. Impacts on the waterway are discussed in Section 3.3.3.2.2 Environmental Consequences. Direct impacts on waterways would result from replacing culverts and bridge piers. UPRR will hold a coordination meeting with

USFS regarding hydrologic modeling assumptions at Grant Creek prior to completing the hydrologic modeling for the project.

18. **Requested revision to Table 3-5 in the EA and Table D2-9 in Appendix D2 to indicate linear feet of streams in the project area.** As stated in Section 3.3.3.2 Environmental Consequences, 8,956 linear feet of potentially jurisdictional watercourse are within the proposed project area.

19. **Information was requested for conceptual mitigation for unavoidable stream impacts, and which agency(s) FRA will coordinate with.** In accordance with IWPA, wetlands would have a mitigation ratio of 1.5:1.0. UPRR will apply for water permits, not FRA. UPRR would work to avoid and minimize impacts to wetlands during final design. UPRR will coordinate with USACE during Section 404 permitting.

20. **Information was requested about IDOT's role in the Project and the current state funding for the Project.** IDOT is the Project sponsor and the recipient of federal funds. In 2012, FRA awarded Illinois $139.7 million for corridor improvements between Joliet and Dwight. IDOT provided a 25% match allocating $46.5 million to the corridor. IDOT will provide an additional $38 million for final design and construction of the Elwood to Braidwood Track Construction Project.

21. **What impact will occur to Hitts Siding Prairie, and will there be any mitigation?** Per Section 3.4, there would be permanent and temporary impacts to the Hitts Siding Prairie INAI Site. Mitigation for temporary impacts to INAI sites includes reseeding disturbed areas. All disturbed areas would be reseeded with an appropriate native seed mix that contains forbs as well as grasses, where feasible.

22. **Request to consider adding two additional access points along tracks in MNTP property.** The proposed Project will not add new access points to MNTP. Per Section 3.4 of the EA, access to MNTP during construction and operation would be unaffected. The Selected Alternative would retain or relocate the existing fence along the UPRR right-of-way, preventing direct access to the UPRR right-of-way from the park and maintaining this safety feature for park users. The Henslow Trail via the Iron Bridge would be left in place, and the MNTP visitors center would be untouched.

23. **Update land ownership in the EA to reflect the ownership of the recently acquired properties by the Will County Forest Preserve.** FRA and IDOT will update land ownership in future design documentation for the Project. Currently, the Project does not anticipate property impacts on the recently acquired parcels by Will County Forest Preserve.

24. **Requests to update EA to include information regarding Grant Creek Watershed as a priority watershed and include information on how the project may impact the Grant Creek Watershed Restoration Action Plan.** Information on Grant Creek can be found in Appendix D1. Section 3.3.3.2 Environmental Consequences discusses the potential impact of the selected alternative on the Grant Creek Restoration Plan. The Project team would work with MNTP to coordinate project activities with the restoration plan.

25. **Information was requested on specific measures to reduce construction and operation emissions.** State and local regulations regarding dust control and other air quality emission reduction controls would be followed during construction. In addition, BMPs would be used prior to, during, and after construction for dust suppression. Specific measures will be established during the final design.

26. **Information was requested on interagency coordination and input received from federal and state agencies, tribes, local municipalities, and other stakeholders.** Appendix F includes correspondence and coordination with cooperating agencies and public involvement materials.

27. **Additional coordination with Illinois State Geological Survey (ISGS) and Illinois Department of Agriculture (IDOA) was requested.** ISGS and IDOA are not permitting agencies for this project moving forward, however IDOT will do additional coordination if these agencies request further discussion. See Section 6 of the EA for more information.

28. **Question about the location of a discussion of RFSS species and habitat.** The reference in the EA referred to Appendix G of the EA, however the information on RFSS surveys is contained in Appendix D.3.1 of the EA.

29. **Request to consider wildlife crossings and underpasses as part of the proposed Project.** Bridges will be designed in accordance with UPRR design guidelines and consistent with IWPA and USACE permitting requirements. Prairie Creek Bridge will be rebuilt with a wider span which may result in improvement of wildlife connectivity. Impacts to fragmentation and movement were minimized by locating improvements along existing disturbed areas and by using design enhancements such as natural-bottom culverts where possible.

30. **Request that mitigation for wetland impacts be permittee-responsible and on-site to the natural areas affected by the project.** UPRR would work to avoid and minimize impacts to wetlands during final design and would mitigate in accordance with Illinois Wetland Preservation Act and USACE regulations. The USACE generally prefers on-site in-kind mitigation, to the extent practicable, for unavoidable impacts to aquatic resources.

31. **Request for grade separation at North River Road.** The proposed project will not construct a grade-separated railroad crossing at North River Road. Grade separations were not considered for this project. At the beginning of the HSR program development, IDOT coordinated with the Illinois Commerce Commission (ICC) and FRA Office of Safety to establish the appropriate level of protection for crossings in the HSR corridor. The selected alternative will upgrade grade crossing protection systems improving safety in the corridor.

32. **Request for a context sensitive design in areas adjacent to residential communities.** IDOT is committed to providing safe, effective transportation for Illinois that enhances quality of life. As the project progresses, the project team will continue to engage stakeholders, which is an element of the IDOT's Context Sensitive Solutions process. The corridor's design is not expected to change so no additional context sensitive design discussions are anticipated.

33. **Concern for impacts to Hine's Emerald Dragonfly.** Per Section 7 Consultation (Appendix D3.4), the Selected Alternative *may affect but is not likely to affect* Hine's emerald dragonfly as suitable larval habitat has not been identified during previous on-site investigations. There are no proposed impacts to known populations of the Hine's emerald dragonfly therefore no mitigation or additional surveys are required.

34. **Requests for surveys to be completed for all federally and state-listed species in the Project area where there is suitable habitat to ensure minimal to no impacts.** Surveys completed as part of the proposed action's impact assessment include bat habitat surveys, prairie surveys, wetland delineations, turtle surveys, bee surveys, and plant surveys. Surveys were previously completed by the Illinois Natural History Survey (INHS), Huff & Huff, Inc (H&H), and Olsson and Associates in 2013, 2014, and 2015. Updates to these surveys were conducted by H&H and Jacobs Engineering throughout the summer of 2020. Additional surveys were conducted by H&H throughout the summer and fall of 2024. Appendix D2 and Appendix D3.4 provide greater detail on completed surveys and potential impacts to state and federally listed species.

35. **Concern expressed for impacts to vegetation along the ROW.** The project area contains scattered trees and hedgerows associated with commercial areas, developed areas, and undeveloped areas as well as some forested areas associated with the Prairie Creek and Grant Creek riparian areas. Natural areas with the highest potential for high-quality upland communities will be avoided to the extent practicable. The selected alternative will impact 16.35 acres of forested land (12.86 within UPRR ROW). The affected forested area adjacent to the existing railroad corridor is not considered a large acreage of habitat. Temporary impacts would be mitigated by restoring ground surface to the

preconstruction contour and planting exposed areas of soil with a cover crop to the extent practicable.

C.2 Agency Comments

- MNTP Letter – August 6th, 2025
- USEPA Letter – August 8th, 2025
- USFWS Letter – August 8th, 2025

USDA United States Department of Agriculture | Forest Service | Midewin National Tallgrass Prairie | 30239 South State Route 53 Wilmington, IL 60481 (815)423-6370

File Code: 2700 Date: 08/06/2025

Subject: USDA, Forest Service, Midewin National Tallgrass Prairie comments.
TIER 2 ENVIRONMENTAL ASSESSMENT/ DRAFT SECTION 4(f) EVALUATION Elwood to Braidwood Track Construction Project (MP 44.60 to MP 55.50) WILL COUNTY, ILLINOIS

To: Chris Hansen
Environmental Program Management
Federal Railroad Administration
1200 New Jersey Avenue
SE West Building, Mail Stop 20
Washington, DC 20590

Please find below comments from the Midewin National Tallgrass Prairie.

EA Section:
Appendix D3: Ecological Systems Natural Resources Reports and Correspondence
4.0 REGIONAL FORESTER SPECIES

> In 2024, the survey was updated to include RFSS species. Only plants were surveyed in 2024. Habitat is present for many species within the corridor in MNTP. Appendix G includes a summary of RFSS species and habitat present within the corridor.

Comment: Surveys conducted in 2024 were only plant surveys and did not include assessment of all USDA, Forest Service, Region 9, Regional Forester Sensitive Species (RFSS). Animal surveys have not been conducted since 2020. Utilizing the RFSS (attached), we request wildlife surveys be conducted for those species occurring at Midewin National Tallgrass Prairie. Particular attention should be paid to species which are listed on the RFSS and the Illinois List of Endangered and Threatened Species (https://dnr.illinois.gov/espb.html).

EA Section:
Appendix D3: Ecological Systems Natural Resources Reports and Correspondence
4.0 REGIONAL FORESTER SPECIES

> In 2024, the survey was updated to include RFSS species. Only plants were surveyed in 2024. Habitat is present for many species within the corridor in MNTP. Appendix G includes a summary of RFSS species and habitat present within the corridor.

Comment: No summary of RFSS species and habitat was found in Appendix G.

Robert West
ROBERT WEST
Prairie Supervisor

REGION 5
CHICAGO, IL 60604

August 8, 2025

Chris Hansen, Environmental Protection Specialist
Federal Railroad Administration
1200 New Jersey Ave., SE
Washington, D.C. 20590

Re: EPA Comments –Draft Environmental Assessment; Elwood to Braidwood High Speed Rail Track Construction Project (Mileposts 44.60 to 55.50); Will County, Illinois

Dear Mr. Hansen:

The U.S. Environmental Protection Agency has reviewed the Federal Railroad Administration's Draft Environmental Assessment for the proposed Elwood to Braidwood High Speed Rail Track Construction Project (proposed Project) in Will County, Illinois. The U.S. Forest Service is a Cooperating Agency because the proposed Project bisects[1] the Midewin National Tallgrass Prairie (MNTP). The Illinois Department of Transportation is the non-Federal local sponsor. The Union Pacific Railroad would be responsible for constructing, operating, and maintaining the proposed Project. This letter provides EPA's comments on the proposed project pursuant to the National Environmental Policy Act and EPA's NEPA review authority under Section 309 of the Clean Air Act.

In 2003, IDOT began the process of planning the Chicago to St. Louis High-Speed Rail Program (HSR Program). The HSR Program's goal was and is to operate trains at 110 miles per hour along the existing Chicago to St. Louis Amtrak route south of Dwight, Illinois. In January 2003, FRA, IDOT, and the Federal Highway Administration completed a Final Environmental Impact Statement for the Chicago to St. Louis corridor (single-track HSR Program). No action was selected between Chicago and Dwight, IL[2].

In 2012, FRA and IDOT issued a Tier 1 FEIS and a Record of Decision for the Chicago to St. Louis HSR Program to change the existing rail corridor from one rail track to two rail tracks (double-track HSR Program). The purpose of the HSR Program between Chicago and St. Louis, as stated in both the 2003 EIS and 2012 EIS, is to enhance the passenger transportation network in the corridor by improving high-speed passenger-rail service, resulting in a more balanced use of different corridor travel options by diverting trips made by automobile and air to rail.

[1] The existing UP rail line bisects the MNTP property, running north-south, for approximately 3.8 miles. The existing railroad right-of-way through the property is approximately 75 feet wide and includes a single track throughout.
[2] The proposed Project falls within the Chicago to Dwight corridor.

The proposed Project is only one component of the greater HSR Program. This Draft EA for the proposed Project is one of several additional Tier 2[3] documents being prepared for portions of the Chicago to St. Louis corridor addressed in the 2012 Tier 1 FEIS and ROD.

The proposed Project area is 9.59 miles along the Union Pacific Railroad mainline between Elwood, Illinois and Braidwood, Illinois. The proposed Project includes construction of a second mainline rail track adjacent to the existing mainline track, as well as the construction of a parallel maintenance access facility, grade crossing improvements, new fencing, culvert and bridge replacements and extensions, drainage improvements, and signal improvements.

Eight build alternatives were considered for the proposed Project. Of these, two build alternatives were carried forward for full analysis in the DEA - Alternative 1B and Alternative 2A. The two build alternatives vary by the location of the second track and maintenance access facility in relation to the existing track and the use of retaining walls to stay within the right-of-way. The No-Build Alternative, which proposes keeping the existing single mainline track, was also analyzed in the DEA. Based on the analysis completed and overall opportunities to minimize the impacts of the proposed Project, Build Alternative 1B was identified as the Preferred Alternative.

EPA's enclosed comments on the DEA focus on impacts to aquatic resources, air, and interagency coordination.

Thank you for the opportunity to review and provide comments on the DEA. Please send an electronic copy of future NEPA documents to R5NEPA@epa.gov. If you have questions or would like to discuss the contents of this letter further, please contact lead NEPA reviewer, Kathy Kowal, at kowal.kathleen@epa.gov.

Sincerely,

Krystle Z. McClain, P.E.
NEPA Program Supervisor

Enclosures:
EPA Detailed Scoping Comments
Construction Emission Control Checklist

CC (with enclosures):
Shawn Cirton, USFWS
Stasi Brown, USACE
Shanna McCarty, USFS-MTNP
Len Kring, USFS-MNTP
Elliot Ramos, IDOT

[3] The 2012 EIS is a Tier 1 NEPA document, which is a broad, programmatic analysis of the environmental consequences of alternatives. Tier 1 documents are followed by more detailed Tier 2 NEPA documents and environmental reviews, which focus on specific projects and improvements.

EPA Comments: Draft Environmental Assessment
Elwood to Braidwood High Speed Rail Track Construction Project
Will County, Illinois
August 8, 2025

1. AQUATIC RESOURCES

A. The DEA indicated wetland impacts are based on a 2020 field delineation which will be submitted to the U.S. Army Corps of Engineers, Chicago District, for jurisdictional determination prior to completing a Clean Water Action Section 404(b)(1) permit. In addition, the DEA also indicated the 2020 delineation would be updated prior to construction to document changes. The information found in the DEA with regard to the timing of a wetland delineation needs clarity.

Recommendations before finalizing the NEPA document:

1. Conduct a field delineation to determine impacts to wetlands and streams since the impacts analysis is based on a wetland delineation that is 5 years old. An updated wetland delineation would inform acreage of impacts and floristic quality values of wetlands, which would influence mitigation ratios.
2. Revise Table 3-4, Waters of the United States Impacts – Wetlands, to include impact totals by wetland type.

B. The DEA did not identify the designation of the Grant Creek Watershed as a priority USFS watershed. The Grant Creek Watershed Restoration Action Plan notes that channel modifications in the watershed have negatively impacted fish, amphibian, and invertebrate species historically found in the Grant Creek watershed.

Recommendations before finalizing the NEPA document:

1. Revise the DEA to include information regarding Grant Creek Watershed as a priority watershed.
2. Discuss how the proposed Project may affect (beneficially or negatively) the goals of the Action Plan.

C. Per Section 3.2.3, Surface Water Resources, the DEA indicated none of the surface waters has a water quality impairment but also stated the Illinois Environmental Protection Agency lists Grant Creek as impaired for aquatic life due to unknown causes.

Recommendations before finalizing the NEPA document:

1. Clarify whether Grant Creek is impaired for aquatic life, the effect of the proposed project on the impaired waterbody(s) (beneficial and negative effects), and best management practices that can reduce said impacts.

D. Table 3-5, Waters of the United States Impacts – Watercourses indicated permanent and temporary impacts to streams in acres. Listing impacts to streams in linear feet would provide a more comprehensive description of stream impacts that would also be easier for reviewers to understand.[4]

Recommendations before finalizing the NEPA document:

1. Revise Table 3-5 in DEA and Table D2-9 in Appendix D2, Ecological Systems, to indicate linear feet of streams in the project area as well as totals for temporary and permanent impacts for each of the Build Alternatives. This information would provide reviewers with an accurate estimate of stream impacts and inform mitigation estimates.

E. Section D2.3., Waters, of the US, located in Appendix D2, Ecological Systems, indicated unavoidable wetland impacts would be mitigated at a bank site to be determined using a ratio of 1.5:1.0. This same section indicated loss of streams may be subject to mitigation measures and would be coordinated with the appropriate agencies during the permitting process. Similar to a proposed wetland mitigation approach, mitigation for unavoidable stream impacts should be included in the DEA.

Recommendations before finalizing the NEPA document:

1. Discuss conceptual mitigation for unavoidable stream impacts (e.g., ratio, etc.) and which agency(s) FRA will coordinate with (eg, coordination w USACE). Consider mitigating stream impacts within MNTP property to complement USFS' Grant Creek Watershed Restoration Action Plan.[5]

2. AIR IMPACTS

A. The proposed project would result in emissions from dredging activities as well as activities to manage dredged materials on land. Temporary construction emissions have the potential to impact human health, especially in sensitive populations, such as the elderly, children, and those with impaired respiratory systems. In 2002, EPA classified diesel emissions as a likely human carcinogen.[6] Diesel exhaust can also worsen heart and lung disease, especially in vulnerable populations, such as children and elderly people. The proposed project would result in air impacts during construction and operation.

[4] The principal units for credits and debits are acres, linear feet, functional assessment units, or other suitable metrics of particular resource types. See Section 230.98(o): https://www.ecfr.gov/current/title-40/chapter-I/subchapter-H/part-230#

[5] The purpose of this subpart is to establish standards and criteria for the use of all types of compensatory mitigation, including on-site and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to offset unavoidable impacts to waters of the United States authorized through the issuance of permits by the U.S. Army Corps of Engineers (Corps) pursuant to section 404 of the Clean Water Act (33 U.S.C. 1344). See Section 230.91: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-H/part-230#

[6] For more information on EPA's classification, see https://iris.epa.gov/ChemicalLanding/&substance_nmbr=642

Recommendations before finalizing the NEPA document:

1. Identify and consider specific measures to reduce construction and operation emissions. EPA recommends FRA consider, as applicable, the following strategies identified in the enclosed Construction Emission Control Checklist.

3. INTERAGENCY COORDINATION

A. Implementation of NEPA requires interagency coordination with multiple stakeholders, including federal and state resource agencies, Tribes, local governments, and affected landowners.

Recommendations before finalizing the NEPA document:

1. Document interagency coordination and input received from federal and state resource agencies, Tribes, local municipalities, and other stakeholders.
2. Provide information required permitting and mitigation for proposed work.

B. Appendix D4, Human Environment, indicated potential hazardous materials within the proposed Project study area were evaluated in a Final Preliminary Environmental Site Assessment Report dated 2014.

Recommendations before finalizing the NEPA document:

2. Since this report is greater than 10 years old, clarify with the Illinois State Geological Survey whether this report is still valid or should be updated. Information may have changed over the course of 10 years, impacting the analysis provided in the DEA.

C. Appendix D1, Physical Environment, indicated the Illinois Department of Agriculture has no objections to implementation of the build alternatives via a letter dated April 23, 2015.

Recommendations before finalizing the NEPA document:

1. Since this concurrence is greater than 10 years old, clarify with the Illinois Department of Agriculture whether the Department's concurrence is still valid or should be updated. Information may have changed over the course of 10 years, impacting the analysis provided in the DEA.

U.S. Environmental Protection Agency
Construction Emission Control Checklist

Diesel emissions and fugitive dust from project construction may pose environmental and human health risks and should be minimized. In 2002, EPA classified diesel emissions as a likely human carcinogen, and in 2012 the International Agency for Research on Cancer concluded that diesel exhaust is carcinogenic to humans. Acute exposures can lead to other health problems, such as eye and nose irritation, headaches, nausea, asthma, and other respiratory system issues. Longer term exposure may worsen heart and lung disease.[7] We recommend FRA consider the following protective measures and commit to applicable measures in the Draft EA.

Mobile and Stationary Source Diesel Controls

Purchase or solicit bids that require the use of vehicles that are equipped with zero-emission technologies or the most advanced emission control systems available. Commit to the best available emissions control technologies for project equipment to meet the following standards.

- On-Highway Vehicles: On-highway vehicles should meet, or exceed, the EPA exhaust emissions standards for model year 2010 and newer heavy-duty, on-highway compression-ignition engines (e.g., long-haul trucks, refuse haulers, shuttle buses, etc.).[8]
- Non-road Vehicles and Equipment: Non-road vehicles and equipment should meet, or exceed, the EPA Tier 4 exhaust emissions standards for heavy-duty, non-road compression-ignition engines (e.g., construction equipment, non-road trucks, etc.).[9]
- Locomotives: Locomotives servicing infrastructure sites should meet, or exceed, the EPA Tier 4 exhaust emissions standards for line-haul and switch locomotive engines where possible.
- Low Emission Equipment Exemptions: The equipment specifications outlined above should be met unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available.

Consider requiring the following best practices through the construction contracting or oversight process:

- Establish and enforce a clear anti-idling policy for the construction site.
- Use onsite renewable electricity generation and/or grid-based electricity rather than diesel-powered generators or other equipment.
- Use electric starting aids such as block heaters with older vehicles to warm the engine.
- Regularly maintain diesel engines to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance (e.g., blue/black smoke indicates that an engine requires servicing or tuning).
- Where possible, retrofit older-tier or Tier 0 nonroad engines with an exhaust filtration device before it enters the construction site to capture diesel particulate matter.
- Replace the engines of older vehicles and/or equipment with diesel- or alternatively fueled engines certified to meet newer, more stringent emissions standards (e.g., plug-in hybrid-electric vehicles, battery-electric vehicles, fuel cell electric vehicles, advanced technology locomotives, etc.), or with zero emissions electric systems. Retire older vehicles, given the significant contribution of vehicle emissions to the poor air quality conditions. Implement programs to encourage the voluntary

[7] Carcinogenicity of diesel-engine and gasoline-engine exhausts and some nitroarenes. *The Lancet.* June 15, 2012
[8] http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm
[9] https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles

removal from use and the marketplace of pre-2010 model year on-highway vehicles (e.g., scrappage rebates) and replace them with newer vehicles that meet or exceed the latest EPA exhaust emissions standards, or with zero emissions electric vehicles and/or equipment.

Fugitive Dust Source Controls

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative, where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Occupational Health

- Reduce exposure through work practices and training, such as maintaining filtration devices and training diesel-equipment operators to perform routine inspections.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, reducing the fume concentration to which personnel are exposed.
- Use enclosed, climate-controlled cabs pressurized and equipped with high-efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Use respirators, which are only an interim measure to control exposure to diesel emissions. In most cases, an N95 respirator is adequate. Workers must be trained and fit-tested before they wear respirators. Depending on the type of work being conducted, and if oil is present, concentrations of particulates present will determine the efficiency and type of mask and respirator. Personnel familiar with the selection, care, and use of respirators must perform the fit testing. Respirators must bear a National Institute for Occupational Safety and Health approval number.

