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U.S. FISH AND WILDLIFE SERVICE
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Standing Analysis – Illinois-Iowa Determination Key

Conservation Measures

Version 1.1

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3.2 Conservation Measures (CM)

This standing analysis applies conservation measures as design features to avoid adverse effects on an individual, population, or species. The Service has previously found that the incorporation of certain conservation measures voluntarily adopted by action agencies, has reduced effects to the extent that the actions do not require formal consultation and the Service, and the action agency have found that actions are not likely to adversely affect species and critical habitat. Projects using this standing analysis to support a determination of NE or NLAA must meet all the requirements of the standing analysis. The inability to voluntarily adopt certain conservation measures may result in a project not qualifying to use this standing analysis. We have built the following conservation measures into questions in the DKey such that any action that gets a NLAA verification letter or NE consistency letter is not expected to adversely affect the species. Therefore, answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid. Additional conservation recommendations (CR) are also included that may be voluntarily implemented as part of the project to further avoid and minimize project impacts.

3.2.1 Qualifying Questions

3.2.1.1 Birds

Collision/Electrocution

- CM-Birds-1: Communications Towers – Design, lighting, and siting are the most effective avoidance and minimization measures to reduce bird collisions with communication towers.

  https://www.fws.gov/story/avoidance-and-minimization-measures-communication-towers

  https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation

- CR-Birds-2: Overhead Transmission and Utility Lines - Design and siting are the most effective avoidance and minimization measures to reduce bird collisions. The Service recommends siting new transmission lines outside of areas considered high risk to birds and designing or retrofitting infrastructure to be “avian-safe” in these areas. Poles can be made avian-safe through design to minimize avian electrocution risk by providing sufficient separation between phases and between phases and grounds or by covering exposed parts with insulators to physically separate electricity from birds. We also recommend burying lines to minimize collision risk. https://www.fws.gov/story/avoidance-and-minimization-measures-power-lines

3.2.1.2 Herbicide/Pesticide/Fertilizer Application (APP)

- CM-APP-1: Avoid aerial or other large-scale application of any chemicals including herbicides, pesticides (e.g. insecticide, fungicide, rodenticide, etc.), and/or fertilizers in areas where potential habitat for a listed species is present.
- CM-APP-2: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of listed species.
- CM-APP-3: Utilize targeted application methods (hack-and-squirt, basal bark, injections, cut-stump, or spot-spraying) and avoid application of pesticides in suitable habitat or

listed species or in a manner that may result in transport or drift of pesticides into areas that are suitable habitat for listed species.

3.2.1.3 Clean Water (CW)

- CM-CW-1: Implement measures to avoid pollution/contamination of rivers/streams and other habitats occupied by listed species and avoid creation of new water-borne contaminant sources (e.g. leachate pond, or pits containing chemicals).
- CM-CW-2: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of potential habitats and/or surface water runoff to potential habitat.
- CM-CW-3: Comply with any requirements of an NPDES permit if applicable.

3.2.1.4 Habitat

- CM-Habitat-1: Avoid locating projects in areas where potential habitat (see below) for listed species is present.
    - natural or semi-natural vegetation types (e.g. grassland, scrub-shrub, forest, etc.);
    - waterbodies (rivers, stream, lake, wetland);
    - mines, caves or associated sinkholes, fissures, or other karst features; or
    - buildings, bridges, or culverts that may provide potential habitat to listed species
- CM-Habitat-2: Avoid potential effects to potential habitat of listed species present in the action area.
    - This includes potential effects within the entire action area. Effects on surface water or groundwater, for example, often extend outside of a project's immediate footprint. The same is true for actions that may cause drift of airborne particles or chemicals into nearby areas or when noise or artificial light is projected to areas outside of the immediate project footprint where they may act as stressors for some species or critical habitats. Be careful when assessing actions that affect rights-of-way, which often contain natural or semi-natural vegetation despite periodic mowing or other management. Some endangered and threatened species inhabit rights-of-way and could be affected by regular maintenance activities or construction.
- CM-Habitat-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (wetland, marshes, fens, etc.) quantity or flow.
- CM-Habitat 4: Avoid in-river, in-stream, or riparian impacts (e.g., construction, road crossings/bridges, dams, wing dikes, pilings, shoreline stabilization, dredging, dredge disposal, etc.).
- CM-Habitat-5: Inspect equipment and materials for invasive species (plants or animals) and/or clean prior to arrival on site.
- CM-Habitat-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.

