

**Wildlife Corridor Analysis
Tier Two Illiana Corridor Study
November 2013**

Background

Given the prominence of agricultural and developed lands within the Illiana Corridor, existing watercourses and associated riparian areas as well as some large wetland complexes provide important functions and values to the region. Some of the more recognizable functions of riparian areas include nutrient cycling, flood control, conveyance, enhanced water quality, sediment and nutrient uptake, and wildlife habitat for both aquatic and terrestrial species. As part of the Tier Two studies, the project team completed a preliminary review of streams and associated riparian areas crossed by the Illiana Corridor (the Corridor) to assess their potential to provide those functions. The evaluation also took into account the regional green infrastructure network main goals identified by the Chicago Wilderness Alliance, in collaboration with the Chicago Metropolitan Agency for Planning (CMAP):

1. Conserve environmental quality strategically by protecting the most critical natural areas and conserving connectivity between them while acknowledging the need for development, and
2. Identify areas to protect based partly on the benefits they provide to people, such as flood storage, air emissions reduction, and water quality improvements.

In addition, the Illiana Corridor lies partially within the Kankakee Sands Conservation Opportunity Area (COA), which includes Midewin National Tallgrass Prairie and Goose Lake Prairie. The Illinois Wildlife Action Plan includes an initial set of COAs that are priority areas for conserving Illinois' Species in Greatest Need of Conservation (SGNC). The riparian areas in the Illinois portion of the Illiana Corridor are a component of the Kankakee Sands COA.

Approach

The analysis focused on streams and associated riparian areas as well as large wetland complexes within the Illiana Corridor in assessing existing terrestrial and aquatic habitat conditions, potential areas for enhancement, connectivity between them, and benefits to people, including flood storage, water quality improvements, and protection of open space.

The following data were evaluated for the stream and associated riparian areas as well as large wetland complexes crossed by the Corridor. The evaluation considered all stream/river crossings which number approximately 40 based on the current design. Of these, approximately 50 percent are proposed as bridges and the remainder proposed as

culverts; however, the focus of this study is on those water courses which present the greatest opportunity to maintain or enhance wildlife passage in the project area.

This analysis will provide the project team with a system for prioritizing those streams within the Corridor which have the highest potential to serve the goals described previously.

- Areas recommended within the *Chicago Wilderness Green Infrastructure Vision* by CMAP and Chicago Wilderness as Resource Protection Areas (RPA)¹.
- Community type (i.e., woodland, prairie, savanna, wetland, etc.)
- Sites with Threatened and Endangered Species, Species of Concern, and Critical Habitat for listed species.
- Sites with Outstanding Remnants of Plant Communities (Floristic Inventories, if available)
- Areas adjacent to or connecting designated parks, forest preserves, etc.
- Future land use plans, local and regional
- Delineated wetlands in the corridor
- Watershed plans, local and regional
- High resolution aerial photography (2012) of the Illiana Corridor for review of surface water features
- Historic aerial photography from Google Earth© and the University of Illinois, Illinois Geospatial Data Clearinghouse for various years, going back as far as the 1937-1947 Historic Aerial Photograph series.
- Illinois Department of Resources (IDNR) Biological Stream Characterization (BSC). This is a multi-tiered classification of streams primarily based on fish communities. This classification system uses letter grades 'A' through 'E' for evaluated reaches, with 'A' being the highest score and 'E' being the lowest (IDNR, 2013).
- Illinois DNR list of Biologically Significant Streams (BSS). This list expands on the Illinois DNR BSC "A" rated streams by adding additional information on endangered and threatened species and mussel diversity.
- Aquatic Resource Assessment Report (CBBEL, 2013).

¹ RPAs are recommended for protection based on various goals such as: protecting headwaters; protection and enhancement of buffers along streams, especially where located in the vicinity of proposed large scale development (areas of increased impervious surface, non-point source pollution); and the protection/restoration of streams in order to improve water quality within watersheds.