NEPA Documentation

- Per Executive Order 13045 on Children's Health[10], EPA recommends the lead agency and project proponent pay particular attention to worksite proximity to places where children live, learn, and play, such as homes, schools, and playgrounds. Construction emission reduction measures should be strictly implemented near these locations in order to be protective of children's health.
- Specify how impacts to sensitive receptors, such as children, elderly, and the infirm will be minimized. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.

[10] Children may be more highly exposed to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Also, children's normal activities, such as putting their hands in their mouths or playing on the ground, can result in higher exposures to contaminants as compared with adults. Children may be more vulnerable to the toxic effects of contaminants because their bodies and systems are not fully developed, and their growing organs are more easily harmed. EPA views childhood as a sequence of life stages, from conception through fetal development, infancy, and adolescence.

United States Department of the Interior

US FISH AND WILDLIFE SERVICE
Illinois – Iowa Field Office
1511 47th Avenue
Moline, Illinois 61265

IN REPLY REFER TO:
FWS/AES-CIFO/2022-0028175

August 8, 2025

Chris Hansen
Environmental Protection Specialist
Major Projects Team | Office of Environmental Program Management
Federal Railroad Administration | U.S. Department of Transportation

Dear Mr. Hansen:

This letter responds to the Federal Railroad Administration's (FRA) request for comments on the Tier 2 Environmental Assessment (EA)/Draft Section 4(f) Evaluation and Biological Assessment (BA) for the Elwood to Braidwood Track Construction Project (a section of the Chicago to St. Louis High-Speed Rail Program), prepared by Huff and Huff, Inc. We provided comments on the draft BA to FRA on March 6, 2025. We have reviewed the EA/BA to ensure it fulfills statutory and policy requirements under the Endangered Species Act (ESA) and to ensure that impacts to U.S. Fish and Wildlife Service (USFWS or Service) trust resources (e.g., Federally listed species, interjurisdictional fish, and migratory birds) and other fish and wildlife resources that may be affected by the proposed project are fully disclosed. We provide comments as they relate to Service trust resources that may be affected by the proposed project.

Federally listed species

Hine's emerald dragonfly

We have reviewed FRA's comments, dated July 9, 2025, which were submitted in response to our March BA comment letter. FRA requested our written concurrence with findings in the BA. Based on the information provided, we concur with your effect determinations for listed species found in the action area.

We agree with the rationale for the "may affect, not likely to adversely affect" determination for the Hine's emerald dragonfly (HED) given the limited information available for the site. However, we stand ready to support FRA and Midewin National Tallgrass Prairie (Midewin) with adult and larval surveys in the highest quality areas. These surveys may inform future management and stewardship of trust resources and important habitat features. We believe these surveys are important to inform future maintenance work and overall stewardship of these important areas. We offer our support and assistance to FRA to conduct larval and adult surveys for the species and we can meet with FRA and Midewin staff to discuss the locations of the most suitable sites at Midewin to conduct these surveys.

The ESA requires the action agency to provide the best scientific and commercial data available concerning the impact of the proposed project on listed species or designated critical habitat. If relevant data are known to be available to the agency or will be available as the result of ongoing or imminent studies, the Services should request those data and any other analyses required by the regulations at 50 CFR §402.14(c) or suggest that consultation be postponed until those data or analyses are available. FRA has indicated that providing the additional data that the Service requested (i.e., HED adult and larval surveys) was not feasible before the BA could be issued. As stated above and in our March 6, 2025, letter, that data would have been helpful in improving the data base for the consultation. FRA should be advised that if and when further data becomes available, the need for reinitiation of consultation may be triggered.

Rusty patched bumble bee

In our previous BA comment letter, we recommended that, "the final BA should ensure that plants from the rusty patched bumble bee (RPBB) Midwest Plant Guide are included into the proposed seed mix, particularly RPBB superfoods, used to revegetate areas of impact. The mitigation ratio for impacts to RPBB habitat and floral resources should be at least 1:1."

The revised BA notes that, "*To the extent practicable*, the mixes would contain an assortment of plant species specific to the habitat type from the RPBB Midwest Plant Guide (Krill, 2024). Species that are RPBB superfoods should be prioritized."

We appreciate FRA's commitment to reestablishing high quality foraging habitat for RPBB. If, during future reestablishment of vegetation in these areas, circumstances preclude FRA from acquiring or seeding these plants, we recommend FRA reach out to our office for assistance removing any barriers to reestablishing habitat that includes the appropriate seed mix and plant diversity. Additionally, the revised BA discusses potential mitigation locations for the RPBB. We recommend that mitigation for the RPBB occur within or adjacent to the high potential zone where the impacts occur (e.g., mitigation for impacts at Midewin occur in suitable areas on Midewin property). The Service requests to be included for all future mitigation discussions (e.g., wetland mitigation).

Wetlands and Waters of the United States

Midewin possesses high quality wetlands onsite, some which have received funding from the Service and some that were restored as permittee responsible mitigation areas through the Corps Regulatory program. These wetlands provide suitable habitat for Service trust resources and may have Federal equity or protections that should be considered. As such, and to ensure wetland conservation and compliance with Section 404 of the Clean Water Act, FRA should incorporate the following recommendations in the EA:

An updated wetland delineation should be provided. By providing an updated delineation, FRA can determine the appropriate amount of wetland and waters of the United States (WOUS) impacts, mitigation ratios and mitigation amounts, etc. Updated floristic quality assessments should be provided as well to help determine wetland mitigation ratios. Additionally, we recommend that FRA follow the 2008 Mitigation Rule for proposed wetland mitigation to:

- Identify and provide the appropriate mitigation ratios for impacts to High Quality Aquatic Resources wetlands onsite.

- Provide higher mitigation ratios for impacts to previously mitigated wetland restoration areas (e.g., restored wetlands in the Mola tract at Midewin).

- Provide in-kind and onsite mitigation (e.g., permittee-responsible mitigation) for wetland impacts at Midewin and other high quality natural areas. This would benefit Service trust resources at these high-quality natural areas.

- Provide in-kind mitigation for WOUS impacts to offset loss of WOUS functions. Onsite permittee-responsible mitigation for stream impacts should be considered if there is an ongoing or planned project (e.g., Midewin's Grant Creek Restoration Plan). If permittee-responsible mitigation cannot be provided for stream impacts, purchasing credits from a bank with available stream credits would be appropriate.

- Provide open bottom culverts to promote the movement of aquatic life and that are sized appropriately to hydrologically accommodate any Midewin work related to the Grant Creek Restoration Plan. This approach should be done for other stream crossings as well (e.g., pipes should not be used at stream crossings to promote water movement).

Migratory Birds

Midewin is the first national tallgrass prairie to be established in the in the country and is the largest tallgrass prairie restoration effort east of the Mississippi River. At approximately 20,000 acres, Midewin is the largest open space in the Chicago Metropolitan Area and northeastern Illinois. Restoration efforts have been ongoing at Midewin since it was established in 1996. Midewin has been a valuable partner of USFWS in large part because it provides habitat for Federal trust resources, which includes migratory grassland birds. It has been well documented that grassland birds are one of the most imperiled groups of birds in the world (e.g., as referenced

in The State of the Birds reports since 2009). Midewin has been designated as an Important Bird Area (IBA), as recognized by the National Audubon Society, due to its significance as a grassland bird area. As described in the EA, Midewin provides habitat area for over 200 different bird species.

Restoration efforts continue to occur at Midewin and the proposed project would impact passerine and grassland bird habitat at Midewin. The EA acknowledges the importance of Midewin as a grassland bird area. The EA also discusses impacts to grassland birds from the proposed action. For example, the EA discusses the Elgin, Joliet, and Eastern (EJ&E) Railway Acquisition wildlife studies (an effort which was conceived by our office in partnership with the lead Federal agency, the Surface Transportation Board). The EA discusses how the EJ&E studies revealed that overall, noise from increased train traffic did not adversely impact birds, although it did acknowledge that birds and other wildlife experienced mortality from train strikes. The EA notes that, "Collisions with trains may cause direct mortality to wildlife" and "Mortalities increased where train traffic was highest, meaning that an increase in traffic volume may increase wildlife mortality. FRA and IDOT will comply with the Migratory Bird Treaty Act (MBTA)."

We agree with FRA's statements that an increase in train volume may result in an increase in wildlife mortality (including grassland birds). Additionally, the EA acknowledges the loss of grassland bird habitat at Midewin and other areas that provide grassland bird habitat (e.g., Hitts Siding Prairie Nature Preserve and the Des Plaines State Fish and Wildlife Area). Grassland birds are imperiled in large part due to the loss of habitat. The proposed action would further reduce grassland bird habitat. Additionally, the proposed retaining walls associated with the proposed action could contribute to habitat fragmentation, reducing the overall size and connectivity of the remaining grassland areas and making those areas unsuitable for grassland birds to use.

The EA notes that FRA and the Illinois Department of Transportation (IDOT) will comply with the MBTA but does not describe how this would be achieved, nor does it discuss possible mitigation for impacts to migratory birds and their habitat. Over the years, mitigation for loss of migratory bird habitat has become a standard practice in the Midwest for Federal projects with significant migratory bird habitat impacts (e.g., for pipeline projects).

To offset impacts to grassland birds, FRA could mitigate for impacts to grassland bird habitat and potential mortality. The Service would appreciate the opportunity to partner with FRA and IDOT to identify measures that would mitigate and offset these impacts. This would include calculating the acreage of grassland bird habitat being impacted and determining an appropriate amount for passerine and grassland bird mitigation or habitat enhancements. We stand ready to meet with FRA and IDOT and assist in these migratory bird discussions prior to the issuance of the Final EA. Mitigation and/or offsetting efforts could be based on quantification of impacts (e.g., habitat lost) using the Habitat Equivalency Analysis (HEA) tool. The HEA methodology is commonly used in the Natural Resource Damage Assessment process to estimate restoration efforts that would be appropriate to compensate the public for losses to natural resources due to oil spills. The HEA process also uses the quality of grassland bird habitat being impacted to assist in determining the appropriate off-setting ratios.

Thank you for the opportunity to provide comments. We look forward to working with FRA and IDOT to make this project a success though improved rail infrastructure and stewardship of this important conservation area. This letter provides comment under the authority of, and in accordance with, the provisions of the National Environmental Policy Act of 1969 (83 Stat. 852, as amended P.L. 91-190, 42 U.S.C. 4321 et seq.), the Fish and Wildlife Coordination Act of 1956 (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.), and the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended; 16 U.S.C. 668-668d).

If you have any questions, please contact Mr. Shawn Cirton at (847) 366-2345.

Sincerely,

Kraig McPeek
Field Supervisor

cc: USACE, Stasi Brown
USEPA, Liz Pelloso, Kathy Kowal
USFS-Midewin, Robert West
IDOT, Elliot Ramos
Huff & Huff, Alycia Kluenenberg

C.3 Supplemental Materials

C3.1 Program Management Technical Memo

C3.2 INHS Report

C3.1 Program Management Technical Memo

SUBJECT: **Elwood to Braidwood Environmental Assessment**
Data Request from Robert West (MNTP)

The purpose of this memo is to provide an overview of how Midewin National Tallgrass Prairie (MNTP) land would be used for Preferred Alternative 1B and to summarize minimization efforts that were ultimately dismissed. This memo was requested by Robert West (MNTP) at our monthly FRA/MNTP/IDOT Coordination call on July 16, 2025.

Alternative 1B Use of Midewin

The existing Union Pacific Railroad (UPRR) right-of-way (ROW) is 100-feet wide through MNTP. This width provides enough space for two tracks and a maintenance access gravel path (referred to as an 'access road' in the design plans), however additional ROW within MNTP is needed given the topography of the project area.

Sample cross-sections through MNTP are shown below. These show the location of the proposed second track and maintenance access gravel path relative to the existing track and the existing ROW. Additional ROW is required within MNTP for drainage ditches, culverts, or to support the fill slopes of the tracks. The drainage ditches and fill slopes need to be maintained by UPRR to ensure the safety and operation of the tracks.

Figure 1 - Sample Cross-Section through MNTP (1 of 2)

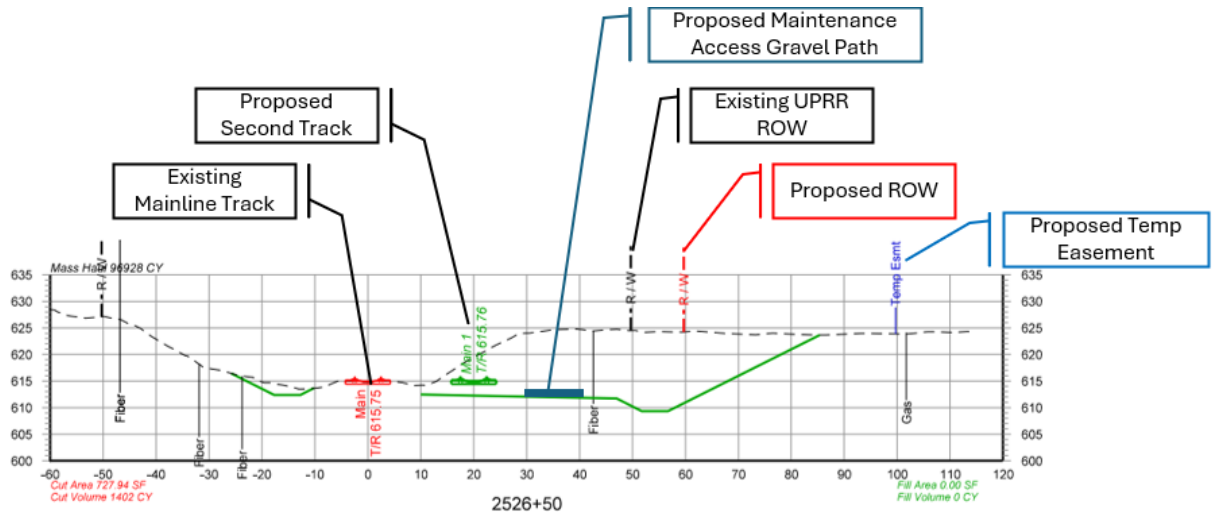
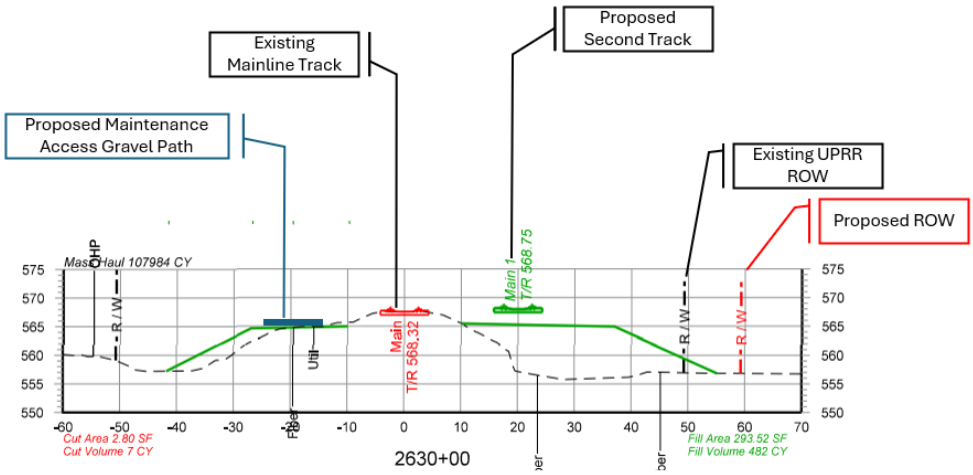
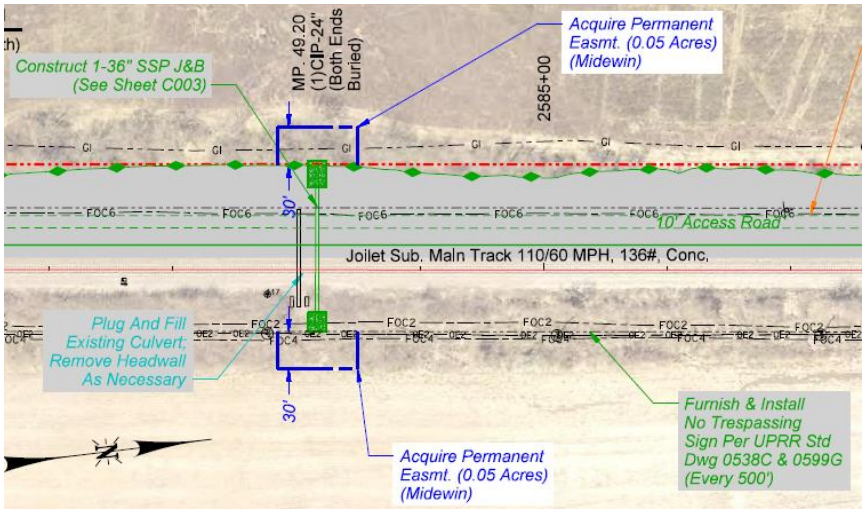


Figure 2 - Sample Cross-Section through MNTP (2 of 2)



Additionally, there are 3 culvert outlet pipes in MNTP that require the placement of riprap outside of the existing and proposed UPRR ROW, which are located at MP 49.2, MP 48.9, MP 48.8. The plan for the culvert at MP 49.2 is shown in the figure below in green. At these culvert locations, the design calls for a permanent easement which would allow UPRR to maintain the culverts.

Figure 3. Proposed Design of Culvert under the Tracks at MNTP



The full design of Alternative 1B can be found in Appendix A of the EA. The design shows the location of the 10 foot access path/access road in a dashed green line and the location of the new second track in a solid green line. The proposed ROW line is shown in dashed red and the easements are shown in blue.

Design Options Considered but Dismissed

Modifications to the design alternatives were evaluated in an attempt to minimize impacts to MNTP. The following modification options were considered and dismissed, as discussed below:

- Reduced Track Spacing Option
- No Maintenance Access Gravel Path Option
- Move existing track option

Reduced Track Spacing Option

The currently proposed design has 20-foot track centers, or 20 feet between the center of each of the railroad tracks. MNTP officials asked the project team to consider reducing track spacing to reduce the use of MNTP. A track spacing of 15 feet was considered and eliminated as described below.

Using only a 15-foot track spacing would lengthen the time of maintenance activities in the affected section of track and slow train operations on the operating track. For worker safety during track maintenance, a 15-foot minimum track spacing would require train speeds on the operating track to reduce to 40 mph from 110 mph. All maintenance work would come to a stop while trains are passing on the operating track. When a train passes by the operating track, maintenance workers must stay between the rails of the track undergoing maintenance or on the field side (side opposite the operating track) of the track under maintenance. Work equipment that has components past the end of the railroad ties must stop work. Any other equipment capable of fouling the operating track must also stop work. When there is 20-foot track spacing, work can continue with no loss of train speed or compromise of safety in most situations.

No Maintenance Access Path Option

MNTP officials also asked about removing the maintenance access gravel path from the Project design to stay within the existing UPRR ROW. The maintenance access path is critical to meeting the project's Purpose and Need to reduce maintenance time and maintenance interference with train operations. Without the maintenance path, inspections or repairs would require on-track access for the transport of equipment and material. The maintenance access path would reduce the frequency and duration of on-track equipment requirements for rail replacement; welding joints; tie replacement; surfacing rail vertical profile irregularities and cross level between the rails; utility maintenance; monthly and annual bridge, signal, and track inspections; and preventive maintenance. Without the maintenance access path, there also could be maintenance delays resulting from not getting track time issued by the dispatcher to transport equipment and materials and perform the work. More frequent trains would reduce the available time a dispatcher could allow equipment, materials, and workers to be on the track without interfering with train operations. More work would have to be done at night to

avoid interfering with train operations. A suspension of service for on-track equipment originating from Braidwood could consume as much as 8 hours of track time. During 8 daytime hours, up to five HSR trains could be affected. To ensure the reliability of HSR in the future and meet the project's Purpose and Need, the maintenance access path was included in all build alternatives.

Move Existing Track Option

MNTP officials asked about moving the existing track from the center of the UPRR right-of-way such that that the spacing between the two tracks is centered on the UPRR right-of-way to avoid some impacts to MNTP. With this option, both tracks would be 10 feet to the east or west of their location in the designs for the eight alternatives. This approach is not feasible as a measure of sound engineering judgment. It would require the second track to be built 10 feet from the existing track. From the perspective of construction worker safety this cannot be done while the existing track remains in operation. However, it would be feasible when the proposed second track is on the side of the UPRR right-of-way adjacent to MNTP or another Section 4(f) resource to build the second track 15 feet from the existing track and then relocate the existing track 5 feet from its current location to order to retain the standard 20-foot track spacing configuration. This approach would move the new second track 5 feet towards the center of the UPRR right-of-way and in turn, the Project footprint 5 feet towards the center of the UPRR right-of-way.

Moving the existing track would increase construction cost, construction time, and construction disruption to rail service during construction, as well as result in new subgrade material and old subgrade material disposal requirements. Worker safety restrictions described with the maintenance of Minimum Track Spacing Option with its permanent 15-foot track centers would apply to the construction of this option. These restrictions would further lengthen construction time. In addition, it is expected that to make such a shift, the subgrade of the existing track would need to be replaced. A combination of old subgrade material and new subgrade material supporting a track could result in differential settlement, i.e. part of the subgrade settling to a different level than the other part. Differential settlement would create a long-term maintenance problem and require more frequent track inspection because differential settlement would cause an excessive cross level difference between the two rails (the two rails of one track would be at different elevations) that would violate FRA's track safety standards for Class 6 track. It would need to be corrected when it occurs.