3.2.2 Mammals

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation/fragmentation
- Exposure Risk/Disturbance

3.2.2.1 Gray Bat (*Myotis grisescens*) - GBAT

Habitat loss/degradation/fragmentation

- CM-GBAT-1: Avoid or minimize impacts to known or potential maternity colony sites and hibernacula (caves or associated sinkholes, fissures, or other karst features).
- CM-GBAT-2: In areas of potential maternity colony sites, conduct a voluntary Phase 1 habitat assessment for potentially suitable hibernacula in accordance with the guidance in the USFWS' current Range-wide Indiana bat and Northern long-eared bat Survey Guidelines.
    - https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines
- CM-GBAT-3: Avoid mineral extraction (e.g. mine/quarry) or drilling/blasting into bedrock within buffers of known maternity colony sites and in areas with suitable habitat for maternity colonies (caves or associated sinkholes, fissures, or other karst features).

Exposure Risk/Disturbance

- CM-GBAT-4: Conduct bridge or culvert assessment(s) according to the range-wide Indiana bat and northern long-eared bat survey guidelines to evaluate bat use.
- CM-GBAT-5: Avoid or minimize impacts to bridges or culverts occupied by gray bats.
- CM-GBAT-6: Conduct prescribed fire under conditions that will reduce or eliminate smoke dispersing into known or potential gray bat maternity colony sites and hibernacula.
- CM-GBAT-7: Complete project activities during the hibernation period for gray bats (October 1-March 31 or November 15-March 31 if within a maternity colony buffer).
- CM-GBAT-8: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential foraging habitat (waterbodies) of the species.

3.2.2.2 Indiana Bat (*Myotis sodalis*) - IBAT

Habitat loss/degradation/fragmentation

- CM-IBAT-1: Avoid or minimize impacts to suitable Indiana bat summer habitat (see definition below) and avoid impacts to known or potential hibernacula (caves or associated sinkholes, fissures, or other karst features and mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats).
    - Suitable summer habitat for Indiana bats includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches dbh that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet of another forested/wooded habitat. Indiana bats have also been observed roosting in human-made structures, such as bridges and bat houses (artificial roost structures); therefore, these structures should also be considered potential summer habitat.
- CM-IBAT-2: In areas of potential hibernacula, conduct a voluntary Phase 1 habitat assessment for potentially suitable hibernacula in accordance with the guidance in the USFWS' current Range-wide Indiana bat and Northern long-eared bat Survey Guidelines.

    - https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines
- CM-IBAT-3: In areas of potential summer habitat, conduct a voluntary Phase 1 habitat assessment in accordance with the guidance the USFWS' current Range-wide Indiana bat and Northern long-eared bat Survey Guidelines.
    - https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines
- CM-IBAT-4: Avoid mineral extraction (e.g. mine/quarry) or drilling/blasting into bedrock in areas of known or potential hibernacula (caves or associated sinkholes, fissures, or other karst features and mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats.
- CM-IBAT-5: Avoid permanent alterations to potential bat roosting spaces (e.g., existing joints, cracks, or crevices) during bridge and culvert maintenance activities.
- CM-IBAT-6: Avoid and minimize the clearing or conversion of suitable Indiana bat summer habitat and limit it to less than 10 acres in total extent for each project.
- CM-IBAT-7: Avoid clearing any potential Indiana bat roost trees (i.e., live trees and/or snags ≥5 inches diameter at breast height that have exfoliating bark, cracks, crevices, and/or cavities) where practicable.