- Illinois Natural History Survey (INHS) Survey for the State Endangered Eastern Massasauga Rattlesnake (*Sistrurus catenatus*) in the Chicagoland Region: Field Surveys from 2005-2006 and Historical Occurrence (2006).
- INHS Assessment of The Herpetofaunal Species Associated with the IDOT Illiana Expressway Project Corridor in Will County, Illinois (2013).
- INHS Limited Assessment of Aquatic Macroinvertebrates and Water Quality Associated with Streams in the IDOT Illiana Expressway Project Corridor in Will County, Illinois (2013).
- INHS Mollusk Collection Database.
- INHS Limited Assessment of the Unionid Mussel Fauna Associated with Streams in the IDOT Illiana Expressway Project Corridor in Will County, Illinois (2013).
- INHS Limited Assessment of Endangered and Threatened Insects Associated with the IDOT Illiana Expressway Project Corridor in Will County, Illinois (2013).
- INHS Wetland Delineation Reports for the Illiana Corridor, Will County, Illinois (2013).
- INHS Mammal Collection Database.
- Cardno JFNew, Endangered, Threatened, and Rare Wildlife Report for the INDOT Illiana Expressway, Indiana (2013).
- Cardno JFNew, Illiana Corridor Preliminary Regulated Wetland and Waters Delineation Report for Indiana (2013).

Wildlife Corridors Identified Within the Illiana Corridor

The following summarizes the findings of the preliminary review of watercourses and associated riparian areas as well as large wetland complexes within and surrounding the Corridor. It should be noted that in addition to these larger riparian features, culverts will most likely be installed in depressional areas throughout the corridor. Even if these culverts consist of smaller pipe structures (12 to 24 inches diameter) they can provide crossings for smaller wildlife species especially if the culvert crossing has a natural bottom feature. This will provide additional potential wildlife crossings that were not studied in detail or identified in the Chicago Wilderness Green Infrastructure Vision by CMAP.

ILLINOIS

Sixteen (16) major watercourses were identified as wildlife corridors in the Illinois portion of the Corridor. These are described below from west to east, from the proposed I-55 interchange to the Illinois/Indiana state line.

Kankakee River

The Kankakee River is identified as an RPA on the Chicago Wilderness Green Infrastructure Vision Map (Chicago Wilderness, 2004). The Kankakee River has a moderate BSC rating (B for Integrity, B for Diversity) according to the Illinois DNR, it is listed as a BSS approximately 3,300 feet downstream of the Corridor, and has been identified as a High Quality Aquatic Resource (HQAR) within the Corridor (IDNR, 2013; INHS 2013d). The Kankakee River provides habitat for state-listed fish as well as federal and state-listed mussels within and adjacent to the Corridor and is an Illinois Natural Areas Inventory (INAI) Site. Riparian areas adjacent to the Kankakee River generally consist of forested land (approximately 70 to 600 feet in width). Agricultural land is located adjacent to forested riparian areas.

Riparian areas associated with the Kankakee River include the Des Plaines Conservation Area (upstream and adjacent to the Corridor), Goose Lake Prairie State Natural Area (6.5 miles upstream), Forest Preserve District of Will County (FPDWC) Evans-Judge Preserve (6 miles downstream), and Kankakee River State Park (6.8 miles downstream).

The Kankakee River provides significant habitat for wildlife, which includes threatened and endangered aquatic species. The Kankakee River also provides passage for aquatic and terrestrial wildlife within the Corridor.

Unnamed Tributary of Kankakee River

The Unnamed Tributary of the Kankakee River is identified as an RPA at its confluence with the Kankakee River (Chicago Wilderness, 2004). The Unnamed Tributary of the Kankakee River flows southwest to the Kankakee River. The tributary possesses natural morphology as well as forested riparian areas (approximately 40 to 100 feet in width) west of the Union Pacific Railroad (UPRR). Large, forested riparian areas associated with the tributary are present at its confluence with the Kankakee River. The tributary is channelized beneath an agricultural field east of the UPRR.

Riparian habitat areas associated with the tributary include the Des Plaines Conservation Area (upstream) and Midewin National Tallgrass Prairie (upstream and adjacent to the Corridor).

Federal and state listed species are not known to inhabit this tributary. The Unnamed Tributary of the Kankakee River provides significant habitat for wildlife at its confluence with the Kankakee River; however, wildlife habitat value associated with this tributary is limited where it is channelized beneath an agricultural field east of the UPRR.