C3.2 INHS Report

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

BOTANICAL SURVEY REPORT

Botanical Survey Results for the High Speed Rail (HSR) Elwood to Braidwood Illinois Department of Transportation (IDOT) Project Area in Will County, Illinois

IDOT Sequence Number: 18446

Prepared by:
Eric Ulaszek and Greg Spyreas (Botanical Surveys)
Janet Jarvis (GIS and Maps)

INHS/IDOT Statewide Biological Survey & Assessment Program
2014-89

14 November 2014

Project Summary

Botanical surveys were conducted within the Illinois Department of Transportation Elwood to Braidwood High Speed Rail Project (Seq. No. 18446). The tasking requested surveys for rare plants, natural community remnants, and populations of *Eryngium yuccifolium* (Rattlesnake-master). Botanical surveys were conducted during June (17, 19, 20, 24, 26, 27), July (1, 3, 8, 10, 11), and September (3, 4) 2014. Results include:

- Eleven sites were evaluated and searched for the presence of *Platanthera leucophaea* (Federal Threatened). No natural populations of *P. leucophaea* or other federally listed plants were found during field surveys.
- An introduced population of *Boltonia decurrens* (Federal Threatened) was present at one site.
- Two populations of *Tomanthera auriculata* (State Threatened) were relocated; a third could not be found. No other state-listed plants were located during field work.
- Twenty-four populations of *Eryngium yuccifolium* were located during surveys; three populations consisted of several thousand plants each.
- One Nature Preserve (Hitts Siding Prairie NP) and two INAI Natural Areas (Joliet Army Ammunition Plant NA and Hitts Siding Prairie NA) are present in the project area.
- Thirteen natural community remnants (botanical sites) were located, mapped, and evaluated; two are significant, one is exceptional, and five are noteworthy examples of these community types.
- Large prairie and wetland reconstructions are present in and adjacent to the project limits on Midewin National Tallgrass Prairie; these have potential to develop into significant botanical resources.

Signed: _____ Date: 14 November 2014

Eric F. Ulaszek
Biological Surveys and Assessment Program
Group Coordinator for Botanical Surveys

Conducted by: Eric Ulaszek (Botanical Surveys)
Greg Spyreas (Botanical Surveys)
Janet Jarvis (GIS and Maps)

University of Illinois
Prairie Research Institute
Illinois Natural History Survey
Biological Surveys and Assessment Program
1816 South Oak Street
Champaign IL 61820
eulaszek@illinois.edu
(217)244-3957

Botanical Survey Results for the Elwood to Braidwood High Speed Rail (HSR) Illinois Department of Transportation Project in Cook and Will Counties, Illinois (IDOT Sequence No. 18446)

Table of Contents

INTRODUCTION

A request received on 11 June 2014 to conduct a botanical survey of the Elwood to Braidwood High Speed Rail (HSR) Illinois Department of Transportation (IDOT) project area in Will County, Illinois. The specified survey goals were to conduct an inventory for threatened and endangered plants, natural community remnants, and the presence of Rattlesnake-master (*Eryngium yuccifolium*). Rattlesnake-master is the only known food plant for the Eryngium stem-borer (*Papaipema eryngii*), an insect listed by the Illinois Endangered Species Protection Board (IESPB 2011) as Endangered and proposed for listing as Endangered or Threatened by the US Fish and Wildlife Service (USFWS 2013). There are known occurrences for the moth adjacent to the project area. Additionally, the project limits are within or adjacent to two recognized Illinois Natural Area Inventory (INAI) features and is adjacent to one Illinois Nature Preserve, Hitts Siding Prairie Nature Preserve.

METHODS

Botanical surveys were conducted on 17 June, 19 June, 20 June, 24 June, 26 June, 27 June, 1 July, 3 July, 8 July, 10 July, 11 July, 3 September, and 4 September 2014, focusing on the Environmental Survey (ESR) limits (Map 1) and adjacent sites with known occurrences or potential habitat for rare plants and other botanical resources. Previously known occurrences of listed plants and natural features were visited during this period for reference purposes. Vascular plant species lists were made for remnant natural communities and to document associates of rare plants. Data points and polygons were taken with a GPS device (Spectra Precision, Trimble Navigation Ltd) for mapping botanical features.

Prairie and wetland natural communities were also evaluated for the presence of *Platanthera leucophaea* (Federal Threatened), using protocols developed by the US Fish and Wildlife Service (2014). Likely habitats are evaluated using FQI values and the presence of known associates. Sites with a Native Mean C $\geq$ 3.5 or Native FQI $\geq$ 20 are considered likely habitat. These sites should have at least four of known associates of *P. leucophaea* present. Typically, sites meeting these criteria should be searched for *P. leucophaea* during the flowering period (28 June - 11 July). Searches at each potential site should be conducted on three non-consecutive days during the flowering period. However, Cathy Pollack of the USFWS communicated to concerned parties that *P. leucophaea* had begun flowering in northeastern Illinois on 17 June 2014 and surveys for *P. leucophaea* could begin at this earlier date. *Platanthera leucophaea* searches were conducted at all the locations listed in Table 1 beginning on June 19 and concluding on 11 July 2014.

Natural communities were classified and their quality was evaluated using the criteria developed for the Illinois Natural Areas Inventory (INAI) (White 1978; Illinois Department of Natural Resources 2010). Natural communities are graded based on the degree of anthropogenic disturbance; grades of natural quality are as follows:

Grade A: Very high; undisturbed with native species composition, structure, and function.

Grade B: High quality; intact natural communities that have experienced some degradation but retain native composition and structure, or are recovering from heavier disturbance.

Grade C: Medium quality; moderately to heavily disturbed communities that are or possess potential for recovery of composition, structure, and function.

Grade D: Low quality; severely degraded communities with significantly altered composition, structure, and function

Grade E: Very severely disturbed; original community has been destroyed or removed.

Within these grades, modifiers (+ or -) are used to refine degrees of disturbance. Grade C, in particular, covers a broad range of conditions, and often the modifier can indicate the potential for restoring the area to a higher quality grade.

In addition, Floristic Quality Assessment (FQA), a method for distinguishing vegetation integrity (Taft et al. 1997), was applied to selected botanical resources (such as remnant natural communities) to further evaluate and substantiate natural quality. High quality natural communities which reflect presettlement conditions are considered **significant** and would qualify for an INAI as a category 1 natural area. Sites of similar quality, but not meeting other requirements (such as minimal size), are considered **exceptional**. Sites not meeting the requirements for significant or exceptional remnant communities but with regionally important natural quality, native plant species diversity, or populations of rare plant species are considered **noteworthy**.

Classification of natural communities generally follows White and Madany (1978) as recently modified (IDNR 2010). Botanical nomenclature follows Mohlenbrock (2002) with exceptions for listed plant species whereupon nomenclature used by the Illinois Endangered Species Protection Board (IESPB 2011) is followed.

RESULTS AND DISCUSSION

Federal Threatened and Endangered Plant Species

Five federally listed species occur in Will County, Illinois: *Asclepias meadii* (Mead's Milkweed, Threatened); *Dalea foliosa* (Leafy Prairie-clover, Endangered); *Platanthera leucophaea* (Eastern Prairie Fringed Orchid, Threatened); *Tetraneuris herbacea* (Lakeside Daisy, Threatened); and *Boltonia decurrens* (Decurrent False-aster, Threatened) (USFWS, 2014). Only *Boltonia decurrens* was found during the botanical survey. All these plant species and their potential occurrence in the project area are discussed below.

Asclepias meadii (Mead's Milkweed, ASCLEPIADACEAE)

Asclepias meadii is listed as Threatened (USFWS 2003); the IESPB (2011) lists this species as Endangered. This species is a long-lived perennial herb; some vegetative reproduction occurs (by rhizomes). Natural populations occur or did occur in Illinois, Indiana, Missouri, Iowa, Kansas, and Oklahoma. Habitat for *A. meadii* is high-quality, well-drained, tallgrass prairie (USFWS 2003).

Asclepias meadii has declined primarily because of habitat loss and degradation through conversion of prairie to cropland. Surviving populations are threatened by land uses (hay mowing, livestock grazing) that prevent flowering or seed production. Although individual plants can persist clonally under such conditions, over time these populations lose genetic diversity through the loss of clones; this loss of genetic diversity can have negative consequences for long-term reproductive fertility and genetic response to other challenges, such as pathogens, insect herbivores, or climate change (Hayworth et al 2001).

No naturally occurring populations of A. meadii are known from Will County, but this milkweed formerly occurred in Cook and Ford counties, Illinois and Lake County, Indiana (Swink and Wilhelm 1994); all these locations were > 40 miles from the project area. Because Will County is within the historic range of the species and because suitable habitat was and is present, this area is considered appropriate for recovery efforts (Zambrana Inc. 1998; USFWS 2003). Efforts to recover Mead's Milkweed in Illinois and northwestern Indiana have focused on restoring genetically diverse populations to suitable habitat. Mead's milkweed has been planted into at least three preserves or restoration projects in Will County; these sites are on Midewin National Tallgrass Prairie (0.75 mi southeast and 3 mi east of the UPRR crossing of Prairie Creek) , Vermont Cemetery Prairie Nature Preserve (twenty miles northwest of Elwood), and Hickory Creek Barrens Nature Preserve (twelve miles northeast of Elwood).

Asclepias meadii is most obvious when in flower (late May-early June in northeastern Illinois); after flowering, the stems are over-topped by surrounding prairie grass and become senescent by August if they are not producing seeds (pers. obs.). No plants of *A. meadii* were seen during the survey; the request for surveys arrived after the flowering period (late May-early June) when the plant is most conspicuous. However, only a small portion of the project area appeared suitable for Mead's Milkweed (Sites 1, 2, and 4). These small sites were searched for rare plants during late June and early July. Mead's milkweed was not found at these sites and the remainder of the project area does not contain any suitable habitat for *A. meadii*.

Boltonia decurrens (Decurrent False-aster, ASTERACEAE)

Decurrent False-aster is listed as Threatened by both the USFWS (1990) and the IESPB (2011). Decurrent False-aster is a perennial herb, often multi-stemmed, growing up to 2.5 meters in height; plants flower from late August until early October. Reproduction is by seed; plants do not form colonies from rhizomes. Decurrent False-aster is restricted to floodplain habitats of the Illinois River and the middle Mississippi River; a few localities elsewhere in Illinois and Missouri appear to the result of accidental introduction or chance long-distance dispersal.

Considerable research effort on this species has confirmed this species' dependence on flooding regimes to maintain open, moist habitat in floodplains (Smith et al. 2005). Control of natural flooding by levees and drainage canals are the greatest threat to the survival of *B. decurrens* (USFWS 1990).

Boltonia decurrens occurs in the project area (Map 3); 25 plants were present at this site on 26 June 2014. This site is outside this species' natural range; the nearest historic population occurred along the Illinois River, nearly 55 miles west of the project area. Seed and /or plants of *B. decurrens* were unintentionally planted in this site during 2002 or 2003 (pers. comm. from USDA Forest Service personnel, Midewin National Tallgrass Prairie). *Boltonia decurrens* plants have persisted at this site and there has been some recruitment, but this population is apparently declining as the restored communities (sedge meadow, marsh, wet prairie) continue to mature.

Dalea foliosa (Leafy Prairie-clover, FABACEAE)

Leafy Prairie-clover is listed as Endangered by both the USFWS (1996) and the IESPB (2011). Leafy Prairie-clover is sometimes placed in the genus *Petalostemum*, as *P. foliosum* (Swink and Wilhelm 1994). Leafy Prairie-clover is a perennial herb, often multi-stemmed; individual plants do not reproduce through rhizomes or other vegetative means. Individual plants are often short-lived (<5-10 years); seed-

banks and recruitment are important for persistence of populations. In northeastern Illinois, the flowering period of *D. foliosa* is from late July until early September (Swink and Wilhelm 1995; pers. obs). Natural populations of Leafy Prairie-clover occur in Illinois, Alabama, and Tennessee. Habitats in Tennessee and Alabama are limestone or dolomite glades; in Illinois, habitats include dolomite and gravel prairies. Loss of habitat has been a major cause of decline; habitats with bedrock at or near the surface are lost to quarrying operations and are preferred sites for certain types of industrial development (petro-chemical refineries). Livestock grazing and encroachment by invasive plants are also threats; in the past, over-collection was also a threat (USFWS 1999).

Historically, Leafy Prairie-clover was known in Illinois from Kankakee, Kane, and LaSalle, Will counties (USFWS 1999). At one time thought extirpated from Illinois, Leafy Prairie-clover was rediscovered in Will County in 1972 (Swink and Wilhelm 1994). As of 2010, further surveys have relocated populations at seven sites, all in Will County. None of these sites is within one mile of the project limits; the closest, on Midewin National Tallgrass Prairie (MNTP), is 2.5 miles west of the project corridor.

Dalea foliosa was not seen during in the project area during the surveys. The project area does not contain suitable habitat (dolomite prairie) or sites that may have once supported dolomite prairie.

Platanthera leucophaea (Eastern Prairie Fringed Orchid, ORCHIDACEAE)

Platanthera leucophaea (Eastern Prairie Fringed Orchid, EFPO) is listed as Threatened (US Fish and Wildlife Service 1999). The IESPB lists this orchid as Endangered (2011). Older references place this orchid in the genus *Habenaria*, as *H. leucophaea* (Swink and Wilhelm 1994). This orchid is a perennial herb, flowering in early summer (late June-early July); when seed is produced, the capsules ripen in late August or September. Plants persist by means of rhizomes, and nearly all reproduction is by recruitment of plants from seed. This orchid has an obligate relationship with a soil fungus (Zettler et al. 2005; Zettler and Piskin 2011). Habitat for this orchid includes moist tallgrass prairies, often characterized as wet-mesic prairie community, but also wet prairies, sedge meadows, and fens. Historically, the natural range was from eastern Oklahoma and eastern Iowa to extreme southeastern Quebec, north of the Ohio River Valley. Habitat loss is the primary cause of this species' decline (Bowles et al. 1992; US Fish and Wildlife Service 1999). The nearest extant locations of *P. leucophaea* are approximately 3 miles west and 12 miles southwest of the project area, in Will and Grundy counties, respectively.

Eleven locations in the project area met the USFWS criteria as suitable habitat for *P. leucophaea* (Table 1); none of these sites has previous records of *P. leucophaea*, although seeds were broadcast over one location on Midewin NTP (Mola Restoration) during the past decade (William Glass, Midewin NTP, pers. comm.). Although some locations were of high natural quality, *P.leucophaea* was not discovered at any of the locations. *P. leucophaea* may be absent from these sites for several reasons; soil pH may be too acidic (Bowles et al. 2005), past disturbance regimes may have been unsuitable (USFWS 1999, 2014), or fungal symbionts may be absent (Zettler et al. 2005; Zettler and Piskin 2011).

Tetraneuris herbacea (Lakeside Daisy, ASTERACEAE)

Lakeside daisy is listed as Threatened by USFWS (1990); it is listed as Endangered by the IESPB (2011). Synonyms used for Lakeside Daisy in relevant floras include *Actinea herbacea*, *Hymenoxys acaulis* var. *herbacea* and *Hymenoxys herbacea* (Swink and Wilhelm 1994).

Lakeside Daisy is a perennial, rosette-forming herbaceous plant; clumps may grow larger through vegetative growth, and spread slightly via short rhizomes. In the United States, there are extant or historical populations known from Illinois, Ohio, and Michigan; the species also occurs in Canada (Ontario). Known habitats include alvars, dolomite prairies, and gravel prairies. Loss of habitat is the major cause of decline; all these habitats are subject to quarrying or mining. Small populations are subject to genetic issues caused by genetic drift; individual plants are self-incompatible and unable to produce seed although they may persist and spread vegetatively (USFWS 1990). The last natural population in Illinois (Will County) was destroyed (Swink and Wilhelm 1994). Historically, there are records of Lakeside Daisy from Will, Mason, and possibly Kankakee counties (Mohar 2000).

Representatives from one Illinois population survive in cultivation; a breeding program was developed using crosses with plants from other states to restore fertility. Offspring from this breeding program contain a genetic contribution from the Illinois plants and were used to restore the species to several appropriate sites in Illinois, specifically in Will, Cook, and Mason counties. Populations are also maintained in cultivation in restoration gardens, as at Morton Arboretum in DuPage County. The nearest location for this species is in Will County, approximately 12 miles north of the project area.

Lakeside Daisy was not observed in the project area during botanical surveys. There are no areas with suitable habitat (dolomite or gravel prairies); it is highly unlikely that this species would be present in other habitats.

State Listed Plant Species

Calopogon oklahomensis – Oklahoma Grass-pink Orchid, ORCHIDACEAE

This recently described species (Goldman 1995) is listed as Endangered in Illinois (IESPB 2011). *Calopogon oklahomensis* is an orchid of prairie and savanna habitats, including tallgrass prairie and pine savannas. *Calopogon oklahomensis* ranges from the Gulf Coast (Texas to Alabama) northwards to southern Wisconsin and southern Minnesota; the majority of extant populations are concentrated in southwestern Missouri, eastern Oklahoma, Arkansas, eastern Texas, and western Louisiana (Goldman et al. 2002). In Illinois, historic and recent records of this species are restricted to Cook, Grundy, Henry, and Will counties, from remnant prairies and sand savannas. Recent records are from Will County, including Hitts Siding Prairie Nature Preserve, adjacent to the project corridor.

In Illinois, this species flowers 12 June – 23 June (based on data from INHS herbarium specimens). Because of the timing of the request, this species may have been missed by botanical surveys; however, no vegetative or post-flowering *Calopogon* plants were observed in suitable habitat in or adjacent to the project area (sites 10, 12, 13, 14, and 15).

Calopogon tuberosus – Grass-pink Orchid, ORCHIDACEAE

This orchid is listed as Endangered by the IESPB (2011). This orchid occurs in bogs, fens, moist prairies, savannas, and pannes (Goldman et al. 2002; Herkert and Ebinger 2002; Swink and Wilhelm 1994). The range includes most of temperate eastern North America, from Manitoba and Newfoundland south to Florida and Texas (Goldman et al. 2002). Habitat loss and invasive plants are the greatest threats, but wild orchids are also subject to collection by individuals and commercial dealers. In Illinois, this species is known primarily from northern Illinois, although there are historic records from Jackson and Macoupin counties (Herkert and Ebinger 2002). *Calopogon tuberosus* is

known from Will County, specifically from Hitts Siding Prairie Nature Preserve, where the two species of *Calopogon* grow closely together in the northern portion of the preserve (pers. obs.).

In northern Illinois, *C. tuberosus* flowers 18 June – 9 August (data from INHS and Morton Arboretum herbarium specimens). There is some overlap with *C. oklahomensis* (mid-late June). This species was not observed in or adjacent to the project corridor during field work; suitable habitat for this species is present (sites 10, 12, 13, 14, and 15).

Filipendula rubra – Queen-of-the-Prairie, ROSACEAE

This perennial, rhizomatous forb is listed as Endangered (IESPB 2011); typical habitats are fens, calcareous seeps, and mesic sand prairies (Herkert and Ebinger 2002). Queen-of-the-Prairie ranges from Wisconsin and Missouri eastwards to New York and North Carolina (Gleason 1952; Yatskievych 2013); some populations may be the result of introductions, as Queen-of-the-Prairie is grown as a garden plant (Rhoads and Block 2007). Threats to this species include destruction of habitat and wetland drainage. In Illinois, natural populations are restricted to northern Illinois, but extend southwards to Scott (extirpated south of Tazewell) and Vermilion counties (Herkert and Ebinger 2002).

Filipendula rubra was present at one location near the project corridor, in the South Patrol Road Restoration on Midewin National Tallgrass Prairie (Map 3). This population appears to consist of a vegetatively spreading colony with 12 rosettes (one in flower). This *F. rubra* location at this point is 1500 feet west of the project limits. This species was planted in this restoration, and more plants occur farther west in the South Patrol Road Restoration (William Glass, USDA Forest Service, pers. comm.). The nearest native population of *F. rubra* occurs 1.5 miles west of the project limits.

Platanthera flava var. *herbiola* – Tubercled Orchid, ORCHIDACEAE

This orchid is currently listed as Threatened in Illinois (IESPB 2011); some floras call this plant *Habenaria flava* var. *herbiola* (Swink and Wilhelm 1994). *Platanthera flava* var. *herbiola* occurs in the northern three-quarters of Illinois, but most of the extant populations are concentrated in northeastern Illinois, including Will County (Herkert and Ebinger 2002). This orchid is widespread in the northeastern USA, ranging from Minnesota and northern Arkansas east to the Atlantic coast (Sheviak 2002). Habitats include wet prairies, floodplain forests, seeps, and even salt marshes (Sheviak 2002) but Illinois populations seem restricted to wet-mesic sand prairies and associated thickets (Swink and Wilhelm 1994; Herkert and Ebinger 2002). In northeastern Illinois, this orchid flowers during late June and July (Swink and Wilhelm 1994).

Tubercled Orchid was not seen during the surveys of the project area, which took place during this species' flowering period. Suitable habitat is present along the project corridor, primarily in the sandy wet-mesic prairies in and adjacent to Hitts Siding Prairie Nature Preserve (Sites 10, 12, 13, 14, and 15). This orchid occurs farther northwest of the project area (in the nature preserve) approximately 3000 feet northwest of the project corridor.

Tomanthera auriculata – Earleaf False-foxglove, SCROPHULARIACEAE

This species is currently listed as Threatened in Illinois (IESPB 2011). Recent research supports the return of this species to the genus *Agalinis* (Neel and Cummings 2004; Pettengill and Neel 2008) and

Agalinis auriculata is the name used for this plant in many floras (Rhoads and Block 2007; Yatskievych 2013).

This annual forb occurs in prairies and open savannas (Swink and Wilhelm 1994; Herkert and Ebinger 2002); it can be present in degraded grasslands where non-native grasses do not form dense cover (Baskin et al. 1991). *Tomanthera auriculata* ranges from Minnesota and Texas east to Pennsylvania, New Jersey, and South Carolina (Molano-Flores et al. 2007; Rhoads and Block 2007). *Tomanthera auriculata* occurs nearly throughout Illinois, but is absent from the southern tip (Herkert and Ebinger 2002). Although photosynthetic, *T. auriculata* is a hemiparasite, forming root connections to other plants (primarily composites) to supplement its own sources of nutrition (Cunningham and Parr 1990). This species flowers from late August into early September in northeastern Illinois (Swink and Wilhelm 1994). This plant responds strongly to native community restoration and management techniques, including encroaching shrub removal and prescribed burning (Vitt et al. 2009).

In the project area, *T. auriculata* has been reported from three locations, two on Midewin NTP, and one on Hitts Siding Prairie NP. Both Midewin locations were relocated during field work for this project. The northern population (Map 3) occurs just beyond the project limits in the South Patrol Road prairie/wetland restoration. This population is apparently natural, surviving at the interface between a railroad ROW and a cropfield (recently converted to prairie reconstruction). On 5 Sep 2014, this population consisted of approximately 250 plants.