Exposure Risk/Disturbance

- CM-IBAT-8: Conduct bridge or culvert assessment(s) according to the range-wide Indiana bat and northern long-eared bat survey guidelines to evaluate bat use.
- CM-IBAT-9: Coordinate with local Ecological Services Field Office when the project involves removal, modification, or maintenance of a human-made structure (barn, house, or other building) known or suspected to contain roosting Indiana bats.
- CM-IBAT-10: Conduct voluntary presence/absence bat survey(s) following the Service's Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines to evaluate bat presence/absence within the action area.
- CM-IBAT-11: Conduct prescribed fire under conditions that will reduce or eliminate smoke dispersing into known or potential Indiana bat hibernacula.
- CM-IBAT-12: Complete project activities including tree clearing during the hibernation period for Indiana bats (October 1-March 31 or November 15-March 31 if near a hibernaculum) and avoid conducting any activities during the pup season (May 15-July 31).
- CM-IBAT-13: If appropriate, conduct emergence surveys on suitable roost trees proposed to be cleared during the summer active season (April 1-September 30 or April 1 -November 15 if near a hibernacula) and if no bats are observed emerging fell the tree(s) immediately or as soon as possible after sunrise on the following day according to survey guidelines.
- CM-IBAT-14: Apply herbicides according to label instructions and utilizing targeted application methods (hack-and-squirt, basal bark, injections, cut-stump, or spot-spraying) and avoid application of pesticides in forested areas or in a manner that may result in transport or drift of pesticides into forested areas that are suitable habitat for Indiana bats.
- CM-IBAT-15: Avoid or limit the amount of nighttime noise caused by project activities during the summer active season and specifically avoid the Indiana bat non-volant pup season (May 15-July 31).

- CM-IBAT-16: When installing new or replacing existing permanent lights, utilize downward-facing lights with the same intensity or less for replacement lighting and direct temporary lighting away from suitable habitat especially during the pup-season (May 15-July 31).
- CM-IBAT-17: Prescribed fire within or adjacent to suitable forested habitat should include an average flame length of <8 feet, be conducted when temperatures are above 40 degrees Fahrenheit, and avoid the Indiana bat non-volant pup season (May 15-July 31).

3.2.2.3 Indiana Bat (*Myotis sodalis*) Critical Habitat – IBAT-CH

Habitat loss/degradation

- CM-IBAT-CH-1: Avoid and minimize impacts to critical habitat of the Indiana bat (The area designated as critical habitat for the Indiana bat in Illinois is Blackball Mine in LaSalle County).
- CM-IBAT-CH-2: Avoid mineral extraction (e.g. mine/quarry) or drilling/blasting into bedrock within buffer of designated critical habitat sites.
- CM-IBAT-CH-3: Avoid and minimize impacts to potential hibernacula habitat for the Indiana bat (caves or associated sinkholes, fissures, or other karst features) within the buffer of designated critical habitat sites.
- CM-IBAT-CH-4: Avoid or minimize the clearing or conversion of suitable Indiana bat summer habitat and limit it to less than 10 acres in total extent.

3.2.3 Birds

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Collision/Electrocution
- Habitat loss/degradation/fragmentation
- Disturbance
- Predation Risk

3.2.3.1 Piping Plover (*Charadrius melodus*) -PIPL

Habitat loss/degradation/fragmentation

- CM-PIPL-1: Avoid or minimize impacts to suitable piping plover habitat (Great Lakes shorelines that support open, sparsely vegetated sandy habitats, such as sand spits or sand beaches, that are associated with wide, unforested systems of dunes and inter-dune wetlands. Habitat also consists of Missouri River shoreline and sandbars. Potential stopover habitats during migration includes the shorelines of the Great Lakes and large lakes such as Lake Shelbyville, Carlyle, and Rend Lakes in Illinois.).

Disturbance/Predation Risk

- CM-PIPL-2: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering rivers/streams/lakes and other waterbodies.
- CM-PIPL-3: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.