Unnamed Tributary of Forked Creek (west)

The Unnamed Tributary of Forked Creek (west) is identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary of Forked Creek (west) is partially channelized within the Corridor with only a small portion of the tributary with natural morphology within the Corridor. This tributary flows through a constructed recreational lake adjacent to a residential area, south of the Corridor. Riparian areas

(approximately 30 feet in width) consisting of shrubs, some trees, and herbaceous vegetation are present on either side of the Unnamed Tributary of Forked Creek (west) within the Corridor. Agricultural land is located adjacent to untilled riparian areas.

Riparian areas associated with this tributary include the Des Plaines Conservation Area (upstream) and Midewin National Tallgrass Prairie (upstream and adjacent to the Corridor).

Federal and state listed species are not known to inhabit this tributary. The Unnamed Tributary of Forked Creek (west) provides moderate wildlife habitat within the Corridor.

Jordan Creek

Jordan Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Jordan Creek has a moderate to low BSC rating (C for Integrity, C for Diversity) according to the Illinois DNR (IDNR, 2013). Jordan Creek flows southwest to Forked Creek and has natural morphology. Linear forested and scrub/shrub riparian areas (approximately 220 to 550 feet in width) are located adjacent to the creek within the northern portion of the Corridor footprint. Agricultural land is located adjacent to untilled riparian areas. Areas adjacent to Jordan Creek in the southern portion of the Corridor are mowed.

Riparian areas associated with Jordan Creek include Midewin National Tallgrass Prairie (which includes the Joliet Army Ammunition Plant Illinois Natural Areas Inventory site) upstream and adjacent to the Corridor and FPDWC Forsythe Woods Forest Preserve/Forked Creek Preserve (3 miles downstream).

Federal and state listed species are not known to inhabit Jordan Creek. Jordan Creek provides moderate habitat for wildlife within the northern portion of the Corridor and limited wildlife habitat in the southern portion of the Corridor.

West Branch Forked Creek

West Branch Forked Creek is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). West Branch Forked Creek flows south and is channelized within the Corridor. Riparian areas (approximately 20 feet in width), which consist of shrubs and herbaceous vegetation, are present on either side of the West Branch Forked Creek within the Corridor. Agricultural land is present adjacent to untilled riparian areas. Federal and state listed species are not known to inhabit this creek. The West Branch Forked Creek provides limited wildlife habitat within the Corridor.

Forked Creek

Forked Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Forked Creek has a moderate BSC rating (B for Integrity, B for Diversity) according to the Illinois DNR (IDNR 2013). Forked Creek flows south within the Corridor, has natural morphology, and provides habitat for state-listed mussels. Forested riparian

areas (approximately 75 to 450 feet in width) are located adjacent to the creek within the Corridor.

Riparian areas associated with Forked Creek include FPDWC Laughton Preserve (1.6 miles upstream), FPDWC John Wesley Preserve (3.8 miles downstream), FPDWC Donohue Grove Preserve (5.7 miles downstream), FPDWC Forked Creek Preserve (7.8 miles downstream), and FPDWC Forsythe Woods Forest Preserve (8 miles downstream).

Forked Creek provides significant habitat for wildlife, which includes state threatened mussel species. Forked Creek also provides passage for aquatic and terrestrial wildlife within the Corridor.

Unnamed Tributary of Forked Creek (east)

The Unnamed Tributary of Forked Creek (east) is identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary of Forked Creek (east) has natural morphology within the Corridor. Linear forested and scrub/shrub riparian areas (approximately 65 to 90 feet in width) are located adjacent to the creek within the Illiana Corridor. Agricultural land is located adjacent to untilled riparian areas. State listed mussel species are known to inhabit this tributary (INHS, 2013m). The Unnamed Tributary of Forked Creek (east) provides moderate wildlife habitat within the Corridor.

South Branch Forked Creek Tributary

South Branch Forked Creek Tributary is identified as an RPA within the Corridor (Chicago Wilderness, 2004). The South Branch Forked Creek Tributary flows southwest to Forked Creek and is channelized within the Corridor. Vegetation (approximately 30 to 45 feet in width) consisting of shrubs, some trees, and herbaceous vegetation is located on either side of the South Branch Forked Creek Tributary within the Corridor. Agricultural land is located adjacent to untilled riparian areas. Federal and state listed species are not known to inhabit this tributary. The South Branch Forked Creek Tributary provides limited wildlife habitat within the Corridor.