The second population on Midewin NTP occurs in a remnant prairie community (Foxglove Prairie) on both Midewin NTP and DesPlaines State Fish and Wildlife Area (Map 4). This population has been monitored since the 1990s and has fluctuated from few plants (<30) to over 3000 plants, apparently in response to habitat management (Vitt et al. 2009; USDA Forest Service personnel, pers. comm.). There have been four prescribed burns at this site since 2002, and extensive brush control during 2009-2012. On 5 Sep 2014, this population was estimated at approximately 1000 plants. In the past decade (pers. obs.) scattered individuals of *T. auriculata* have occurred in openings along the railroad; only one plant was found in this area on 5 September 2014 (Map 4). The immediate vicinity of this plant (along the railroad) was overgrown with dense shrubs and saplings.

The population at Hitts Siding Prairie NP was not relocated during this survey. There is suitable habitat present at sites 10, 12, 13, 14, and 15, but there has been no recent management (shrub control or prescribed burning) at these sites within the last five years. *Tomanthera auriculata* is known to persist in seed banks, although not for more than 3 years (Baskin et al. 1991); plants may reappear at this site following appropriate management actions (Vitt et al. 2009).

Vaccinium macrocarpon – Large Cranberry, ERICACEAE

This low-growing shrub is listed as Endangered in Illinois (Herkert and Ebinger 2002). In northeastern Illinois and adjacent regions, the habitat of Large Cranberry is primarily bogs (Herkert and Ebinger 2002; Swink and Wilhem 1994); at two Will County sites this species grows in acidic wet-mesic sand prairie, often in areas with high cover and species diversity of native shrubs (pers. obs.). Some of this species' shrubby associates include *Spiraea alba, Aronia melanocarpa, Corylus americana, Cornus obliqua,* and *Salix* spp.

Suitable areas with native shrub associates occur along the project corridor (Sites 10, 12, 14, and 15), although they are fragmented by encroaching shrubs (*Frangula alnus* and *Rhamnus cathartica*).

Vaccinium macrocarpon not seen in these habitats during the surveys of the project area. This creeping shrub occurs in the nature preserve approximately 2500 feet northwest of the project corridor.

Two additional State Endangered plants have been reported from Hitts Siding Prairie Nature Preserve; *Orobanche fasciculata* (Clustered Broomrape, OROBANCHACEAE) and *Drosera rotundifolia* (Round-leaved Sundew, DROSERACEAE) (Loebach and Glass 1997). Neither species was observed in or adjacent to the project corridor, although suitable habitat was searched.

Other Plant Species of Conservation Interest

Eryngium yuccifolium – Rattlesnake-master, APIACEAE

Eryngium yuccifolium is a characteristic plant of mesic prairie communities (White and Madany, 1978). Although its numbers have declined greatly because of habitat loss, *E. yuccifolium* remains widespread in Illinois, with large populations (several thousands of plants) present in protected and managed prairie remnants, such as Goose Lake Prairie State Natural Area (Grundy County) and Grant Creek Prairie Nature Preserve (Will County). This plant is of concern because it is the only known food plant for a rare insect, *Papaipema eryngii. Papaipema eryngii* is a rare moth listed as Endangered by the IESPB (@011); the larvae burrow into the stems and crowns of *E. yuccifolium*. Loss of habitat and food plants have caused this moth to decline; it has been extirpated from much of its former range (USFWS 2013). This decline, and concern about the moth's survival, have resulted in *P. eryngii* being a candidate for Federal listing as Threatened or Endangered (USFWS 2013). *Papaipema eryngii* is present on adjacent Hitts Siding Prairie Nature Preserve, and one site 2.5 miles west of the project corridor (there are other populations of this moth in Will and adjacent (Cook, Grundy) counties.

Many sites in the project area were found to support populations of *E. yuccifolium*; some are relatively large (1000s of plants). These large populations occur in large remnant prairies and large prairie reconstructions. The status and size of these populations is summarized in Table 2. Populations of *E. yuccifolium* on or immediately adjacent to Hitts Siding Prairie Nature Preserve (Populations J, K, L, M, N, and O) all are likely to support *P. eryngii*, which is known from the preserve. Although nearby populations P, Q, R, S, and T are small (<100 plants) they may be sufficiently close to the Nature Preserve population to allow for movement of *P. eryngii* between these sites.

Although prairie reconstructions on Midewin NTP do support large populations of *E. yuccifolium* (Maps 3 and 4), the moth has not yet been introduced or located there (USDA FS staff, pers. comm.). However, there is a population of *P. eryngii* two miles northwest of the South Patrol Road Restoration.

Nature Preserves

Hitts Siding Prairie Nature Preserve (261 acres) occurs along the northwestern margins of the project corridor between the Strip Mine Road and Coal City Road crossings. A utility easement separates the boundary of the preserve from the project limits by approximately 150 feet), but many of the high-quality natural communities extend from beyond the preserve boundaries onto the utility easement. High quality (Grades A or B) natural communities present include mesic prairie, wet-mesic prairie, wet prairie, and wet-mesic sand prairie (Loebach and Glass 1997).

Illinois Natural Areas Inventory Sites

Hitts Siding Prairie Natural Area

This INAI site consists of a large tract (343.8 acres) with high quality natural communities, including grade B mesic prairie, wet-mesic prairie, wet prairie, and wet-mesic sand prairie. Lower quality communities (Grade C) include dry-mesic sand prairie and dry-mesic sand savanna (Loebach and Glass 1997). There has been considerable management of the portions of this natural area within and immediately adjacent to the natural preserve, and the natural quality has improved; portions of Site 14 (Map 6) meet INAI guidelines as Grade A. Listed plant species present in this INAI site include: *Calopogon oklahomensis, Calopogon tuberosus, Platanthera flava* var. *herbiola, Tomanthera auriculata, Vaccinium macrocarpon*.

In addition to the area within the natural preserve, the INAI site boundaries were expanded in the early 1990s to include prairie remnants in the Union Pacific RR right-of-way. These remnants were formerly included in a separate INAI railroad prairie site. Portions of the Hitts Siding Prairie INAI are within or immediately adjacent to the project corridor; these areas are described in more detail below under 'Significant, Exceptional, and Noteworthy Natural Communities.'

Joliet Army Ammunition Plant Natural Area

This INAI site consists of several tracts both east and west of the project corridor between Hoff Road and North River Road (Map 9). These tracts consist of large, unfragmented grassland habitat that supports populations of area-sensitive grassland birds and other grassland wildlife. These areas are now under the management of the USDA Forest Service, Midewin National Tallgrass Prairie.

Significant, Exceptional, and Noteworthy Natural Communities

The Elwood-Braidwood HSR project area contains many natural community remnants of varying quality. Prairie remnants occur at several locations within the Union Pacific Railroad (UPRR) right-of-way (ROW), and small populations of the most disturbance tolerant prairie species occur throughout (Figure 1). However, most former remnant areas are no longer recognizable because of woody encroachment (Figure 2), invasion by non-native species (Figure 14), and direct disturbances by railroad maintenance, herbicide spraying, and installation of underground cables and pipelines (Figure 20). In particular, riparian vegetation is highly disturbed and often dominated by ruderal woody species and/or *Phalaris arundinacea** (Figures 6 and 8). The natural community remnants are now separated by highly disturbed areas. Species lists for these individual remnants are in Table 3; floristic quality summaries are in Table 4.

Hoff Road North Railroad Prairie (Site 1, Map 1; **HN** in Tables 3 and 4)

This remnant consists of a small (0.1 acres) strip of Grade B mesic prairie community within the UPRR ROW (Figure 3). Satellite images from 2013 show this remnant extending to the west off the right-of-way, but the western portion was destroyed prior to June 2014 in preparation for development. This mesic prairie community is surprisingly intact despite proximity to the railroad and evidence of past disturbance (gravel dumping). Conservative grasses and forbs are relatively common, including *Dichanthelium leibergii*, *Sporobolus heterolepis, Eryngium yuccifolium, Parthenium integrifolium*, and *Amorpha canescens*. Although the quality of this **exceptional** remnant is Grade B, this site is too small to

meet INAI guidelines for prairie remnants (0.25 acres). This community has a Mean C of 3.2, reflecting the presence of conservative species; the FQI value is 26.8, largely the result of a relatively low species diversity in this small remnant.

Hoff Road Southwest Railroad Prairie (Site 2 on Map 1; **HW** in Tables 3 and 4)

This **noteworthy** remnant consists of dry-mesic, mesic, and wet-mesic prairie communities (Grade C+). Although similar to the remnant across the railroad (Site 3, Hoff Road Southeast, **HE**), this location appears less degraded with smaller amounts of woody encroachment, and lacks the large patches dominated by ruderal forbs characteristic of Site 3. *Bromus inermis** occurs throughout this remnant except in the wettest portions; however, it has not formed pure stands that exclude native grasses and forbs. Dominant native grasses at this site include *Andropogon gerardii, Sorghastrum nutans*, and *Spartina pectinata*. There is a small population of *Eryngium yuccifolium* in this remnant.

Hoff Road Southeast Railroad Prairie (Site 3 on Map 2; **HE** in Tables 3 and 4)

This location supports a mosaic of degraded prairie remnants (Grades C and D) in the ROW between the UPRR and IL Route 53, south of Hoff Road. Natural communities represented include dry-mesic prairie, mesic prairie, and wet-mesic prairie, but these are scattered in a matrix dominated by cool-season grasses (*Bromus inermis*, Poa pratensis, Lolium arundianceum*, Phalaris arundinacea**), ruderal woody species (*Rubus allegheniensis, Lonicera maackii*, Rubus occidentalis, Rhamnus cathartica*, Rosa multiflora*, Vitis riparia*), and ruderal herbaceous plants (*Solidago canadensis, Pastinaca sativa*, Ambrosia trifida*) (Figure 4). Since the 1990s, this site has received periodic disturbance from construction and maintenance activities (including herbicide spraying) associated with the railroad, underground pipelines, underground optic-fiber cables, and overhead electric transmission lines.

Where prairie grasses and forbs are still remain, the common prairie grasses are *Andropogon gerardii, Panicum virgatum, Sorghastrum nutans*, and *Spartina pectinata.* Frequent forbs include *Euphorbia corollata, Heliopsis helianthoides, Helianthus grosseserratus, Monarda fistulosa, Ratibida pinnata*, and *Silphium integrifolium*. More conservative species are present in small patches or as scattered individuals: *Comandra umbellata, Dodecatheon meadia, Eryngium yuccifolium*, *Gentiana puberula, Hesperostipa spartea , Parthenium integrifolium, Phlox pilosa, Silene stellata,* and *Sporobolus heterolepis*.

This location was evaluated in 2003 as part of an inventory of roadside prairies in Illinois; the quality class was rated as 3 (highly degraded) (#31 in Handel and Koontz 2004). This site had a Mean C (3.7) and FQI (39.2) reflecting the persistence of conservative species despite degradation. Although the community is too degraded to be considered a noteworthy remnant today, this site still supports a high diversity of native plants (112 native species) and is used as source of native seed representing local genotypes by Midewin National Tallgrass Prairie (Jen Durkin and William Glass, Midewin NTP, pers. comm.).

Grant Creek North Railroad Prairie (Site 4 on Map 2; **GP** In Tables 3 and 4)

This **noteworthy** remnant consists of a dry-mesic prairie community (Grade C+) , in the ROW between the UPRR and IL Route 53. The cool-season grass *Bromus inermis** occurs throughout the

remnant and the prairie community is being encroached upon by shrubs (Figure 5). However, native grasses and forbs are common and conspicuous. The east-facing slope (towards the RR) shows more evidence of herbicide drift than the remainder of the site. In addition to *B. inermis**, frequent herbaceous species include *Andropogon gerardii, Hesperostipa spartea*, and *Psoralidum tenuiflorum*. The Mean C for this site was relatively high (4.0) reflecting the presence of many conservative species, while the FQI was relatively low (25.6) because this is a small remnant with limited species diversity.

Mola Prairie Remnant (Site 5 on Map 3; **MI** in Tables 3 and 4)

This wet-mesic prairie remnant (Grade C) persisted between a drainage ditch that parallels the UPRR and adjacent crop field; despite past disturbances (agriculture) a considerable diversity of native plants survived. This remnant is now managed with the Route 66 Restoration on Midewin National Tallgrass Prairie and has been enhanced through overseeding and prescribed burning. Dominant graminoids include *Agrostis gigantea*, Carex pellita, Carex vulpinoidea, Andropogon gerardii, Panicum virgatum*, and *Spartina pectinata*.

Midewin National Tallgrass Prairie (USDA Forest Service) Prairie and Wetland Restorations (Maps 3 and 4; **SP** and **RV** in Tables 3 and 4)

There are three large prairie and wetland reconstructions adjacent to the project corridor: South Patrol Road (Map 3); Mola (Map 3), and Vulcan (Map 4). All three were formerly in annual row crop production, although portions adjacent to the UPRR ROW were often too wet for row crops. Some portions of these areas sustained remnant assemblages of native prairie and wetland plants around the edges or in poorly drained depressions.

East of the UPRR are the Mola and Vulcan projects, now collectively managed by Midewin staff as the Route 66 Restoration (**RV** in Tables 3 and 4). These projects were initiated during 1996 (Vulcan) and 2002 (Mola); prior to reconstruction activities, both sites were mostly cropland. Areas along the project limits are seasonally inundated by shallow water (3-12 inches); these are areas dominated by *Alisma subcordatum*, *Echinochloa crusgallii*, Amaranthus tuberculatus, Persicaria pensylvanica,* and *Phalaris arundinacea**. Cattails (*Typha* spp.) and *Phragmites australis* are less frequent, apparently subject to more effective control practices. There also are areas dominated by thickets of woody plants (*Salix interior, Acer saccharinum, Populus deltoides, Salix amygdaloides, Fraxinus lanceolata*), or stands of *Phalaris arundinacea**. Farther to east (>100-200 feet) the reconstruction becomes increasingly dominated by native perennials characteristic of marsh, sedge meadow, and wet prairie communities, such as: *Calamagrostis canadensis, Carex pellita, Carex stricta, Leersia oryzoides, Polygonum amphibium, Schoenoplectus tabernaemontani, Sparganium eurycarpum,* and *Spartina pectinata*. *Boltonia decurrens* (Federal Threatened) has been unintentionally introduced into this site.

West of the UPRR is the South Patrol Restoration (**SP** in Tables 3 and 4), initiated in 2004. The site consisted mostly of cropland, but there was a narrow strip of grassland within 60 feet of the UPRR; this grassland consisted of highly degraded prairie largely dominated by non-native plants, especially *Bromus inermis*, Pastinaca sativa*, Melilotus* spp.*, and *Lotus corniculatus**. Removal of abandoned railberms, disabling of drainage tile, broadcast seeding of appropriate native plants, and installation of native plant plugs was conducted over the entire site (MNTP personnel, pers. comm.). This strip along the railroad was managed with the adjacent Midewin project, using prescribed burning, invasive plant

control, and overseeding, enhancing the low-quality remnants in the ROW. Native species present prior to restoration efforts have increased, including *Tomanthera auriculata* (State Threatened). *Bromus inermis** is still frequent near the UPRR, but other common graminoids include *Agrostis gigantea**, *Andropogon gerardii, Carex pellita, Carex vulpinoidea, Panicum virgatum, Poa pratensis**, *Sorghastrum nutans, Spartina pectinata,* and *Sporobolus compositus*. Species diversity is relatively high (126 native species) and increases to the west. The Mean C for this reconstruction (3.5) is comparable or higher than many remnants in the project area; the relatively high FQI (41.6) reflects the diversity, which is at least partially a result of the seeding strategy. Size and quality would qualify the South Patrol Restoration as an **exceptional** site (Grade C+) if it were remnant natural community. The State Endangered *Filipendula rubra* has been planted in this reconstruction project (Map 3; Figure 9). *Eryngium yuccifolium* was planted in this reconstruction; the population now consists of thousands of plants covering >400 acres.

Foxglove Wetland (Site 6 on Map 5; **FS** in Tables 3 and 4)

This is a large wetland west of the UPRR, degraded by fire suppression, drainage attempts (there is a ditch at the southeast end), livestock use (abandoned fences), and woody encroachment. However, this community retains an understory with herbaceous species characteristic of sedge meadow and wet prairie: *Calamagrostis canadensis, Carex pellita, Carex stricta, Iris shrevei,* and *Spartina pectinata*. The canopy consists largely of even-age stands of *Fraxinus lanceolata, Acer saccharinum*, and *Populus deltoides*; where the canopy has been opened because of tree deaths caused by flooding and emerald ash-borer, the herbaceous flora has responded with increased vigor and flowering (Figure 11). There is local invasion by *Phalaris arundinacea*a* under these canopy gaps. Because of the extensive degradation, the natural communities present (sedge meadow and wet prairie) are Grade C, but have considerable potential for restoration to higher quality.

Foxglove Prairie (Sites 7 and 8 on Map 5; **FP** in Tables 3 and 4)

This location consists of a prairie remnant on Midewin National Tallgrass Prairie (USDA Forest Service) and adjacent DesPlaines State Fish and Wildlife Area (IDNR). This community was degraded in the past by grazing (remnants of livestock fences are present), fire suppression, and woody encroachment. This has resulted in the disappearance or decline of certain characteristic prairie species, including *Sporobolus heterolepis, Parthenium integrifolium, Dalea purpurea*, and *Eryngium yuccifolium*, which are present in many other remnants along the project corridor. Communities within the mapped area consist of mesic prairie and wet-mesic prairie. The portion of this community with the longest management history (12+ years of prescribed burning, woody control, invasive plant treatments) is Grade C+ (Site 8, Map 4), and is a **noteworthy** botanical resource. The remainder (Site 7, Map 4) is more degraded, and consists of a mosaic of C and C- quality. Surrounding these prairie communities is a more degraded wetland community that has been heavily invaded by woody plants (Foxglove Wetland, above). Dominant graminoids in these communities are *Andropogon gerardii, Carex pellita,* and *Sorghastrum nutans*. The most frequent forb is *Helianthus grosseserratus* (Figure 12) among 90 native species present. Mean C for this site is 3.5, despite the absence of many conservative species; the FQI is 35.2. This location hosts a large population of *Tomanthera auriculata* (Earleaf False-foxglove; see discussion above).

Hitts Siding Sand Savanna (Site 9 on Map 6; **SS** in tables 3 and 4)

This sand community occurs on a low ridge along the west side of the UPRR (Figure 16). Immediately west of this community are several mature *Quercus velutina*; presumably any oaks close to the railroad and utility lines were removed, and this feature now resembles a dry-mesic sand prairie community. Although there has been some invasion by non-native grasses and forbs (especially *Bromus inermis*, Poa pratensis*, Rumex acetosella*,* and *Verbascum thapsus**), native grasses, forbs, and shrubs are still predominant. Native graminoids include *Hesperostipa spartea, Schizachyrium scoparium* and *Sorghastrum nutans*. Native forbs include some relatively conservative species: *Coreopsis palmata, Eryngium yuccifolium, Liatris aspera, Parthenium integrifolium, Phlox pilosa*, and *Solidago speciosa*. This **noteworthy** remnant is Grade C+, largely because of disturbance related to the adjacent railroad (tree removal, herbicide drift, invasive plants). This site is included within the INAI Hitts Siding Prairie Natural Area (Map 9). The Mean C was relatively high 3.6 with a FQI of 29; the latter value reflects this remnant's relatively small size and low species diversity.

Hitts Siding Prairie (Sites 10, 11, 12, 13, 14, and 15 on Maps 5 and 6; **HS** in Tables 3 and 4)

Within 100-200 of the UPRR, these sites are a mosaic of natural communities interspersed with encroaching woody vegetation or *Phragmites australis*. Some of the thickets are dominated by native woody plants (*Corylus americana, Populus deltoides, Populus tremuloides, Rosa setigera, Salix discolor, Sambucus canadensis*) but non-native buckthorns (*Rhamnus cathartica*, Frangula alnus**) and honeysuckles *(Lonicera* spp.*) occur throughout. Although there are signs of past management (burn scars, stumps) there is no evidence of very recent management (within 3-5 years). There is also an older disturbance, an abandoned rail siding running to the northwest; the rails were removed decades ago and the berm has been recolonized by native species. In many places, the native vegetation extends up to the UPRR (Figure 15). Natural communities present include mesic sand prairie, wet-mesic sand prairie, wet-mesic sand prairie, wet sand prairie, and sedge meadow. Native shrubs were relatively frequent in open prairie communities, but not dominant (*Aronia melanocarpa, Ceanothus americanus, Rosa carolina, Rubus hispidus, Salix humilis, Spiraea alba*); no shrub prairie communities were present. Dominant graminoids vary with soil moisture; *Andropogon gerardii, Calamagrostis canadensis, Carex haydenii, Panicum virgatum, Schizachyrium scoparium, Sorghastrum nutans, Spartina pectinata,* and *Sporobolus heterolepis* are locally predominant. Among conservative native forbs present were *Aletris farinosa, Amorpha canescens, Osmunda regalis spectabilis, Platanthera lacera, Solidago speciosa,* and *Tephrosia virginiana*. This site also supports a large population of *Eryngium yuccifolium* (1000s of plants). The natural communities are **significant features**, Grades A and B (Figure 17) although there are Grade C+ areas near the railroad, usually associated with woody encroachment. All the natural communities are within the INAI Hitts Siding Prairie Natural Area; these all extend from the Hitts Siding Prairie Nature Preserve. This area had a high Mean C (3.7) and FQI (51.1), among the highest of the remnants within or adjacent to the project limits.

Union Pacific Railroad Prairie North (Sites 16, 17, 18, 19, 20, 21, 22, and 23 on Maps 5 and 6; **RN** in Tables 3 and 4)

As recently as the late 1990s, this area supported a more continuous stand of prairie vegetation, occasionally interrupted where the ROW was crossed by pipelines or ditches (pers. obs.). However, the natural communities here now exist as discrete openings (Figure 18) between thickets of woody vegetation or dense stands of *Phragmites australis* (Figure 20). Lack of management and frequent disturbance (herbicide drift, railroad maintenance, installation and maintenance of optic-fiber cables, pipelines, and electrical transmission lines) have caused extensive degradation and encouraged encroachment by invasive and ruderal plants. The remnants continue to persist and some appear relatively free of invasive plants, although most are being encroached upon by ruderal species (Figure 19). Natural communities present include mesic sand prairie, wet-mesic sand prairie, and wet sand prairie, all of Grade C natural quality. Dominants in the remnants include *Andropogon gerardii, Calamagrostis canadensis, Carex stricta, Panicum virgatum,* and *Sorghastrum nutans*. *Helianthus grosseserratus* and *Solidago canadensis* are frequent in these remnants; so is invasive *Phalaris arundinacea**. Small populations of *Eryngium yuccifolium* are present in four of the remnants (Table 2).