- CM-PIPL-4: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-PIPL-5: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-PIPL-6: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.
- CM-PIPL-7: Conduct project activities outside the piping plover breeding and nesting seasons and migration windows (April 1- August 31). (*primarily applicable in areas of known breeding and nesting, i.e. Lake Michigan Shoreline*)
- CM-PIPL-8: Avoid disturbance to species if present in the project action area.

3.2.3.2 Piping Plover (*Charadrius melodus*) Critical Habitat – PIPL-CH

Habitat loss/degradation/fragmentation

- CM-PIPL-CH-1: Avoid direct and indirect impacts to critical habitat of the piping plover (In Illinois, one unit has been designated on the Lake Michigan shoreline from Illinois Beach State Park to Waukegan Beach in Lake County.)

3.2.3.3 Rufa Red Knot (*Calidris canutus rufa*)

Habitat loss/degradation/fragmentation

- CM-REKN-1: Minimize impacts to suitable stopover habitat (Great Lakes region includes beaches, dunes, mudflats, peat banks, sandbars, or shoals along the coastline. Inland stopover habitats may include riverine habitats and manmade impoundments).

Disturbance

- CM-REKN-2: Conduct project activities outside of the rufa red knot migration window if possible (May 1-September 30).
- CM-REKN-3: Avoid disturbance to species if present in the project action area.

3.2.3.4 Whooping Crane (*Grus americana*)

Habitat loss/degradation/fragmentation

- CM-WHCR-1: Minimize impacts to potential or known stopover and overwintering habitat (During migration, whooping cranes use a variety of habitats; however, wetland mosaics appear to be the most suitable and they often use riverine habitats).

Disturbance

- CM-WHCR-2: Conduct project activities outside of the whooping crane migration and overwintering timeframe if possible (November 1 – March 31).
- CM-WHCR-3: Avoid disturbance to species if present in the project action area.

3.2.4 Reptiles

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation

- Exposure risk/harm

3.2.4.1 Alligator Snapping Turtle (*Macrochelys temminckii*) - AST

Habitat loss/degradation

- CM-AST-1: Avoid or minimize impacts to potential habitat (rivers/streams/oxbows and associated riparian areas, swamps, lakes, reservoirs, ponds, and adjacent upland areas).
- CR-AST-2: Utilities installed at water crossings should be directionally bored rather than trenched and installed with sufficient depth below stream bottoms so that they will not become exposed.

Exposure Risk/Disturbance

- CM-AST-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (stream, river, wetland, etc.) quantity or flow.
- CM-AST-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering rivers/streams and other waterbodies.
- CM-AST-5: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-AST-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-AST-7: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-AST-8: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.

3.2.4.2 Eastern Massasauga Rattlesnake (*Sistrurus catenatus*) - EMR

Habitat loss/degradation - In occupied areas

- CM-EMR-1: Avoid or minimize impacts to potential habitat; wet areas (wetlands, wet prairies, marshes, fens, sedge meadows, peatlands, scrub-shrub and floodplain forests, old fields, and roadside/drainage ditches) and adjacent upland areas (shrubland, open woodlands, prairie, grassland, riparian forest).
- CM-EMR-2: Avoid impacts to or modification of hibernation habitat (e.g. small mammal burrows, crayfish burrows, or tree root networks along the edge of wet areas or in adjacent upland areas) including impacts to hydrology (surface or groundwater conditions).

Exposure Risk/Disturbance - In occupied areas

- CM-EMR-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (stream, river, wetland, etc.) quantity or flow.
- CM-EMR-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of potential habitat of the species.