Originally part of an INAI natural area as Illinois Central Railroad Prairie, this site was added to the Hitts Siding Prairie Natural Area (Loebach and Glass 1997). This location was evaluated in 2003 as part of an inventory of roadside prairies in Illinois; the quality class was rated as 3 (highly degraded) (#32 in Handel and Koontz 2004). The communities here are now too degraded and fragmented to be considered a noteworthy remnant, but this site supports a high diversity of native plants (132 native species) and is used as source of native seed representing local genotypes by Midewin National Tallgrass Prairie (Jen Durkin and William Glass, Midewin NTP, pers. comm.).

Coal City Road Prairie Remnant (Site 24 on Map 7; **CS** in Tables 3 and 4)

This location consists of a mosaic of disturbed land and remnant natural communities. Where the land surface is disturbed there are artificial depression and rectilinear mounds that appear produced by earthmoving equipment prior to the middle 1900s, perhaps for sand mining. Between these disturbance areas are remnants of mesic prairie, wet-mesic prairie, and wet prairie. The disturbed sites are now dominated by dense thickets of ruderal woody species (*Frangula alnus*, Lonicera maackii*, Rosa multiflora*, Fraxinus lanceolata, Acer saccharinum, Populus deltoides*) while the openings are dominated by prairie grasses (*Andropogon gerardii, Calamagrostis canadensis, Panicum virgatum, Schizachyrium scoparium, Sorghastrum nutans*, and *Spartina pectinata*) (Figure 21). Forbs include many conservative species: *Arnoglossum plantagineum, Eryngium yuccifolium, Hypoxis hirsuta, Lithospermum canescens, Oxypolis rigidior, Parthenium integrifolium, Phlox pilosa,* and *Spiranthes magnicamporum* (Figure 22). Although the soil has a sandy component, plant species characteristic of or limited to sand prairies are absent. Instead, present are a few species associated with dolomite prairies, including *Calamintha arkansana, Eleocharis compressa*, and *Scutellaria parvula* var. *parvula* (Swink and Wilhelm 1994; IDNR, 2010). This site is a **noteworthy** botanical resource, because of the relatively diverse (155 native species) intact communities, although fragmented by disturbed areas. Natural quality is Grade C+; Mean C is 3.6 and FQI is 45.3, reflecting the relatively high diversity (Tables 3 and 4).

Coal City Road Sedge Meadow (Site 25 on Map 7; **SM** in Tables 3 and 4)

This community is the eastern extension of a larger wetland to the west. It consists of remnant wet prairie and sedge meadow between dense woody thickets to the south and a dense stand of *Phragmites australis* to the north. Although there is scattered woody encroachment (mostly *Fraxinus lanceolata*, *Cornus obliqua, Frangula alnus**) the natural communities are otherwise intact (Grade B). Dominant graminoids are *Calamagrostis canadensis, Carex pellita, Carex sartwellii, Carex stricta*, and *Spartina pectinata*. There is a small population of *Eryngium yuccifolium* in the wet prairie community. Given its size (0.5 acres) and quality (Grade B) this wetland is a **significant** feature. This is supported by Mean C of 4.0 and an FQI of 36.7 (Table 4).

Union Pacific Railroad Prairie South (Site 26 on Map 7; **RS** in Tables 3 and 4)

This location consists of a small prairie remnant in the ROW between the UPRR and IL Route 53; like the ROW north of Coal City Road, this area has undergone considerable degradation, and most of the prairie communities have been lost to encroachment by woody species and *Phragmites australis*. One opening with a Grade C wet-mesic prairie community was present. Common prairie species include *Andropogon gerardii, Anemone canadensis, Carex pellita, Eryngium yuccifolium, Euthamia graminifolia, Helianthus grosseserratus, Potentilla simplex*, *Silphium integrifolium*, and *Spartina pectinata*. *Poa pratensis** and *Solidago canadensis* are abundant in this community.

CONCLUSIONS

The Elwood-Braidwood HSR (Sequence No. 18446) traverses a region with multiple botanical resources, including listed plant species, Nature Preserves, natural areas, and significant, exceptional, and noteworthy natural community remnants.

Eleven locations were suitable for *Platanthera leucophaea* (Federal Threatened); these sites were identified and searched following USFWS protocols. No *P. leucophaea* was found in or adjacent to the project area. No natural populations of any other Federal Threatened and Endangered plant species were found in the project area, although an introduced population of *Boltonia decurrens* (Federal Threatened) was present at one location.

Two previously known populations of *Tomanthera auriculata* (State Threatened) were relocated during the survey, both on Midewin National Tallgrass Prairie. A third population could not be relocated. No other state-listed plant species were found during the surveys. A non-listed plant species, *Eryngium yuccifolium*, was found at twenty-four sites in the project area; this includes several large populations that are known or potential hosts for a rare moth (*Papaipema eryngii*) being considered for federal listing.

The project area borders one state nature preserve: Hitts Siding Prairie Nature Preserve. Recognized natural areas present in or immediately adjacent to the project area include Joliet Army Ammunition Plant Natural Area (Midewin National Tallgrass Prairie) and Hitts Siding Prairie Natural Area (partially within the nature preserve). The project area is also adjacent to large prairie and wetland reconstruction projects present on Midewin National Tallgrass Prairie; one of these sites, South Patrol Road Restoration, is progressing towards natural quality comparable to some natural areas.

Thirteen natural community remnants were identified in or adjacent to the project area. Many of these have been considerably degraded, but the following qualified as significant, exceptional, or noteworthy sites:

Hoff Road North Railroad Prairie	Exceptional	Grade B	Site 1
Hoff Road West Railroad Prairie	Noteworthy	Grade C+	Site 2
Grant Creek North Railroad Prairie	Noteworthy	Grade C+	Site 4
Foxglove Prairie	Noteworthy	Grade C+	Sites 7 and 8
Hitts Siding Sand Savanna	Noteworthy	Grade C+	Site 9
Hitts Siding Prairie	Significant	Grades A, B, C	Sites 10, 11, 12, 13, 14, and 15
Coal City Road Prairie	Noteworthy	Grade C+	Site 24
Coal City Road Sedge Meadow	Significant	Grade B	Site 25

REFERENCES

Baskin, J.M., C.C. Baskin, P.D. Parr, and M. Cunningham. 1991. Seed germination ecology of *Tomanthera auriculata* (Scrophulariaceae). Castanea 56:51-58.

Bowles, M., R. Falkne, and R. Dombeck. 1992. Status and Population Fluctuations in the Eastern Prairie Fringed Orchid [*Platanthera leucophaea* (Nutt.) Lindl.] in Illinois. Erigenia 12:26-40.

Bowles, M., L. Zettler, T. Bell, and P. Kelsey. 2005. Relationships between soil characteristics distribution, and restoration potential of the Federal Threatened Eastern Prairie Fringed Orchid, *Platanthera leucophaea* (Nutt.) Lindl. American Midland Naturalist 154:273-285.

Cunningham, M., and P.D. Parr. 1990. Successful culture of the rare hemiparasite Tomanthera auriculata (Michx.) Raf. (Scrophulariaceae). Castanea 55:266-271.

Goldman, D.H. 1995. A new species of *Calopogon* from the midwestern United States. Lindleyana 10:37-42.

Goldman, D.H., L.K. Magrath, and P.M. Catling. 2002. *Calopogon*. Pages 597-602 *in* Flora of North America Editorial Committee. Flora of North America, Volume 26. Magnoliophyta: Liliidae: Liliales and Orchidales. Oxford University Press, New York and Oxford. 723 pp.

Handel, W.C., and J. Koontz. 2004. Inventory of Roadside Prairies, Illinois Department of Transportation District 1. Technical report prepared for the Illinois Department of Transportation, Bureau of Design and Environment, Springfield. Center for Biodiversity Technical Report (3) 2004, Illinois Natural History Survey, Champaign Il. 59 pp. and Map.

Hayworth, D.A., M.L. Bowles, B.A. Schaal, and K.E. Shingleton. 2001. Clonal population structure of the Federal Threatened Mead's Milkweed, as determined by RAPD analysis, and its conservation implications. Proceeding of the 17th North American Prairie Conference, Mason City IA: 182-190.

Herkert, J.R., and J.E. Ebinger, editors. 2002. Endangered and Threatened Species of Illinois: Status and Distribution, Volume 1 – Plants. Illinois Endangered Species Protection Board, Springfield IL. 61 pp.

Illinois Department of Natural Resources. 2010. The Standards and Guidelines for Illinois Natural Areas Inventory. Natural Areas Program, Division of Natural Heritage, Springfield IL. 148 pp.

Illinois Endangered Species Protection Board. 2011. Checklist of Endangered and Threatened Animals and Plants of Illinois. Accessed website 29 October 2013. http://www.dnr.illinois.gov/espb/documents/etchecklist2011.pdf

Loebach, E., and W. Glass. 1997. A proposal to dedicate Hitts Siding Prairie as an Illinois Nature Preserve, Will County, Illinois. Illinois Department of Natural Resources. 16 pp. and appendices.

Mohar, P. (ed.). 2000. A congenial fellowship: A botanical correspondence between Charles C. Deam and Floyd A. Swink 1946-1951. Shirley Heinze Environmental Fund, Michigan City IN. 338 pp.

Mohlenbrock, R.H. 1999. The Illustrated Flora of Illinois: Sedges: *Carex*. Southern Illinois University, Carbondale IL. 328 pp.

Mohlenbrock, R.H. 2002. Vascular Flora of Illinois, 3rd ed. Southern Illinois University, Carbondale, IL. 491 pp.

Molano-Flores, B., J.A. Koontz, and M.A. Feist. 2007. Genetic Diversity of the Illinois-threatened *Agalinis auriculata* (Orobanchaceae) and two common congeners. American Midland Naturalist 158:279-291.

Neel, M.C., and M.P. Cummings. 2004. Section-level relationships of North American *Agalinis* (Orobanchaeae) based on DNA sequence analysis of three chloroplast gene regions. BMC Evolutionary Biology 4:15.

Pettengill, J.B., and M.C. Neel. 2008. Phylogenetic patterns and conservation among North American member of the genus *Agalinis* (Orobanchaceae). BMC Evolutionary Biology 8:264.

Rhoads, A.F., and T.A. Block. 2007. Flora of Pennsylvania: An Illustrated Manual, 2nd Edition. University of Pennsylvania Press, Philadelphia. 1042 pp.

Sheviak, C.J. 2002. *Platanthera*. Pages 551-571 *in* Flora of North America Editorial Committee. Flora of North America, Volume 26. Magnoliophyta: Liliidae: Liliales and Orchidales. Oxford University Press, New York and Oxford. 723 pp.

Smith, M., H. Caswell, and P. Mettler-Cherry. 2005. Stochastic flood and precipitation regimes and the population dynamics of a threatened floodplain plant. Ecological Applications 15:1036-1052.

Swink, F. and G. Wilhelm. 1994. Plants of the Chicago Region, 4th ed. Indiana Academy of Sciences, Indianapolis, IN. 921 pp.

Taft, J.B., G.S. Wilhelm, D.M. Ladd, and L.A. Masters. 1997. Floristic Quality Assessment for vegetation in Illinois, a method for assessing vegetation integrity. Erigenia 15:3-95.

U.S. Fish and Wildlife Service. 1990. Decurrent False Aster Recovery Plan. U.S. Fish and Wildlife Service, Twin Cities Minnesota. 26 pp.

U.S. Fish and Wildlife Service. 1990. Recovery Plan for the Lakeside Daisy (*Hymenoxys acaulis* var. *glabra*). U.S. Fish and Wildlife Service, Twin Cities, Minnesota. 80 pp. + Appendices.

U.S. Fish and Wildlife Service. 1996. Leafy Prairie-clover Recovery Plan. U.S. Fish and Wildlife Service, Atlanta, Georgia. 74 pp.

U.S. Fish and Wildlife Service. 1999. Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) Recovery Plan. Fort Snelling, Minnesota. 62 pp.

U.S. Fish and Wildlife Service. 2003. Mead's Milkweed (*Asclepias meadii*) Recovery Plan. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 120 pp.

U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; 12-month finding on a petition to list the rattlesnake-master borer moth (*Papaipema eryngii*) as an Endangered or Threatened species. Federal Register 78 (157):49422-49440.

U.S. Fish and Wildlife Service. 2014. Determining whether eastern prairie fringed orchid (*Platanthera leucophaea*) may be present in a proposed project area in the following northeastern Illinois. Section & Technical Assistance, Chicago Field Office, Barrington IL. Accessed 26 September 2014. http://www.fws.gov/midwest/endangered/section7/s7process/plants/epfos7guide.html

Vitt, P., K. Havens, B.E. Kendall, and T.M. Knight. 2009. Effects of community-level management on the non-target rare annual *Agalinis auriculata*. Biological Conservation 142:798-805.

White, J. and M.H. Madany. 1978. Classification of natural communities in Illinois. Pages 310-405 (Appendix 30) *in*: White, J. Illinois Natural Areas Technical Report, Volume 1. Survey Methods and Results. Urbana. Illinois Natural Areas Inventory.

Yatskievych, G. 2006. Steyermark's Flora of Missouri, Revised Edition. Volume 2. Missouri Department of Conservation, Jefferson City, and Missouri Botanical Garden Press, St. Louis. 1181 pp.

Yatskievych, G. 2013. Steyermark's Flora of Missouri, Revised Edition. Volume 3. Missouri Department of Conservation, Jefferson City, and Missouri Botanical Garden Press, St. Louis. 1382 pp.

Zambrana Engineering, Inc. 1998. Assessment of the Reintroduction Potential of Five Federally Threatened and Endangered Plant Species at Midewin National Tallgrass Prairie. Report submitted to USDA Forest Service, Wilmington IL.

Zettler, L.W. and K.A. Piskin. 2011. Mycorrhizal fungi from protocorms, seedlings, and mature plants of the Eastern Prairie Fringed Orchid, *Platanthera leucophaea* (Nutt.) Lindley: A comprehensive list to augment conservation. American Midland Naturalist 166:29-39.

Zettler, L.W., K.A. Piskin, S.L. Stewart, J.J. Hartstock, M.L. Bowles, and T.J. Bell. 2005. Protocrom mycobionts of the Federally threatened eastern prairie fringed orchid, *Platanthera leucophaea* (Nutt.) Lindley, and a technique to prompt leaf elongation in seedlings. Studies in Mycology 53:163-171.

Appendix 1, Table 1: Sites surveyed for *Platanthera leucophaea* (Eastern Prairie Fringed Orchid; EPFO) in the Elwood to Braidwood High Speed Rail project (Seq. #18446) during June-July 2014. A total of 11 natural community remnants were surveyed for EPFO; other sites were not suitable (too degraded, too dry) for this orchid.

Site and Map Numbers	Site Description and Natural Communities Present	Native FQI[1]	Native Mean C[2]	#EFPO associates[3]	Dates Searched[4]	EFPO found?	Comments
1; Map 1	Remnant north of Hoff Rd, west of UPRR; Grade B- Mesic Prairie	29.6	3.8	8	19 Jun 2014 3 Jul 2014 10 Jul 2014	No	Site small
2; Map 2	Remnant south of Hoff Road, west of UPRR; Grade C+ dry-mesic, mesic, and wet-mesic prairie	37.3	4.0	6	19 Jun 2014 3 Jul 2014 10 Jul 2014	No	Site degraded
3; Map 2	Remnant south of Hoff Road, east of UPRR; Grade C/D dry-mesic, mesic, and wet-mesic prairie	42.8	4.4	11	19 Jun 2014 3 Jul 2014 10 Jul 2014	No	Site degraded, prairie fragmented
5; Maps 3 and 4	Mola Remnant and Midewin NTP Prairie/Wetland Restorations; Grade C wet-mesic prairie remnant with reconstructed prairie and wetland communities	29.9	3.5	11	26 Jun 2014 3 Jul 2014 10 Jul 2014	No	Past agricultural use, recent prairie reconstruction
6; Map 4	Foxglove Wetland; Grade C sedge meadow and wet prairie	22.4	3.2	11	26 Jun 2014 8 Jul 2014 10 Jul 2014	No	Seasonally flooded, shaded by encroaching trees
7, 8; Map 4	Foxglove Prairie; Grades C+ and C mesic and wet-mesic prairie	37.5	4.0	13	26 Jun 2014 10 Jul 2014 8 Jul 2014	No	Past agricultural use (grazing), shrub encroachment
10, 11, 12, 13, 14, and 15; Maps 5 and 6	Hitts Siding Prairie Natural Area and Nature Preserve; Grades A, B, and C+ dry-mesic prairie, mesic prairie, wet-mesic prairie, and wet prairie	54.3	4.2	18	1 Jul 2014 3 Jul 2014 8 Jul 2014 11 Jul 2014	No	Localized shrub encroachment, perhaps soil too acidic?
16, 17, 18, 19, 20, 21, 22, and 23; Maps 5 and 6	IL Route 53/UPRR ROW prairie remnants; Grade C mesic, wet-mesic, and wet prairie	41.8	3.6	18	1 Jul 2014 3 Jul 2014 8 Jul 2014 11 Jul 2014	No	Site degraded, woody and invasive encroachment

Site and Map Numbers	Site Description and Natural Communities Present	Native FQI[1]	Native Mean C[2]	#EFPO associates[3]	Dates Searched[4]	EFPO found?	Comments
24; Map 7	Fragmented prairie remnants south of Coal City Road; Grade C+ mesic and wet-mesic prairie	48.8	3.9	17	1 Jul 2014 8 Jul 2014 11 Jul 2014	No	Patchy disturbance, woody encroachment
25; Map 7	Wetland __ feet south of Coal City Road; Grade B-/C+ wet-mesic prairie and sedge meadow	38.3	4.3	13	1 Jul 2014 8 Jul 2014 11 Jul 2014	No	Woody encroachment
26; Map 7	UPRR ROW prairie remnant, 3600 feet SW of Coal City Rd crossing; Grade C wet-mesic prairie	23.7	3.6	5	1 Jul 2014 8 Jul 2014 11 Jul 2014	No	Woody encroachment, soil disturbance

[1]Sites with Native Floristic Quality Index ≥ 20.0 are considered to have potential for EPFO (USFWS 2014).

[2]Sites with Native Mean C ≥ 3.5 are considered to have potential for EPFO (USFWS 2014).

[3]USFWS (2014) considers the presence of four associates to be indicative of EFPO habitat.

[4]USFWS (2014) recommends three site searches on non-consecutive days between 28 June and 11 July in northeastern Illinois. For this project, some locations required four visits to ensure complete habitat surveys.

Appendix1, Table 2. *Eryngium yuccifolium* in the Elwood-Braidwood HSR (Seq. #18446) project area: locations and population size.

Population Indicator & Map #	**Location**	**Size of Population**	**Habitat**
A; Map 1	South of Strawn Road	1 plant	Old field/degraded prairie (Grade D)
B; Map 1	North of Hoff Rd	78 plants	Grade B mesic prairie
C; Map 1	North of Hoff Road	41 plants	Old field
D; Map 2	South of Hoff Rd, west of RR	3 plants	Grade C mesic prairie
E; Map 2	South of Hoff Rd, east of RR	153 plants in two patches	Grade C-/D mesic prairie & roadside ditch
F; Map 2	North of Grant Creek, west of RR	2 plants	Old field
G; Map 3	South Patrol Road Restoration, Midewin NTP	>5000 plants	Prairie/Wetland Reconstruction
H; Map 3	Mola Restoration, Midewin NTP	>2500 plants	Prairie/Wetland Reconstruction
I; Map 4	Vulcan Tract, Midewin NTP	100-125 plants	Prairie/Wetland Reconstruction
J; Map 5	NW of UPRR; Hitts Siding Prairie NP	19 plants	Grade C+ dry-mesic sand savanna
K; Map 5	NW of UPRR; Hitts Siding Prairie NP	250 plants	Grade B mesic/wet-mesic sand prairie openings amid shrub thickets
L; map 5	NW of UPRR; Hitts Siding Prairie NP	150 plants	Grade B mesic/wet-mesic sand prairie openings amid shrub thickets
M; Map 5	NW of UPRR; Hitts Siding Prairie NP	150 plants	Grade B mesic/wet-mesic sand prairie openings amid shrub thickets
N; Map 6	NW of UPRR; Hitts Siding Prairie NP	>2000 plants	Grades A, B & C mesic sand prairie/wet-mesic sand prairie
O; Map 6	NW of UPRR; Hitts Siding Prairie NP	72 plants	Grade B mesic/wet-mesic sand prairie openings amid shrub thickets
P; Map 6	SE of UPRR, in ROW between RR and IL Route 53	13 plants	Grade C mesic/wet-mesic sand prairie remnant
Q; Map 6	SE of UPRR, in ROW between RR and IL Route 53	2 plants	Grade C mesic/wet-mesic sand prairie remnant
R; Map 6	SE of UPRR, in ROW between RR and IL Route 53	3 plants	Grade C mesic/wet-mesic sand prairie remnant
S; Map 6	SE of UPRR, in ROW between RR and IL Route 53	3 plants	Grade C mesic/wet-mesic sand prairie remnant
T; Map 6	NW of UPRR, north of Coal City Road	55 plants	Old field

Population Indicator & Map #	Location	Size of Population	Habitat
U; Map 7	NW of UPRR, south of Coal City Road	53 plants	Grade C+ mesic/wet-mesic prairie remnant
V; Map 7	NW of UPRR, 1550 feet SW of Coal City Road crossing	9 plants	Grade B- wet-mesic/wet prairie/sedge meadow
W; Map 7	SE of UPRR, 3550 feet SW of Coal City Rd crossing	52 plants	Grade C mesic/wet-mesic prairie remnant
X; Map 7	SE of UPRR, 3650 ft SW of Coal City Rd crossing	7 plants	Roadside

Appendix 1, Table 3. Vascular plant species distribution and abundance in natural and restored communities in the project area, by site, in the Elwood-Braidwood HSR project area (Seq. # 18446). **HN** = Site 1 (Map 1); **HW** = Site 2 (Map 2); **HE** = Site 3 (Map 2); **GP** = Site 4 (Map 2); **MI** = Site 5 (Map 3); **FP** = Sites 7 and 8 (Map 4); **FS** = Site 6 (Map 4); **SS** = Site 8 (Map 5); **RN** = Sites 18-23 (Maps 5 and 6); **RS** = Site 26 (Map 7); **HS** = Sites 9-17 (Maps 5 and 6); **SP** = South Patrol Road Restoration (Map 3); **RV** = Route 66 Restoration (Maps 3 and 4); **SM** = (Site 25, Map 7); and **SC** = (Site 24, Map 7). Floristic Quality Data summarized in Table 4.

			Relative Abundance[2]														Growth
Scientific Name	**Common Name**	**CC[1]**	**HN**	**HW**	**HE**	**GP**	**MI**	**FP**	**FS**	**SS**	**RN**	**RS**	**HS**	**SP**	**RV**	**SM**	**SC**	**Form[3]**
Acalypha rhomboidea	Three-Seeded Mercury	0													2			A-FORB
Acer negundo	Box Elder	1							2				2					TREE
Acer saccharinum	Silver Maple	1							4		2	1	2		2	2	2	TREE
*Achillea millefolium**	Common Milfoil		1		3		2	2		3			2				3	P-FORB
Agalinis tenuifolia	Slender False Foxglove	5											3					A-FORB
Agastache nepetoides	Yellow Giant Hyssop	4		2														P-FORB
Ageratina altissima	White Snakeroot	2						2									1	P-FORB
Agrimonia parviflora	Swamp Agrimony	5						2	2		2	3	3	3	2	3	4	P-FORB
Agrostis gigantea	Red Top	0					3	3			3	3	3	3	3		2	P-GRASS
*Ailanthus altissima**	Tree-Of-Heaven										1		1					TREE
Aletris farinosa	Colic Root	9											2					P-FORB
Alisma subcordatum	Common Water Plantain	2							1					3	3			P-FORB
*Alliaria petiolata**	Garlic Mustard										1						2	B-FORB
Allium canadense	Wild Garlic	2		3	3		4						2	2	2		4	P-FORB
Allium cernuum	Nodding Wild Onion	7		2	1									2				P-FORB
Amaranthus tuberculatus	Tall Waterhemp	1												2	2			A-FORB
Ambrosia artemisiifolia	Common Ragweed	0	2				2			2	2		1		2			A-FORB
Ambrosia trifida	Giant Ragweed	0		2	2		2				3				3			A-FORB
Amorpha canescens	Lead Plant	8	2	3									1					SHRUB
Amphicarpaea bracteata var. comosa	Hog Peanut	4		2														H-VINE
Andropogon gerardii	Big Bluestem	5	3	4	3	2	3	4		2	2	2	4	3	2		3	P-GRASS
Anemone canadensis	Meadow Anemone	4			3							3			2	2	2	P-FORB
Anemone cylindrica	Candle Anemone	8	2		2												1	P-FORB
Anemone virginiana	Tall Anemone	4					1	2		2	2	2	2	3	2	2	2	P-FORB
Apios americana	Ground Nut	3		2	4		3					3		4	2	2	2	H-VINE

Scientific Name	Common Name	CC[1]	Relative Abundance[2]														Growth Form[3]
			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
Apocynum androsaemifolium	Spreading Dogbane	6									1							P-FORB
Apocynum cannabinum	Dogbane	2		2	3	2		2			1	2	2					P-FORB
Apocynum sibiricum	Indian Hemp	2	2				3				3		1	2	2	3	2	P-FORB
Arnoglossum plantaginea	Prairie Indian Plantain	10														2	2	P-FORB
Aronia melanocarpa	Black Chokeberry	8									1		2					SHRUB
Asclepias incarnata	Swamp Milkweed	4					3	1	2					2			1	P-FORB
Asclepias sullivantii	Prairie Milkweed	7						2					2	2			1	P-FORB
Asclepias syriaca	Common Milkweed	0	2	2			2			2	3		2	2	2		2	P-FORB
Asclepias verticillata	Horsetail Milkweed	1	1														1	P-FORB
Asclepias viridiflora	Green Milkweed	9				1												P-FORB
*Asparagus officinalis**	Garden Asparagus						1							2				P-FORB
Aster ericoides	Heath Aster	4	2	3	3		2	3			2		2	3			2	P-FORB
Aster laevis	Smooth Blue Aster	8	2	2	2	2												P-FORB
Aster lanceolatus	Panicled Aster	3			2		2	3	2		2			3	2	3	3	P-FORB
Aster lateriflorus	Side-Flowering Aster	2							3									P-FORB
Aster novae-angliae	New England Aster	4	2		3			2			2		2	2	3		2	P-FORB
Aster oolentangiensis	Sky-Blue Aster	7			1								2				1	P-FORB
Aster pilosus	Hairy Aster	0	2		2						2							P-FORB
Aster praealtus	Willow Aster	4			2									2		2		P-FORB
Aster puniceus	Bristly Aster	7		2	3			2									2	P-FORB
Baptisia alba	White Wild Indigo	6												2				P-FORB
*Barbarea vulgaris**	Winter Cress														1			B-FORB
Bidens cernua	Nodding Bur Marigold	2													2			A-FORB
Bidens comosa	Swamp Tickseed	2							1									A-FORB
Bidens connata	Purple-Stemmed Tickseed	2													2			A-FORB
Bidens frondosa	Common Beggar's Ticks	1							3		2				2		2	A-FORB
Bidens polylepis	Bur Marigold	1						2	2		3		3	4	3		3	A-FORB
Boehmeria cylindrica	False Nettle	3							3		1		2				2	P-FORB
Bolboschoenus fluviatilis	River Bulrush	3													2			P-SEDGE
Boltonia decurrens	Illinois False Aster	4													1			P-FORB
Botrychium virginianum	Rattlesnake Fern	4															1	FERN

Scientific Name	Common Name	CC[1]	Relative Abundance[2]														Growth Form[3]
			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
*Bromus inermis**	Hungarian Brome			4	4	4					2			3				P-GRASS
Calamagrostis canadensis	Blue Joint Grass	3			2			2	3		2		4	3	3	3	2	P-GRASS
Calamintha arkansana	Low Calamint																2	P-FORB
Calystegia sepium	American Bindweed	1	2	3	3	2	3	3		2	3	3	2	2	3	1	2	P-FORB
Camassia scilloides	Wild Hyacinth	7			3					2								P-FORB
Campanula aparinoides	Marsh Bellflower	8														1		P-FORB
Carex annectens	Large Yellow Fox Sedge	3												2				P-SEDGE
Carex bicknellii	Bicknell's Sedge	8	2		2													P-SEDGE
Carex blanda	Common Wood Sedge	2				1												P-SEDGE
Carex brevior	Plains Oval Sedge	4		2	3		2				1		2	2				P-SEDGE
Carex buxbaumii	Dark-Scaled Sedge	9									1					2		P-SEDGE
Carex cristatella	Crested Oval Sedge	3					3		2				2	3	2			P-SEDGE
Carex emoryi	Riverbank Sedge	6		2	2													P-SEDGE
Carex granularis	Pale Sedge	2												2	2			P-SEDGE
Carex gravida	Long-Awned Bracted Sedge	4		2		1												P-SEDGE
Carex grisea	Wood Gray Sedge	3													1		2	P-SEDGE
Carex haydenii	Long-Scaled Tussock Sedge	7									1		3			2	2	P-SEDGE
Carex hystericina	Porcupine Sedge	6									1			2	1			P-SEDGE
Carex lacustris	Common Lake Sedge	6												2				P-SEDGE
Carex meadii	Mead's Stiff Sedge	6		3	2						2						3	P-SEDGE
Carex muhlenbergii var. muhlenbergii	Sand Bracted Sedge	5								2								P-SEDGE
Carex normalis	Spreading Oval Sedge	4	1	2											2			P-SEDGE
Carex pellita	Wooly Sedge	4		2	4		4	3	3		3	3	2	4	2	2	3	P-SEDGE
Carex sartwellii	Running Marsh Sedge	5									1					3		P-SEDGE
Carex scoparia	Lance-Fruited Oval Sedge	5											2					P-SEDGE
Carex stricta	Common Tussock Sedge	5							2		1		2	2		3		P-SEDGE
Carex suberecta	Wedge-Fruited Oval Sedge	7									1		2				2	P-SEDGE
Carex tribuloides	Awl-Fruited Oval Sedge	3						2										P-SEDGE

Scientific Name	Common Name	CC[1]	Relative Abundance[2]														Growth Form[3]
			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
Carex trichocarpa	Hairy-Fruited Lake Sedge	6						2	2									P-SEDGE
Carex vulpinoidea	Brown Fox Sedge	3			2		4		3				2	4	2	2	2	P-SEDGE
Catalpa speciosa	Cigar Tree	5									1							TREE
Ceanothus americanus	New Jersey Tea	8		2	1					1	1		2					SHRUB
Celastrus scandens	Climbing Bittersweet	2									2						1	W-VINE
Celtis occidentalis	Hackberry	3		2													1	TREE
Cephalanthus occidentalis	Buttonbush	4											2			1		SHRUB
Cerastium nutans	Nodding Chickweed	0															1	A-FORB
Chamaecrista fasciculata	Golden Cassia	1								3	2	2	3				2	A-FORB
Cicuta maculata	Water Hemlock	4			2		2				2	2	3	3	1	3	3	B-FORB
Cinna arundinacea	Common Wood Reed	5							3									P-GRASS
*Cirsium arvense**	Field Thistle			2	3						2							P-FORB
Cirsium discolor	Pasture Thistle	3		2							1		2			2	2	B-FORB
Comandra umbellata	Bastard Toad-Flax	6		3	3		2	2		2			2		2	2		P-FORB
*Conium maculatum**	Poison Hemlock				1								1		2			B-FORB
Coreopsis palmata	Prairie Coreopsis	6	2	2	2					3	1		2				2	P-FORB
Coreopsis tripteris	Tall Coreopsis	4	2	2	3					2	2	3	3	2		2		P-FORB
Cornus obliqua	Pale Dogwood	4			2		2	3	3	3			3	2	2	3	3	SHRUB
Cornus racemosa	Gray Dogwood	2	2		3			2			2		2					SHRUB
Corylus americana	American Filbert	4								3	2		3					SHRUB
Crataegus mollis	Downy Hawthorn	2		2		1	2				1							TREE
*Dacytlis glomerata**	Orchard Grass																2	P-GRASS
Dalea candida	White Prairie Clover	9				1												P-FORB
Dalea purpurea	Purple Prairie Clover	8		2	1								2	2			2	P-FORB
*Daucus carota**	Queen Anne's Lace				3			3		2		2	1				2	B-FORB
Desmanthus illinoensis	Illinois Bundle Flower	4												2				P-FORB
Desmodium canadense	Showy Tick Trefoil	5									1		2	3	2	1		P-FORB
Desmodium canescens	Hoary Tick Trefoil	4											1					P-FORB
Desmodium illinoense	Illinois Tick Trefoil	5								2								P-FORB
*Dianthus armeria**	Deptford Pink			2			1							1				A-FORB
Dichanthelium acuminatum var. implicatum	Panic Grass	2					2				2		2	2			3	P-GRASS

Scientific Name	Common Name	CC[1]	Relative Abundance[2]														Growth Form[3]
			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
Dichanthelium clandestinum	Deer-Tongue Grass	4									1		2					P-GRASS
Dichanthelium leibergii	Prairie Panic Grass	7	3	3	2	2												P-GRASS
Dichanthelium oligosanthes var. scribnerianum	Scribner's Panic Grass	3			2		2				1		3	1			2	P-GRASS
Dichanthelium villosissimum	White-Haired Panic Grass	5								2								P-GRASS
*Dipsacus fullonum**	Common Teasel						1											B-FORB
*Dipsacus laciniatus**	Cut-Leaved Teasel			2	3		1	2			3	2			2		1	B-FORB
Dodecatheon meadia	Shooting Star	6		2	2													P-FORB
Echinacea pallida	Pale Purple Coneflower	7			2	3												P-FORB
*Echinochloa crus-galli**	Barnyard Grass														3			A-GRASS
*Elaeagnus umbellata**	Autumn Olive		2	2	3	2		2		2	3		2	3	2		3	SHRUB
Eleocharis acicularis	Needle Spikerush	3													2			P-SEDGE
Eleocharis compressa	Flat-Stemmed Spikerush	7						2									2	P-SEDGE
Eleocharis erythropoda	Red-Rooted Spikerush	3					2							3	2	2	2	P-SEDGE
Eleocharis palustris	Marsh Spikerush	5												2	3			P-SEDGE
Elymus canadensis	Canada Wild Rye	4	3	2	3	4		2					2					P-GRASS
Elymus virginicus	Virginia Wild Rye	4		2			2						2		2			P-GRASS
*Elytrigia repens**	Quack Grass		1	2									2		2			P-GRASS
Epilobium coloratum	Cinnamon Willow Herb	3												2	2			P-FORB
Equisetum arvense	Common Horsetail	0	3	2	4		2	2	2		2	3	3	2	1		2	FERN
Equisetum hyemale var. affine	Tall Scouring Rush	2									2			2				FERN
Equisetum laevigatum	Smooth Scouring Rush	4			3		3	2					2	1			2	FERN
Eragrostis spectabilis	Purple Love Grass	3								1			2					P-GRASS
Erechtites hieracifolia	Fireweed	2						2			2							A-FORB
Erigeron annuus	Annual Fleabane	1		2	3		2				2			2				B-FORB
Erigeron philadelphicus	Marsh Fleabane	3						1						2			2	P-FORB
Erigeron strigosus	Daisy Fleabane	2			2						1		2				2	P-FORB
Eryngium yuccifolium	Rattlesnake Master	7	2	2	2		1			2	2	3	3	2	2	2	3	P-FORB

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			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
Eupatorium altissimum	Tall Boneset	2	2			3	2	2		2	2	2	1					P-FORB
Eupatorium perfoliatum	Common Boneset	4									1					2	2	P-FORB
Eupatorium serotinum	Late Boneset	1					2	2		1	2		2		3	1		P-FORB
Euphorbia corollata	Flowering Spurge	3	3	2		3				3	2	2	3				2	P-FORB
Euthamia graminifolia	Grass-Leaved Goldenrod	3							1		3	4	2		2	3		P-FORB
Euthamia gymnospermoides	Viscid Grass-Leaved Goldenrod	5											3				3	P-FORB
*Festuca arundinacea**	Tall Fescue										3		3	2	3		2	P-GRASS
Filipendula rubra	Queen Of The Prairie	10												1				P-FORB
Fragaria virginiana	Wild Strawberry	2	2	2	2		3	3			3	3	3	3	2	2	4	P-FORB
*Frangula alnus**	Glossy Buckthorn									2	3		3			3	3	SHRUB
Fraxinus lanceolata	Green Ash	2	1					3	3		3	1	2	3	2	3	3	TREE
Galium aparine	Annual Bedstraw	0			2													A-FORB
Galium obtusum	Wild Madder	5					2	2	2		2	3	2	3		3	4	P-FORB
Gaura biennis	Biennial Gaura	2															1	B-FORB
Gentiana andrewsii	Closed Gentian	7					2	2						1		2	2	P-FORB
Gentiana puberulenta	Downy Gentian	9			1													P-FORB
Geum canadense	White Avens	2		2	2						1		1	2	2		1	P-FORB
Geum laciniatum	Rough Avens	2					2	2					2	2	1			P-FORB
Gleditsia triacanthos	Honey Locust	2						2	2								2	TREE
Glyceria striata	Fowl Manna Grass	4						2	3		2					2	1	P-GRASS
Helenium autumnale	Sneezeweed	3											2			2	2	P-FORB
Helianthus grosseserratus	Sawtooth Sunflower	2	2		4		3	4	2		3	3	4	4	3	3	2	P-FORB
Helianthus hirsutus	Bristly Sunflower	5		2	3		2					2						P-FORB
Helianthus mollis	Downy Sunflower	7								3	2		3				2	P-FORB
Helianthus pauciflorus	Prairie Sunflower	6	3	3	3	1		3		2	2		2					P-FORB
Heliopsis helianthoides	False Sunflower	4			2									2				P-FORB
Hesperostipa spartea	Porcupine Grass	6	1	2	2	3				2	1							P-GRASS
Hibiscus laevis	Halberd-Leaved Rose Mallow	4							1									P-FORB
*Hypericum perforatum**	Common St. John's-wort													1				P-FORB
Hypericum punctatum	Spotted St. John's-wort	3									1		2				1	P-FORB
Hypericum pyramidatum	Giant St. John's-wort	8												2				P-FORB

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Hypericum sphaerocarpum	Round-Fruited St. John's-wort	5					3	3			2		3	2		2	3	P-FORB
Hypoxis hirsuta	Yellow Stargrass	6															2	P-FORB
Impatiens capensis	Spotted Touch-Me-Not	2									2		2		2			A-FORB
Iris shrevei	Southern Blue Flag	5					2		3		2		2	2	2	2	5	P-FORB
Juglans nigra	Black Walnut	4														1	1	TREE
Juncus acuminatus	Sharp-Fruited Rush	4												2				P-FORB
Juncus anthelatus	Tall Path Rush																1	P_FORB
Juncus dudleyi	Dudley's Rush	4	3					2	2		2		3	3			3	P-FORB
Juncus effusus var. solutus	Common Rush	4											2	2				P-FORB
Juncus torreyi	Torrey's Rush	3						2			2		1	3			2	P-FORB
Juniperus virginiana	Eastern Red Cedar	1	1	2													2	TREE
Krigia biflora	False Dandelion	5											2					P-FORB
Lactuca canadensis	Wild Lettuce	1		2							2			2			1	B-FORB
*Lactuca serriola**	Prickly Lettuce														1			B-FORB
Lathyrus palustris	Marsh Vetchling	7		2	2			2				1	2	2			2	P-FORB
Leersia oryzoides	Rice Cut Grass	3							2				2		3			P-GRASS
Leersia virginica	White Grass	4							3									P-GRASS
Lepidium virginicum	Common Peppergrass	0		2	2													A-FORB
Lespedeza capitata	Roundhead Bush Clover	4	2							2			3	2	1		1	P-FORB
Liatris aspera	Rough Blazing Star	7			2					2			2					P-FORB
Liatris pycnostachya	Prairie Blazine Star	6												2				P-FORB
Liatris spicata	Marsh Blazing Star	7						2	1		1	2	3	2			2	P-FORB
*Ligustrum vulgare**	Common Privet												1					SHRUB
Lilium michiganense	Michigan Lily	6			2						1		2					P-FORB
Linum sulcatum	Grooved Yellow Flax	8								2			2					P-FORB
Lithospermum canescens	Hoary Puccoon	6			2		1	2					2			2	2	P-FORB
Lithospermum incisum	Fringed Puccoon	8				1												P-FORB
Lobelia cardinalis	Cardinal Flower	6											2			2		P-FORB
Lobelia siphilitica	Great Blue Lobelia	4											2		1			P-FORB
Lobelia spicata	Pale Spiked Lobelia	4		1				2					2	2		2	3	P-FORB
*Lonicera maackii**	Amur Honeysuckle		2	2	3	1	2	2			3		3	2	2	2	2	SHRUB

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*Lonicera X notha**	Fly Honeysuckle		2								2		2				3	SHRUB
*Lotus corniculatus**	Birdsfoot Trefoil													2				P-FORB
Ludwigia alternifolia	Seedbox	5								1			2					P-FORB
Ludwigia polycarpa	False Loosestrife	5											2	2				P-FORB
Lycopus americanus	Common Water Horehound	3						2	2		2		2			3	2	P-FORB
Lycopus virginicus	Bugle Weed	5														1		P-FORB
Lysimachia thyrsiflora	Tufted Loosestrife	7														1	1	P-FORB
Lythrum alatum	Winged Loosestrife	5			2			2	2			1	2	2	2	2	2	P-FORB
Malus ioensis	Iowa Crab	3			2													TREE
*Malus sieboldii**	Japanese Crab Apple										2		1				3	TREE
*Medicago lupulina**	Black Medic				3			2		2								A-FORB
*Melilotus alba**	White Sweet Clover		2	2	3	3	2	2		2	2		2	2	1			B-FORB
*Melilotus officinalis**	Yellow Sweet Clover				1	2								1				B-FORB
Mentha arvensis var. villosa	Wild Mint	4							2		1			2		2	1	P-FORB
Mimulus ringens	Monkey Flower	5									1				2	2		P-FORB
Monarda fistulosa	Wild Bergamot	4	2	3	3	2		2			2		3	2	2		2	P-FORB
*Morus alba**	White Mulberry		2	2				2			2		1				2	TREE
Muhlenbergia mexicana	Leafy Satin Grass	4					2											P-GRASS
*Nepeta cataria**	Catnip				2													P-FORB
Oenothera biennis	Common Evening Primrose	1		2									1		2		2	B-FORB
Oenothera pilosella	Prairie Sundrops	6									1						3	P-FORB
Oligoneuron riddellii	Riddell's Goldenrod	7					2							2			3	P-FORB
Oligoneuron rigidum	Rigid Goldenrod	4	2	3	3	3	2	3		2	2		2	2			2	P-FORB
Onoclea sensibilis	Sensitive Fern	5								2	3		3			2	2	FERN
Onosmodium molle var. hispidissimum	Rough Marbleseed	5						2						2				P-FORB
Orbexilum onobrychis	French Grass	6												1				P-FORB
Osmunda regalis var. spectabilis	Regal Fern	8											2					FERN
Oxalis stricta	Common Wood Sorrel	0								2							1	P-FORB