- CM-EMR-5: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-EMR-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-EMR-7: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-EMR-8: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.
- CM-EMR-9: Avoid construction of new roads through areas of suitable habitat and/or modification of existing roads (alignment/configuration/surface type) if the activity would increase the risk of road mortality and/or create a permanent barrier to movement. Vehicles and equipment should be offloaded at the closest point to the work zone as practicable, on a road or parking areas, and utilize existing roads to access the work zone.
- CM-EMR-10: Avoid activities that would create a permanent barrier impacting the movement and dispersal (e.g. widening an existing road or trail, new road, trail, fence, wall, canal, etc.).
- CM-EMR-11: If installing erosion control fencing or other erosion control materials, utilize wildlife-safe materials (100% biodegradable and loose weave that allows animals to wiggle free) and avoid the use of plastic mesh netting or other similar material that could ensnare EMRs. When no longer required, temporary erosion and sediment control materials should be promptly removed.
- CM-EMR-12: Temporary exclusion fencing should be properly installed and maintained around work and staging areas to limit any EMR from entering the work and staging areas. These areas should be visually examined following fence installation and prior to the beginning of work to deem the project area snake free.
- CM-EMR-13: Limit any herbaceous vegetation (brush, shrubs, trees) removal to hand cutting and access the site on foot or using low-impact equipment such as lightweight, all-terrain vehicles (ATVs) or utility task vehicles (UTVs).

3.2.5 Fishes

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure risk/harm

3.2.5.1 Pallid Sturgeon (Scaphirhynchus albus) - PS

Habitat loss/degradation

- CM-PS-1: Avoid or minimize impacts to potential habitat (large rivers, specifically the Missouri and Mississippi Rivers and lower reaches of larger tributaries to these rivers). Limit impacts to 0.5 acres and/or less than 500 feet of shoreline.

- CR-PS-2: Utilities installed at river/stream crossings should be directionally bored rather than trenched and installed with sufficient depth below stream bottoms so that they will not become exposed.

Exposure Risk/Disturbance

- CM-PS-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (stream/river) quantity or flow.
- CM-PS-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering rivers/streams.
- CM-PS-5: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-PS-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-PS-7: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-PS-8: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.
- CR-PS-9: In-river activities should not occur from March 1 to June 30 to avoid impacts during the primary time frame for fish spawning and larval drift.
- CR-PS-10: Water intakes should be screened with a ¼-inch or smaller mesh and have an intake velocity of less than ½ ft/sec and be placed at water depths greater than 15 feet.

3.2.5.2 Topeka Shiner (Notropis topeka) - TS

Habitat loss/degradation - In occupied areas

- CM-TS-1: Avoid or minimize impacts to potential habitat (Small prairie streams with low to moderate flow, off-channel habitats such as oxbows, backwaters, and floodplain pools, ponds, dugouts and associated stream banks with grassy or vegetated margins).
- CR-TS-2: Utilities installed at river/stream crossings should be directionally bored rather than trenched and installed with sufficient depth below stream bottoms so that they will not become exposed.

Exposure Risk/Disturbance - In occupied areas

- CM-TS-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (stream, river, oxbow, etc.) quantity or flow.
- CM-TS-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering rivers/streams and other waterbodies.
- CM-TS-5: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-TS-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.

- CM-TS-7: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-TS-8: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.

3.2.5.3 Topeka Shiner (*Notropis topeka*) Critical Habitat - TSCH

Habitat loss/degradation/fragmentation

- CM-TSCH-1: Avoid direct and indirect impacts to critical habitat of the topeka shiner (In Iowa, 25 stream segments have been designated) https://www.fws.gov/species-publication-action/endangered-and-threatened-wildlife-and-plants-final-designation-23

3.2.6 Clams-Freshwater Mussels

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure risk/harm

The stressors for the listed freshwater mussels are similar between species; thus, we are providing one list of conservation measures that are applicable to all the listed mussel species.

3.2.6.1 Freshwater Mussels (FM)

Habitat loss/degradation

- CM-FM-1: Avoid or minimize impacts to potential habitat (rivers and streams) with known occurrences of the species.
    - Iowa - Cedar, Iowa, Mississippi, Wapsipinicon Rivers
    - Illinois - Embarras, Kankakee, Mississippi, Rock, Saline River System (North Fork Saline and Lower Saline Rivers), Ohio, Vermilion River System (Middle Fork Vermilion, North Fork Vermilion, Middle Branch North Fork Vermilion, Salt Fork, and Vermilion Rivers), Wabash Rivers
- CR-FM-2: Utilities installed at river/stream crossings should be directionally bored rather than trenched and installed with sufficient depth below stream bottoms so that they will not become exposed.