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Oxypolis rigidior	Cowbane	7									1		2			2	1	P-FORB
Panicum virgatum	Prairie Switch Grass	4	2		2		3	2					3	2			2	P-GRASS
Parthenium integrifolium	Wild Quinine	8	2	2	2	1		2		3	2		3					P-FORB
Parthenocissus inserta	Thicket Creeper	1															3	W-VINE
*Pastinaca sativa**	Wild Parsnip		2	3	4						3			2	1		1	B-FORB
Pedicularis canadensis	Wood Betony	7											3			2	2	P-FORB
Pedicularis lanceolata	Fen Betony	9											2					P-FORB
Penstemon digitalis	Foxglove Beard Tongue	4						2					1	3	2			P-FORB
Penthorum sedoides	Ditch Stonecrop	2												2	2			P-FORB
Perideridia americana	Thicket Parsley	6				1												P-FORB
Persicaria amphibia	Water Knotweed	3											2	2	2	2	2	P-FORB
*Persicaria hydropiper**	Water Pepper															1	2	A-FORB
Persicaria hydropiperoides	Mild Water Pepper	4											2		2			P-FORB
Persicaria pensylvanica	Pinkweed	1													2			A-FORB
*Phalaris arundinacea**	Reed Canary Grass		1	2	2		3	2	3	1	3	2	2	2	4	2	2	P-GRASS
Phlox glaberrima ssp. interior	Smooth Phlox	6	3		2		3			1	1	2	3	3	3	3	3	P-FORB
Phlox pilosa ssp. fulgida	Prairie Phlox	7	3	2	2		2	2									2	P-FORB
Phlox pilosa ssp. pilosa	Sand Prairie Phlox	7											3					P-FORB
Phragmites australis	Common Reed	1		2					1		4	2	2	2	2	2	2	P-GRASS
Phyla lanceolata	Fog Fruit	1												2	3			P-FORB
Physalis heterophylla	Clammy Ground Cherry	2	1	2				2									1	P-FORB
Physostegia virginiana	Obedient Plant	6	2	2	2			3			1		3	2			3	P-FORB
Platanthera lacera	Green Fringed Orchid	9											1					P-FORB
Platanus occidentalis	Sycamore	3										1					1	TREE
*Poa compressa**	Canadian Blue Grass		2	2		2	2				2	1	2				3	P-GRASS
*Poa pratensis**	Kentucky Blue Grass		3	3		2	3	2		3	2	3		3	3	2	3	P-GRASS
Populus deltoides	Eastern Cottonwood	2	1				2	2	3		2	2	2	2	2		2	TREE
Populus tremuloides	Quaking Aspen	3									1		2					TREE
Potentilla arguta	Prairie Cinquefoil	10			1										1			P-FORB
Potentilla simplex	Common Cinquefoil	3	2	2	1			2				3	2	2			2	P-FORB
Prenanthes aspera	Rough White Lettuce	8								1			2					P-FORB

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Prenanthes racemosa	Glaucous White Lettuce	8									1		2	2		1	3	P-FORB
Proserpinaca palustris	Mermaid Weed	5							2							2		P-FORB
Prunella vulgaris var. elongata	Self-Heal	1											2	2			3	P-FORB
Prunus americana	American Plum	3		2	2	2	1							2				TREE
Prunus serotina	Wild Black Cherry	1	2			1				2								TREE
Pseudognaphalium obtusifolium	Old-Field Balsam	2								1			2					B-FORB
Psoralidium tenuiflorum	Scurfy-Pea	8		2		3												P-FORB
Pycnanthemum tenuifolium	Slender Mountain Mint	4										3	2	1			3	P-FORB
Pycnanthemum virginianum	Common Mountain Mint	5		2			3	2			2		3	2	2	3	2	P-FORB
*Pyrus calleryana**	Ornamental Pear				2													TREE
Quercus velutina	Black Oak	5								2			2					TREE
Ratibida pinnata	Yellow Coneflower	4	2		3	2	2	3				2	2	3		2	2	P-FORB
*Rhamnus cathartica**	Common Buckthorn		2	2				2			2	2	2			2	2	SHRUB
Rhus glabra	Smooth Sumac	1				3					2							SHRUB
Ribes missouriense	Missouri Gooseberry	2		2			1	1									1	SHRUB
Rosa carolina	Pasture Rose	4	3	3	3	3	2	3		2	2	2	2				3	SHRUB
*Rosa multiflora**	Japanese Rose		1		2		2	2	1						1		1	SHRUB
Rosa setigera	Illinois Rose	5					2	2							2	1	2	SHRUB
Rubus allegheniensis	Common Blackberry	2		2	3		2	3		2	2	2	3				2	SHRUB
Rubus flagellaris	Common Dewberry	2								3	2	2	3					SHRUB
Rubus hispidus	Swampy Dewberry	8											2					SHRUB
Rubus occidentalis	Black Raspberry	2		2	3		2		2		2		2		1		2	SHRUB
Rudbeckia hirta	Black-Eyed Susan	2	2	2						2	2		3	2	2	2	3	P-FORB
Rudbeckia subtomentosa	Sweet Black-Eyed Susan	5		2									2	2				P-FORB
Rudbeckia sullivantii	Sullivant's Orange Coneflower	6			2			3						3				P-FORB
Ruellia humilis	Hairy Ruellia	3		2		3											2	P-FORB
*Rumex acetosella**	Field Sorrel									3			2					P-FORB
*Rumex crispus**	Curly Dock													2				P-FORB

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Sagittaria latifolia	Common Arrowhead	4												1	3			P-FORB
Salix amygdaloides	Peach-Leaved Willow	4							3		1				1		2	TREE
Salix discolor	Pussy Willow	4									2		2	2		1	2	SHRUB
Salix eriocephala	Heart-Leaved Willow	8											1					SHRUB
Salix humilis	Prairie Willow	5								2	1		2				1	SHRUB
Salix interior	Sandbar Willow	1							2		2		2	2	2	1	2	SHRUB
Salix nigra	Black Willow	3													1	1	2	TREE
Salix petiolaris	Meadow Willow	6								1	1		2					SHRUB
Sambucus canadensis	Common Elder	2									3		2	2				SHRUB
Sanicula canadensis	Canadian Black Snakeroot	4		2									1					B-FORB
Sanicula odorata	Clustered Black Snakeroot	2						2										P-FORB
*Saponaria officinalis**	Bouncing Bet										2							P-FORB
Schizachyrium scoparium	Little Bluestem	5	3	2	2	3		2		2	3		3	2			2	P-GRASS
Schoenoplectus acutus	Hard-Stemmed Bulrush	6												2	2			P-SEDGE
Schoenoplectus pungens	Chairmaker's Rush	3												2				P-SEDGE
Schoenoplectus tabernaemontani	Soft-Stem Bulrush	4		2											3			P-SEDGE
Scirpus atrovirens	Dark Green Rush	4		2			2				2			2	3			P-SEDGE
Scirpus cyperinus	Wool Grass	5											2		1		1	P-SEDGE
Scirpus pendulus	Red Bulrush	3	2				3	3						3	1		3	P-SEDGE
Scrophularia lanceolata	Early Figwort	5								3	1		2					P-FORB
Scutellaria lateriflora	Mad-Dog Skullcap	4							1									P-FORB
Scutellaria parvula	Small Skullcap	6															1	P-FORB
*Securigera varia**	Crown Vetch			2														P-FORB
Senecio glabellus	Butterweed	0									1				2		1	A-FORB
Senecio pauperculus	Balsam Ragwort	3						2			2						2	P-FORB
*Silene pratensis**	White Campion												1					A-FORB
Silene stellata	Starry Campion	6		2														P-FORB
Silphium integrifolium	Rosin Weed	5	2	3	3	1	1	2			1	3	2	3	2		2	P-FORB
Silphium laciniatum	Compass Plant	5	3	2	3	3	1	2			1		1	1	2	1	2	P-FORB
Silphium perfoliatum	Cup Plant	4					3							2	3			P-FORB

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Silphium terebinthinaceum	Prairie Dock	4	1		2	2	2	3			2	2	2	2	2	2	3	P-FORB
Sinapis arvensis	Charlock	0									1							A-FORB
Sisyrinchium albidum	Common Blue-Eyed Grass	4	2	1	2	2											3	P-FORB
Sium suave	Water Parsnip	5												1			1	P-FORB
Smilacina stellata	Starry False Solomon Seal	5		2	2					2	2						2	P-FORB
Smilax lasioneuron	Common Carrion Flower	4					1											H-VINE
Solanum carolinense	Horse Nettle	0					2				1		1					P-FORB
*Solanum dulcamara**	Bittersweet Nightshade										2				2			W-VINE
Solidago canadensis	Canada Goldenrod	1	2	4	4		2	4		3	3	4	3	4	3	2	3	P-FORB
Solidago gigantea	Late Goldenrod	3						2	2		2		3	3	4	3	2	P-FORB
Solidago juncea	Early Goldenrod	4			3					2	1		2				1	P-FORB
Solidago missouriensis	Missouri Goldenrod	4			3													P-FORB
Solidago nemoralis	Old Field Goldenrod	3			3								2				1	P-FORB
Solidago speciosa	Showy Goldenrod	7								3			3					P-FORB
*Sonchus arvensis**	Field Sow Thistle			2													1	P-FORB
Sorghastrum nutans	Indian Grass	4	2	2	2		2	3		2			4	2	2		2	P-GRASS
Spartina pectinata	Prairie Cord Grass	4	1	2	4		3	3	3		2	2	3	4	3	2	2	P-GRASS
Sphenopholis intermedia	Slender Wedge Grass	5						2								1	1	P-GRASS
Spiraea alba	Meadowsweet	6											2					SHRUB
Spiranthes magnicamporum	Great Plaines Ladies' Tresses	6											2			2	2	P-FORB
Sporobolus compositus	Rough Dropseed	3				3		2										P-GRASS
Sporobolus heterolepis	Northern Dropseed	9	3		2	2		1				2	2	1			1	P-GRASS
Stachys pilosa var. homotricha	Woundwort	5					3	2	2		2		3	3		2	2	P-FORB
*Taraxacum officinale**	Common Dandelion																1	P-FORB
Tephrosia virginiana	Goat's Rue	7								2			2					P-FORB
Teucrium canadense var. canadense	American Germander	3					3	2	2	2	2		2	2		1	1	P-FORB
Thalictrum dasycarpum	Purple Meadow Rue	5									1				1	1	1	P-FORB

Scientific Name	Common Name	CC[1]	Relative Abundance[2]														Growth Form[3]
			HN	HW	HE	GP	MI	FP	FS	SS	RN	RS	HS	SP	RV	SM	SC	
Thelypteris palustris var. pubescens	Marsh Shield Fern	7									2		2			2	2	FERN
Tomanthera auriculata	Eared False Foxglove	8						3						2				A-FORB
Toxicodendron radicans	Poison Ivy	1	1		3			2	3		3	2	2	3	2	2	2	W-VINE
Tradescantia ohiensis	Common Spiderwort	3	3	3	4		3	3		2	3	2	3	3	3	2	3	P-FORB
*Tragopogon dubius**	Sand Goat's Beard				1													B-FORB
*Tragopogon pratensis**	Common Goat's Beard				2													B-FORB
Tridens flavus	Common Purpletop	1								1	2		2					P-GRASS
*Trifolium hybridum**	Alsike Clover													2	2			P-FORB
*Trifolium pratense**	Red Clover												1	2				P-FORB
*Typha angustifolia**	Narrow-Leaved Cattail										3		2		2	1		P-FORB
Typha latifolia	Broad-Leaved Cattail	1											1			2	1	P-FORB
*Typha x glauca**	Hybrid Cattail										3			1	2			P-FORB
Ulmus americana	American Elm	5	2								3	2	2	2			2	TREE
Urtica gracilis	Stinging Nettle	2							2									P-FORB
*Verbascum thapsus**	Woolly Mullein									2			1					B-FORB
Verbena hastata	Blue Vervain	3			2						2			2				P-FORB
Verbena stricta	Hoary Vervain	2			2													P-FORB
Verbena urticifolia	White Vervain	3			2													P-FORB
Vernonia fasciculata	Common Ironweed	5			2		2	2	1		2	2	2	2		2	1	P-FORB
Vernonia gigantea	Tall Ironweed	4										2						P-FORB
Vernonia missurica	Missouri Ironweed	5											2					P-FORB
Veronicastrum virginicum	Culver's Root	6		2	2		2	2		1	1	1	2	1		2	3	P-FORB
Viburnum recognitum	Smooth Arrowwood	6								3			2					SHRUB
Vicia americana	American Vetch	6						2										P-FORB
Viola sororia	Woolly Blue Violet	3		2														P-FORB
*Viburnum opulus**	European High-bush Cranberry																1	SHRUB
Vitis riparia	Riverbank Grape	2	2	3	3	2	3	3			3	3	3	3	2		2	W-VINE
Vitis vulpina	Frost Grape	4					1				1							W-VINE
Xanthium strumarium	Cocklebur	0													2			A-FORB
Zizia aurea	Golden Alexanders	6	2	2	1		3	2			2	2	2	2	2	2	2	P-FORB

[1]Coefficient of Conservatism – a reflection of an Illinois native species' tendency to be restricted to high-quality natural communities; this is expressed as a ranking from 0 to 10, with 10 being the most conservative (restricted to natural habitats).

[2]Relative Abundance Values: 1 = uncommon; 2 = occasional; 3 = common; 4 = abundant

[3]Growth Form: A-FORB = annual forb; A-GRASS = annual grass; B-FORB = biennial forb; P-FORB = perennial forb; P-GRASS = perennial grass; P-SEDGE = perennial sedge; SHRUB = woody shrub; TREE = tree (regardless of current growth stage, such as woody sprouts or seedlings); W-VINE = woody vine.

Appendix 1, Table 4. Floristic Quality Summary Table for Natural Community Remnants and Reconstructed Natural Communities in the Elwood-Braidwood HSR project area (Seq. # 18446). **HN** = Site 1 (Map 1); **HW** = Site 2 (Map 2); **HE** = Site 3 (Map 2); **GP** = Site 4 (Map 2); **MI** = Site 5 (Map 3); **FP** = Sites 7 and 8 (Map 4); **FS** = Site 6 (Map 4); **SS** = Site 8 (Map 5); **RN** = Sites 18-23 (Maps 5 and 6); **RS** = Site 26 (Map 7); **HS** = Sites 9-17 (Maps 5 and 6); **SP** = South Patrol Road Restoration (Map 3); **RV** = Route 66 Restoration (Maps 3 and 4); **SM** = (Site 25, Map 7); and **SC** = (Site 24, Map 7).

	REMNANT/RECONSTRUCTION SITE														
FLORISTIC QUALITY DATA	**HN**	**HW**	**HE**	**GP**	**MI**	**FP**	**FS**	**SS**	**RN**	**RS**	**HS**	**SP**	**RV**	**SM**	**SC**
Number Species/Site	72	100	112	42	85	102	50	66	154	50	187	143	113	86	177
Number Native Species/Site	59	85	94	35	74	90	48	54	132	44	166	126	95	79	155
Percent (%) Native	81.9	85	83.9	83.3	87.1	88.2	96	84.4	85.7	88	88.8	88.1	84.1	91.9	87.6
Mean C (all species)	3.2	3.4	3.7	4.0	3.0	3.5	3.1	3.6	3.1	3.1	3.7	3.5	2.6	4.0	3.4
Mean C (native only)	3.8	4.0	4.4	4.7	3.5	4.0	3.2	4.3	3.6	3.6	4.2	3.9	3.1	4.3	3.9
FQI (all species)	26.8	34.4	39.2	25.6	27.9	35.2	21.9	29	38.7	22.2	51.1	41.6	27.4	36.7	45.3
FQI (native only)	29.6	37.3	42.8	28.1	29.9	37.5	22.4	31.6	41.8	23.7	54.3	44.3	29.9	38.3	48.4

Appendix 2: Threatened and Endangered Species Element Occurrence Summary Forms

TAXON: *Tomanthera auriculata* (Michx.) Raf.

STATUS: State Threatened

PROJECT AREA: High Speed Rail (Elwood-Braidwood) (Seq. # 18446) **COUNTY**: Will

DATE: 4 September 2014

LOCATION IN THE PROJECT AREA: At west margin of project limits (see Map 3).

Coordinates: -88.13853, 41.34256

POPULATION DATA:

Size: Approximately 250 flowering plants.

Reproductive State: Most past flower; some plants browsed by deer or caterpillars.

Voucher: No

Photograph: No

DESCRIPTION OF THE COMMUNITY:

Natural Community Classification: Prairie Restoration/Reconstruction

Community Dominants: *Carex pellita, Andropogon gerardii, Spartina pectinata*

Species' Associates: *Dalea purpurea, Phlox glaberrima, Asclepias sullivantii, Rudbeckia fulgida, Silphium* spp.

Comments: This site consisted of degraded prairie enhanced by adjacent prairie reconstruction. The population is natural (not seeded in by restoration activities).

TAXON: *Tomanthera auriculata* (Michx.) Raf.

STATUS: State Threatened

PROJECT AREA: High Speed Rail (Elwood-Braidwood) (Seq. # 18446) **COUNTY**: Will

DATE: 4 September 2014

LOCATION IN THE PROJECT AREA: Immediately west of the Union Pacific RR, within project limits, but most of population lies 250-400 feet west of project limits (see Map 4).

Coordinates: -88.14016, 41.33827; -88.13894; 41.33869

POPULATION DATA:

Size: Approximately 1000 plants.

Reproductive State: Most just past flowering; no more than 5% still in flower.

Voucher: No

Photograph: Yes (Figure 13)

DESCRIPTION OF THE COMMUNITY:

Natural Community Classification: Mesic and Wet-mesic Prairie (Grade C+)

Community Dominants: *Andropogon gerardii, Sorghastrum nutans*

Species' Associates: *Helianthus grosseserratus, Rudbeckia fulgida, Physostegia virginiana, Phlox pilosa, Silphium terebinthinaceum*

Comments: This site was recently burned (2013-2014) and has been subject to periodic control of invasive shrubs.

TAXON: *Tomanthera auriculata* (Michx.) Raf.

STATUS: State Threatened

PROJECT AREA: High Speed Rail (Elwood-Braidwood) (Seq. # 18446) **COUNTY**: Will

DATE: 4 September 2014

LOCATION IN THE PROJECT AREA: Immediately northwest of the Union Pacific RR, within project limits.

Coordinates: -88.17153, 41.29670

POPULATION DATA:

Size: No plants observed in 2014.

Reproductive State: None

Voucher: No

Photograph: No

DESCRIPTION OF THE COMMUNITY:

Natural Community Classification: Mesic and Wet-mesic Sand Prairie (Grade C+)

Community Dominants: *Andropogon gerardii, Sorghastrum nutans*

Species' Associates: *Eryngium yuccifolium, Parthenium integrifolium, Pedicularis canadensis, Solidago speciosa, Solidago nemoralis*

Comments: This site has not received any recent management (2010-present) which often stimulates germination from the seed bank in this species.

TAXON: *Filipendula rubra* (Hill) Robins.

STATUS: State Threatened

PROJECT AREA: High Speed Rail (Elwood-Braidwood) (Seq. # 18446) **COUNTY**: Will

DATE: 3 July 2014

LOCATION IN THE PROJECT AREA: 1500 feet west of project limits (see Map 3).

Coordinates: -88.14233, 41.34761

POPULATION DATA:

Size: Approximately 250 flowering plants.

Reproductive State: One reproductive stem in flower on 3 July 2014.

Voucher: No

Photograph: Yes (Figure 9)

DESCRIPTION OF THE COMMUNITY:

Natural Community Classification: Prairie Reconstruction

Community Dominants: *Carex pellita, Andropogon gerardii, Spartina pectinata*

Species' Associates: *Phlox glaberrima, Eryngium yuccifolium, Desmodium canandense, Rudbeckia fulgida, Silphium* spp.

Comments: This site consists of prairie and wetland communities restored on cropland. The population of *F. rubra* is the result of planting; more colonies occur > 1600 feet west of project limits.

TAXON: *Boltonia decurrens* (Torr. & Gray) Wood

STATUS: State Threatened

PROJECT AREA: High Speed Rail (Elwood-Braidwood) (Seq. # 18446) **COUNTY**: Will

DATE: 26 June 2014

LOCATION IN THE PROJECT AREA: At east margin of project limits (see Map 3).

Coordinates: -88.13794, 41.34192

POPULATION DATA:

Size: Approximately 30 plants.

Reproductive State: Plants in vegetative growth in June.

Voucher: No

Photograph: No

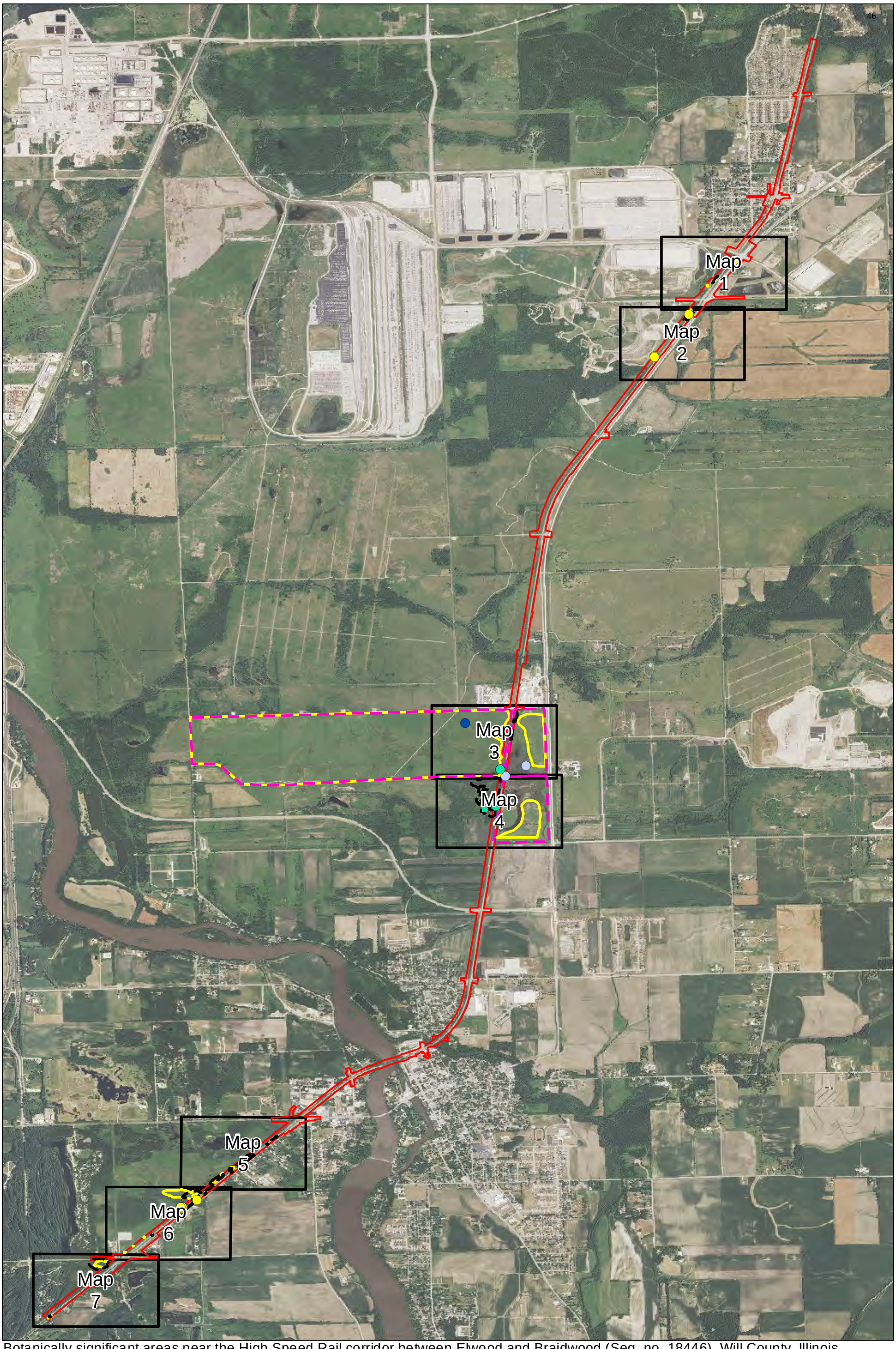
DESCRIPTION OF THE COMMUNITY:

Natural Community Classification: Wetland Reconstruction

Community Dominants: *Phalaris arundinacea, Alisma subcordatum*

Species' Associates: *Calamagrostis canadensis, Schoenoplectus tabernaemontani, Sagittaria latifolia, Asclepias incarnata*

Comments: This population is the result of an unintentional introduction in 2002 or 2003. More plants occur farther east (>700 feet), outside project limits.



Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Restoration Site
Eryngium yuccifolium Population
Tomanthera auriculata Population
Botanical Site

0 0.5 1 Miles

N

Jarvis, 10/13/2014

Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Map 1 of 7

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014

Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

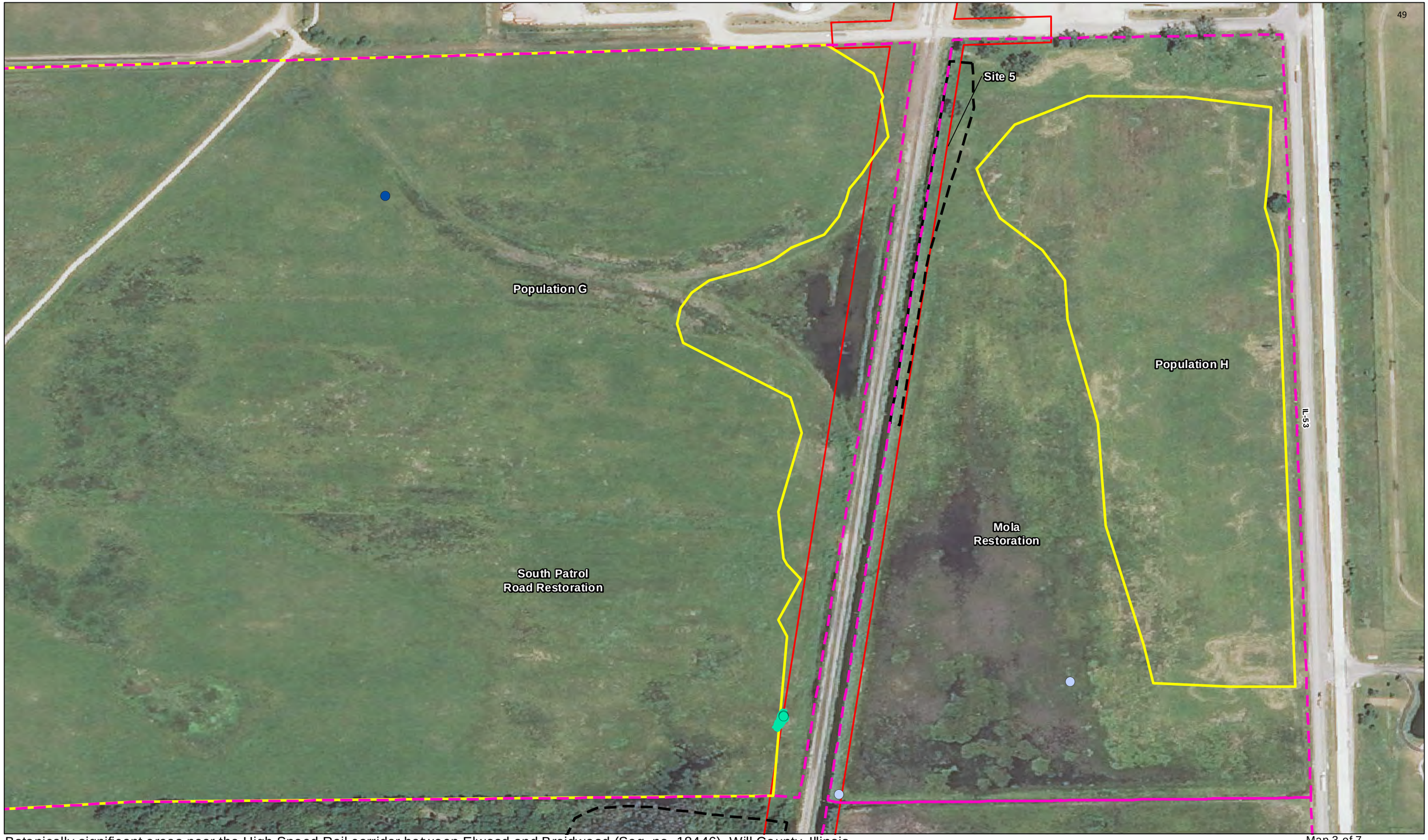
Map 2 of 7

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014



Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

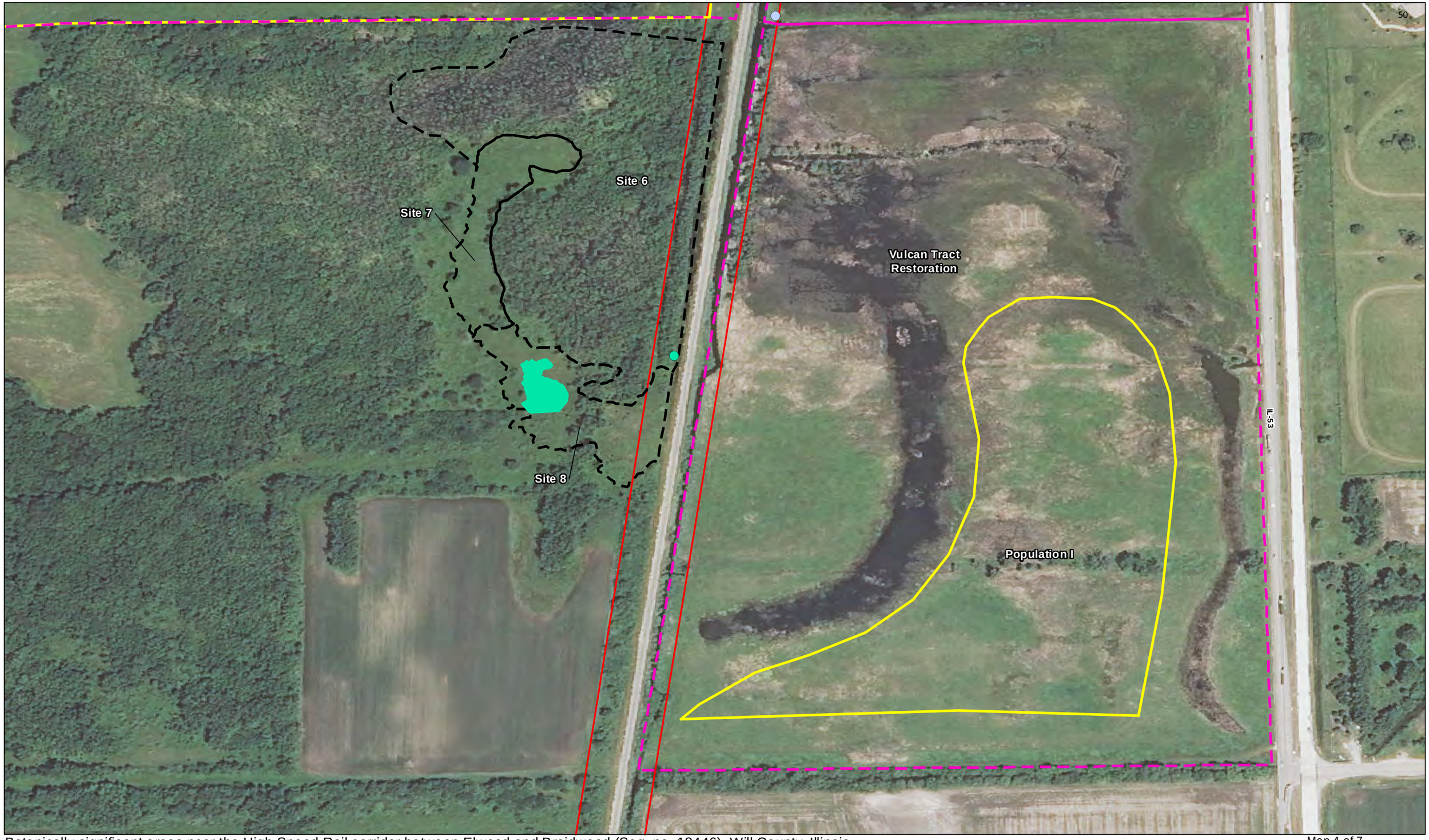
Map 3 of 7

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014



Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014

Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014

Population N
Site 14
Population P
Site 20
Population Q
Site 15
Site 21
Population O
Site 22
Population R
IL-53
Site 23
Population S
Population T
W COAL CITY RD

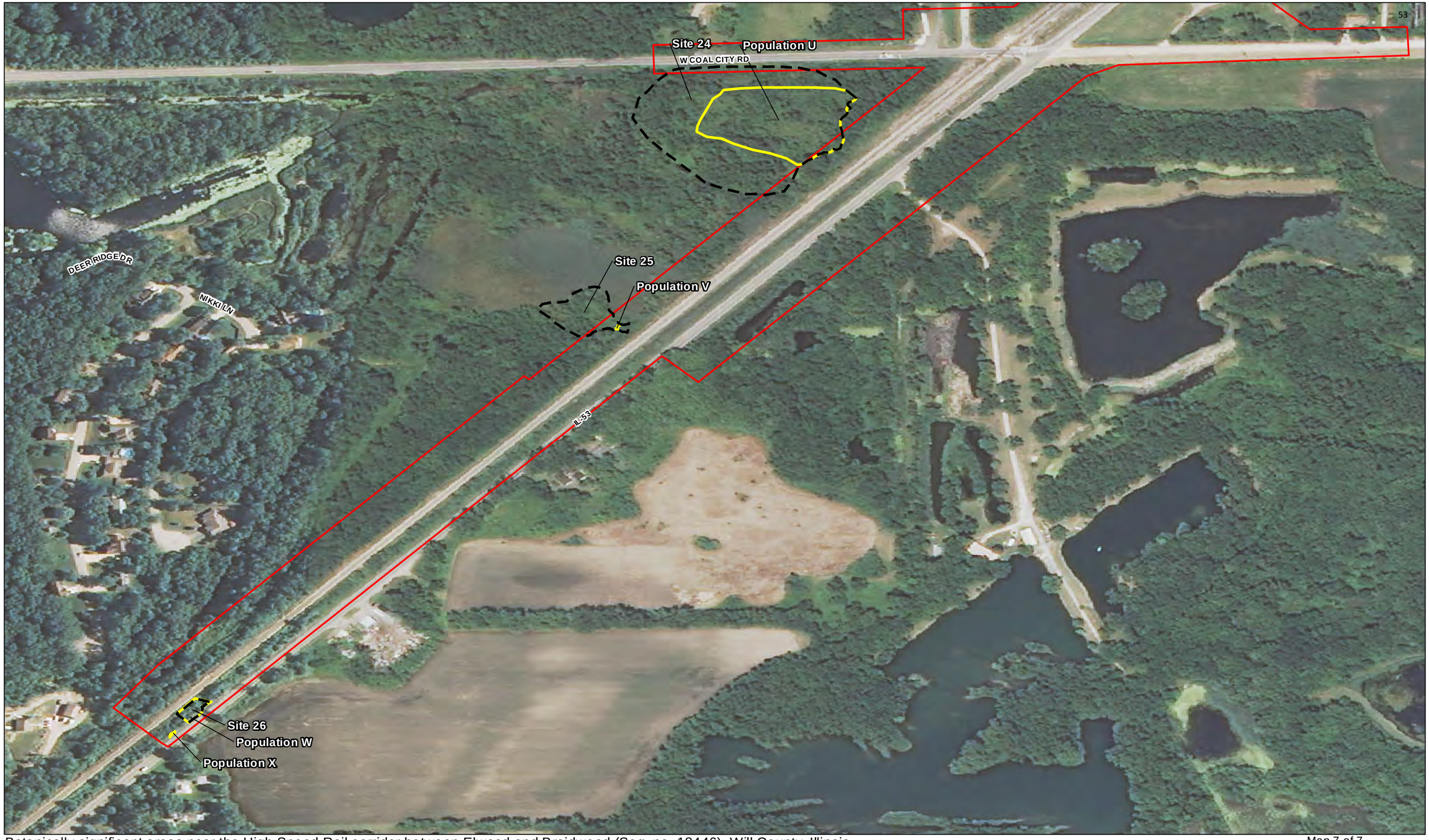
Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014



Botanically significant areas near the High Speed Rail corridor between Elwood and Braidwood (Seq. no. 18446), Will County, Illinois.

Map 7 of 7

Project Boundary
Boltonia decurrens Location
Filipendula rubra Location
Eryngium yuccifolium Location
Tomanthera auriculata Location
Eryngium yuccifolium Population
Tomanthera auriculata Population
Restoration Site
Botanical Site

0 200 400 800 Feet

N

Jarvis, 10/13/2014

Nature Preserve and INAI Sites near the High Speed Rail corridor between Elwood and Braidwood (Seq. no 18446), Will County, Illinois.

Project Boundary
INAI Sites
Nature Preserves

0 2,000 4,000 8,000 Feet

N

Jarvis, 9/25/14

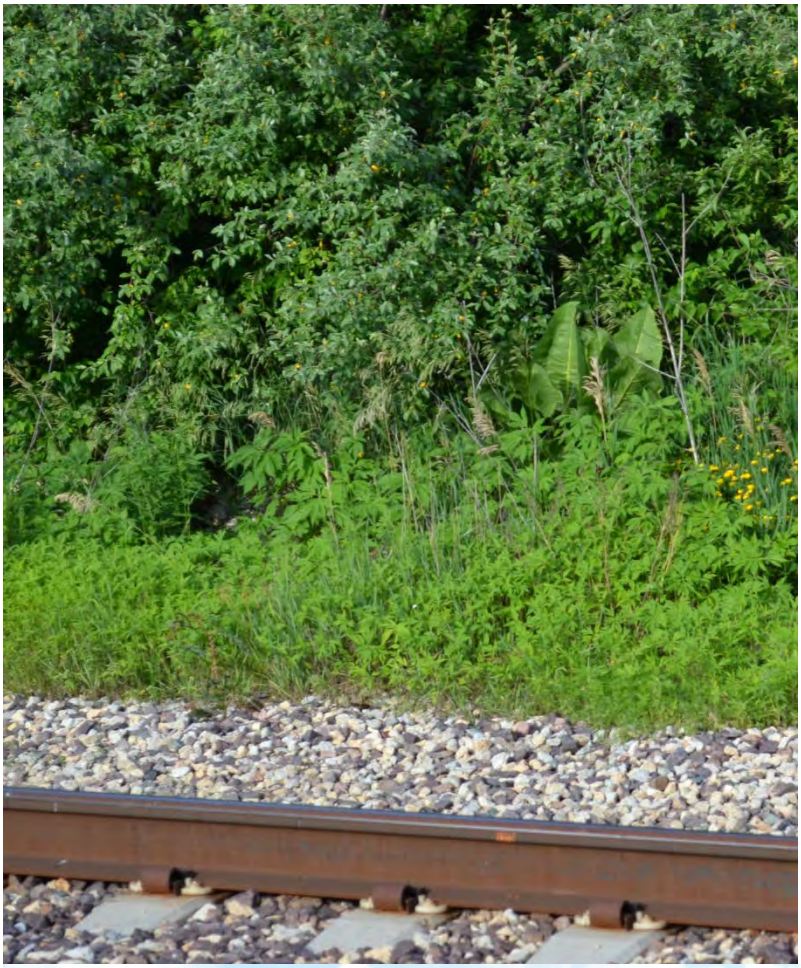


Figure 1 (left): Typical vegetation along the project corridor, consisting mostly of ruderal woody and herbaceous plants. Also present are scattered native prairie species, persisting as scattered individuals or small populations. The large-leaved plant at center-right of photograph is Prairie Dock (*Silphium terebinthinaceum*) , a deep-rooted prairie forb that frequently persists after certain types of habitat alteration. 17 June 2014.

Figure 2 (below): Ruderal woody growth along the project corridor, this site approximately 1.5 miles south of the Hoff Road crossing. Dominant species include native Smooth Sumac (*Rhus glabra*) and Black Cherry (*Prunus serotina*) with non-native Autumn-olive (*Elaeagnus umbellata*) and Amur Honeysuckle (*Lonicera maackii*). 24 June 2014.

Figure 3 (above): Site 1, a strip of Grade B mesic prairie in the UP RR right-of-way. Among the plants present are *Eryngium yuccifolium* (rattlesnake-master), *Sporobolus heterolepis* (prairie dropseed), *Solidago canadensis* (tall goldenrod), *Panicum leibergii* (prairie panic-grass), and *Silphium laciniatum* (compass-plant). 19 June 2014 (photo by Greg Spyreas).

Figure 4 (left): Site 3, a degraded prairie remnant now dominated by non-native and ruderal species. However, a considerable diversity of native plants persists at this site: pale purple coneflowers (*Echinacea pallida*) growing along the railroad. 19 June 2014.

Figure 5 (above): Site 4, one of the higher-quality prairie remnants in the UPRR right-of-way. Although the dominant grass is *Bromus inermis**, the site supports a considerable diversity of native forbs and grasses (*Asclepias viridiflora, Echinacea pallida, Psoralidium tenuiflorum, Silphium laciniatum, Hesperostipa spartea)*. 19 June 2014.

Figure 6 (left): Grant Creek, looking west from the UPRR right-of-way. 19 June 2014.

Figure 7 (above): View of Joliet Army Ammunition Plant INAI site on Midewin National Tallgrass Prairie. The habitat is not a natural community, but is non-native grassland, managed for area-sensitive grassland birds. 24 June 2014.

Figure 8 (below): Union Pacific Railroad crossing Prairie Creek, viewed from the west. This bridge is part of the project corridor. 24 June 2014.

Figure 9 (left): Queen-of-the-Prairie (*Filipendula rubra*, State Endangered) growing in the South Patrol Road Restoration (Site SP) on Midewin National Tallgrass Prairie. Populations of *F. rubra* at this site are the result of planting. Among the associates in this restored prairie habitat are Rattlesnake-master (*Eryngium yuccifolium*), Sawtooth Sunflower (*Helianthus grosseseserratus*), and Water hemlock (*Cicuta maculata*).

3 July 2014.

Figure 10 (below): Project corridor between two large restoration projects on Midewin National Tallgrass Prairie, facing south. To the left (east) is the Route 66 Restoration, to the right (west) is the South Patrol Road Restoration. 3 July 2014.

Figure 11 (above): Site 6, a degraded wet prairie/sedge meadow community altered by drainage attempts and woody encroachment. Sufficient light penetrates the canopy to allow survival of graminoids (*Spartina pectinata, Carex pellita, Carex stricta*). 26 June 2014.

Figure 12 (below): Foxglove Prairie (Sites 7 and 8), a Grade C+ mesic prairie remnant on Midewin National Tallgrass Prairie and adjacent IDNR land. This site supports a large population of State Threatened *Tomanthera auriculata*. 5 September 2014.

Figure 13 (left): Earleaf False-foxglove (*Tomanthera auriculata*, State Threatened) in Foxglove Prairie (Site 8) on Midewin National Tallgrass Prairie. Taken in early summer, the plants will flower in late August-early September. 26 June 2014.

Figure 14 (below): Reed Canary Grass (*Phalaris arundinacea**), an invasive, none-native grass that occurs throughout the project area and often dominates both natural and man-made wetlands to the exclusion of other species. This site is immediately south of the New River Road crossing. 24 June 2014.

Figure 15 (above): View from Hitts Siding Prairie Natural Area (Site 14) to the southeast, looking across the UPRR; the white vehicle is northbound on IL Route 53. Foreground community is mesic prairie; note *Eryngium yuccifolium (*rattlesnake-master) on the left. 8 July 2014.

Figure 16 (left): Dry-mesic sand prairie (Site 9) adjacent to the UPRR, along the southeast margin of the Hitts Siding Prairie Natural Area. Forbs present include *Coreopsis palmata, Solidago speciosa, Parthenium integrifolium,* and *Phlox pilosa.* 8 July 2014.

Figure 17 (above): Grades A & B mesic prairie community in Hitts Siding Prairie Natural Area and Nature Preserve, northwest of the project corridor (Site 14). This community supports a large population of *Eryngium yuccifolium* (rattlesnake-master) and the rare insect *Papaipema eryngii*. 4 September 2014.

Figure 18 (below): Wet prairie remnant I (Site 21) in the right-of-way between the UPRR and IL Route 53, showing degree of woody encroachment. Site 21 is within an INAI natural area. 8 July 2014.

Figure 19 (above): Wet prairie remnant (Site 22) in the right-of-way between the UPRR and IL Route 53, illustrating invasion by ruderal shrubs and *Phragmites austr*alis. *Cicuta maculata* (water-hemlock) in flower. 8 July 2014.

Figure 20 (below): Project corridor at Coal City Road crossing, looking northeast. Present on both sides of the UPRR are dense stands of the invasive grasses *Phragmites australis* and *Phalaris arundinacea**; along with cattails (*Typha* spp.) and encroaching woody plants,, these species now dominant in much of the area mapped as remnant prairie communities by the original Illinois Natural Areas Inventory. 4 September 2014.

Figure 21 (above): Site 24, south of Coal City and immediately west of the project corridor. This site is a mosaic of Grade C+ prairie remnants and disturbed land dominated by dense thickets of ruderal shrubs. 8 July 2014.

Figure 22 (left): *Spiranthes magnicamporum* (Great Plains Ladies' tresses) a native orchid present at several sites in the project corridor. This individual was at Site 24. 4 September 2014.