Exposure Risk/Disturbance - In occupied areas

- CM-FM-3: Conduct a voluntary habitat assessment and presence/absence survey(s) within the action area following the Service's mussel survey guidelines. (Survey activities should be coordinated IL-IA Ecological Services Field Office)
- CM-FM-4: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (stream/river) quantity or flow.
- CM-FM-5: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering rivers/streams.

- CM-FM-6: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-FM-7: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-FM-8: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-FM-9: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.

3.2.6.2 Rabbitsfoot Mussel (*Quadrula cylindrica cylindrica*) Critical Habitat – RABB-CH

Habitat loss/degradation/fragmentation

- CM-RABB-CH: Avoid direct and indirect impacts to designated critical habitat of the rabbitsfoot mussel (In Illinois, critical habitat has been designated in the Ohio River and Vermilion River Watershed (North Fork Vermilion and Middle Branch North Fork Vermilion) https://www.fws.gov/species-publication-action/designation-critical-habitat-neosho-mucket-and-rabbitsfoot-final-rule

3.2.6.3 Sheepnose Mussel (*Plethobasus cyphyus*) Critical Habitat – SHEEP-CH

Habitat loss/degradation/fragmentation

- CM-SHEEP-CH: Avoid direct and indirect impacts to critical habitat of the sheepnose mussel (In Illinois, critical habitat has been designated in the Kankakee River and extends from the confluence of the Kankakee River with West Creek (Kankakee County, Illinois) downstream to its confluence with the Illinois River (Grundy County, Illinois). https://ecos.fws.gov/ecp/species/6903#crithab

3.2.6.4 Snuffbox Mussel (*Epioblasma triquetra*) Critical Habitat – SNUFF-CH

Habitat loss/degradation/fragmentation

- CM-SNUFF-CH: Avoid direct and indirect impacts to critical habitat of the snuffbox mussel (In Illinois, critical habitat has been designated in the Embarras River and extends from East County Road 1550 North Bridge on the border of Crittenden Township and Camargo Township (Douglas County, Illinois) downstream to the County Road 1200 North Bridge in Cottonwood Township (Cumberland County, Illinois). https://www.fws.gov/species-publication-action/designation-critical-habitat-rayed-bean-sheepnose-snuffbox-and-1

3.2.6.5 Spectaclecase (*Cumberlandia monodonta*) Critical Habitat – SPEC-CH

Habitat loss/degradation/fragmentation

- CM-SPEC-CH: Avoid direct and indirect impacts to critical habitat of the spectaclecase mussel (In Illinois and Iowa, critical habitat has been designated in the Mississippi River and extends from the downstream side of Lock and Dam 14 at Hampton (Rock Island County, Illinois) downstream to Lock and Dam 19 at Keokuk (Lee County, Iowa). https://www.fws.gov/species-publication-action/designation-critical-habitat-rayed-bean-sheepnose-snuffbox-and-1

3.2.7 Snails

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure Risk/Disturbance

3.2.7.1 Iowa Pleistocene Snail (*Discus macclintocki*) - IPS

Habitat loss/degradation

- CM-IPS-1: Avoid impacts to potential habitats (algific talus slope). The rarity and fragility of these slopes support the need for preservation of this unique habitat.

Exposure Risk/Disturbance

- CM-IPS-2: Implement measures to avoid or minimize erosion and sedimentation and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of potential habitats and/or surface water runoff to potential habitats.
- CM-IPS-3: Avoid disposing of or staging construction materials, chemicals, fuel, or other waste within sinkholes or potential habitat (algific talus slopes) or within drainages leading to a sinkhole or potential habitat.
- CM-IPS-4: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-IPS-5: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat (algific talus slopes) of the species.
- CM-IPS-6: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat (algific talus slopes) of the species.
- CM-IPS-7: Avoid or limit any disturbance (human foot traffic, livestock grazing and trampling) to areas (algific talus slopes) potentially occupied by the species.

3.2.8 Insects

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure risk/disturbance

3.2.8.1 Hine's Emerald Dragonfly (*Somatochlora hineana*) - HED

Habitat loss/degradation – In occupied area

- CM-HED-1: Avoid or minimize impacts to potential habitat (wet areas; wetlands, wet prairies, marshes, fens, sedge meadows and adjacent upland areas; shrubland, open woodlands, prairie, grassland).

Exposure Risk/Disturbance – In occupied areas

- CM-HED-2: Implement measures to avoid or minimize depletion or contamination of groundwater including contamination from fuel/chemical storage, septic systems, wells (water, oil, gas), etc. in areas occupied by the species.
- CM-HED-3: Avoid construction of new roads or railways through or adjacent to areas of suitable habitat and/or modification of existing roads (alignment/configuration/surface type) or railway if the activity would increase the risk of road mortality and/or cause habitat fragmentation.
- CM-HED-4: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-HED-5: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.
- CM-HED-6: Implement measures to avoid or minimize the influence of the action on groundwater and surface water (wetland, marshes, fens, etc.) quantity or flow.
- CM-HED-7: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of potential habitats and/or surface water runoff to potential habitat.
- CM-HED-8: Inspect equipment and materials for invasive species (plants or animals) and/or clean prior to arrival on site.
- CM-HED-9: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat and keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.

3.2.8.2 Hine's Emerald Dragonfly (*Somatochlora hineana*) Critical Habitat – HED-CH

Habitat loss/degradation/fragmentation

- CM-HED-CH-1: Avoid and minimize impacts to critical habitat of the Hine's Emerald Dragonfly (In Illinois, critical habitat is designated in Cook, DuPage, and Will Counties) https://www.fws.gov/species-publication-action/final-revised-critical-habitat-hines-emerald-dragonfly-somatochlora

3.2.8.3 Monarch butterfly (*Danaus plexippus*) - MOBU

Habitat loss/degradation - In occupied areas

- CM-MOBU-1: Avoid or minimize impacts to potential habitat (fields, roadside areas, open areas, wet areas, urban gardens, etc. with milkweed and floral resources/flowering plants present).

Exposure Risk/Harm - In occupied areas

- CM-MOBU-2: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat of the species.
- CM-MOBU-3: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.

- CM-MOBU-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of potential habitat of the species.
- CM-MOBU-5: Inspect equipment and materials for invasive species (plants or animals) and/or clean prior to arrival on site.
- CM-MOBU-6: Avoid disposing of or staging construction equipment, materials, chemicals, fuel, or other waste within or near potential habitat.
- CM-MOBU-7: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CR-MOBU-8: Complete project activities when the species are not present in the action areas (i.e. during the overwintering period).

3.2.8.4 Poweshiek Skipperling (*Oarisma poweshiek*) Critical Habitat– POSK-CH

Habitat loss/degradation/fragmentation

- CM-POSK-CH-1: Avoid and minimize impacts to critical habitat of the Hine's Emerald Dragonfly (In Iowa, 11 critical habitat units are designated). https://www.fws.gov/species-publication-action/designation-critical-habitat-dakota-skipper-and-poweshiek-skipperling-1

3.2.9 Crustaceans

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure Risk/Disturbance

3.2.9.1 Illinois Cave Amphipod (*Gammarus acherondytes*) - ICA

Habitat loss/degradation

- CM-ICA-1: Avoid impacts to caves, associated sinkholes, or other karst features including mineral extraction (e.g. mine/quarry) or drilling/blasting into bedrock in areas of caves, sinkholes, or other karst features.
- CR-ICA-2: Establish or maintain a 50-foot minimum vegetated buffer along streams or surface water drainages and around sinkhole or cave entrances.
    - https://www.nrcs.usda.gov/sites/default/files/2022-09/Riparian_Forest_Buffer_391_CPS_10_2020.pdf

Exposure Risk/Disturbance

- CM-ICA-3: Implement measures to avoid or minimize depletion or contamination of groundwater including contamination from fuel/chemical storage, septic systems, wells (water, oil, gas), etc.
- CM-ICA-4: Implement measures to avoid or minimize any runoff, sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering streams, sinkholes, cave systems, and/or abandoned wells.

- CM-ICA-5: Avoid disposing of or staging construction materials, chemicals, fuel, or other waste within or near sinkholes, streams, or drainages leading to a sinkhole, stream, or cave system.
- CM-ICA-6: Keep equipment free of leaks (oil, gas, lubricants) and other potential contaminants when working near or in areas of potential habitat.
- CM-ICA-7: Apply herbicides and pesticides (e.g. insecticide, fungicide, rodenticide, etc.) utilizing targeted application methods while maintaining a buffer (see product label) between sprayed areas and surface water, caves, sinkholes, and other karst features.
- CM-ICA-8: Apply herbicide, pesticides (e.g. insecticide, fungicide, rodenticide, etc.), fertilizers according to label instructions and under conditions that will limit drift, runoff, and potential contamination of surface and groundwater.

3.2.10 Plants

Qualifying actions typically involve one or more of the following stressors and the conservation measures provided below are intended to reduce potential adverse effects from these stressors:

- Habitat loss/degradation
- Exposure risk/disturbance

The stressors for the listed plants are similar between species; thus, we are providing one list of conservation measures that are applicable to all the listed plants species

3.2.10.1 Plants

<u>Habitat loss/degradation</u>

- CM-PLANTS-1: Avoid or minimize impacts to potential habitat and areas with known occurrences of the species.
    - Decurrent False Aster - moist, sandy floodplains and prairie wetlands along the Illinois and Mississippi River
    - Eastern Prairie Fringed Orchid - wet to mesic prairie and wetland communities (including sedge meadow, fen, marsh and marsh edge)
    - Lakeside Daisy - alvar habitat, which includes sparsely vegetated rock barrens/grasslands with shallow soils
    - Leafy Prairie Clover - thin-soiled (less than 18 inches deep) mesic and wet-mesic dolomite prairie, limestone cedar glades, and limestone barrens
    - Mead's Milkweed - mesic to dry mesic tallgrass prairie, hay meadows, and thin soil glades or barrens
    - Northern Wild Monkshood - shaded to partially shaded cliffs, algific talus slopes, and cool, streamside sites
    - Pitcher's Thistle - open sand dunes and low open beach ridges along the shorelines of Lakes Michigan
    - Prairie Bush-Clover - disturbed tallgrass prairie habitats and undisturbed remnant prairie sites including dry, dry-mesic, mesic, or bedrock prairies
    - Western Prairie Fringed Orchid - moist tallgrass prairies and sedge meadows

<u>Exposure Risk/Disturbance - In occupied areas</u>

- CM-PLANTS-2: Conduct a voluntary habitat assessment and presence/absence survey(s) within the action area. (Survey activities should be coordinated IL-IA Ecological Services Field Office)
- CM-PLANTS-3: Implement measures to avoid or minimize the influence of the action on groundwater and surface water in wetlands (including sedge meadow, fen, marsh and marsh edge) and wet to mesic prairies.
- CM-PLANT-4: Implement measures to avoid or minimize runoff, erosion and sedimentation, and/or contamination (herbicides, pesticides, fertilizer, human waste, animal waste, etc.) of surface water entering potential habitats.
- CM-PLANT-5: Inspect and/or clean all equipment and materials prior to arrival on site to remove any potential invasive species (plants or animals).
- CM-PLANT-6: Apply herbicides and pesticides utilizing targeted application methods while maintaining a buffer between sprayed areas and potential habitat or known populations of the species.
- CM-PLANT-7: Apply herbicide, pesticides, fertilizers according to label instructions and under conditions that will limit drift, runoff, and contamination of potential habitat of the species.