South Branch Forked Creek

South Branch Forked Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). South Branch Forked Creek has a moderate to low BSC rating (C for Integrity, C for Diversity) according to the Illinois DNR (IDNR, 2013). South Branch Forked Creek flows south within the Corridor and has natural morphology. Vegetation (approximately 40 to 230 feet in width), which consists of shrubs, some trees, and herbaceous vegetation, is located on either side of the South Branch Forked Creek within the Corridor.

Riparian areas associated with South Branch Forked Creek include FPDWC Wayne Lehnert Forest Preserve (3.7 miles upstream) and FPDWC Huyck's Preserve (0.5 miles downstream). A state listed mussel species, the slippershell (*Alasmidonta viridis*), was found by the INHS in the South Branch of Forked Creek. South Branch Forked Creek

provides moderate habitat for wildlife within the Corridor. South Branch Forked Creek also provides passage for aquatic and terrestrial wildlife within the Corridor.

Rock Creek

Rock Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Rock Creek flows southwest within the Corridor and is channelized. Vegetation (approximately 20 to 45 feet in width) consisting of shrubs, some trees, and herbaceous vegetation is located on either side of Rock Creek within the Corridor. Agricultural land is located adjacent to untilled riparian areas.

Riparian areas associated with Rock Creek include FPDWC Raccoon Grove Nature Preserve and Monee Reservoir (6.5 miles upstream) and Kankakee River State Park (9.3 miles downstream). Rock Creek provides moderate habitat for wildlife within the Corridor, which includes state-threatened mussel species.

Black Walnut Creek

Black Walnut Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Black Walnut Creek has a low BSC rating (C for Integrity, D for Diversity) according to the Illinois DNR (IDNR, 2013). Black Walnut Creek flows south within the project limits and is channelized. Vegetation (approximately 40 to 100 feet in width), which consists of herbaceous vegetation, is located on either side of the Black Walnut Creek within the Corridor.

Riparian areas associated with Black Walnut Creek include FPDWC Black Walnut Creek Preserve (9.6 miles upstream). Black Walnut Creek provides limited habitat for wildlife within the Corridor.

Marshall Slough

Marshall Slough is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Marshall Slough flows southwest within the project limits and is channelized within the Corridor. Vegetation (approximately 30 to 45 feet in width), which consists of shrubs, and herbaceous vegetation, is located on either side of Marshall Slough within the Corridor. Agricultural land is located adjacent to untilled riparian areas. Marshall Slough provides limited habitat for wildlife within the Corridor.

South Branch Rock Creek

South Branch Rock Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). South Branch Rock Creek flows southwest and is channelized within the Corridor. Vegetation (approximately 20 to 40 feet in width), which consists of shrubs, some trees, and herbaceous vegetation is located on either side of South Branch Rock Creek within the Corridor. Agricultural land is located adjacent to untilled riparian areas. The South Branch Rock Creek provides limited habitat for wildlife within the Corridor, which includes habitat for state listed mussels.

Exline Slough

Exline Slough is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Exline Slough flows southwest and is channelized within the Corridor. Vegetation (approximately 20 to 35 feet in width), which consists of shrubs, some trees, and herbaceous vegetation is located on either side of Exline Slough within the Corridor. Agricultural land is present adjacent to untilled riparian areas. Exline Slough provides moderate habitat for wildlife within the Corridor.

Trim Creek

Trim Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Trim Creek is rated as a BSS according to the Illinois DNR. Trim Creek provides habitat for state-listed mussels. Trim Creek flows south and is channelized within the Corridor. Vegetation (approximately 30 to 40 feet in width), which consists of some shrubs and herbaceous vegetation, is located on either side of Trim Creek within the Corridor. Agricultural land is located adjacent to untilled riparian areas. Trim Creek provides moderate habitat for wildlife within the Corridor, which includes state-threatened mussel species.

Pike Creek

Pike Creek is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Pike Creek flows south and has natural morphology within the Corridor. Forested riparian areas (approximately 80 to 215 feet in width) are located adjacent to Pike Creek within the Corridor. Pike Creek provides moderate habitat for wildlife within the Corridor.

INDIANA

Eleven (11) major watercourses and one large wetland complex were identified as wildlife corridors in the Indiana portion of the Corridor. These are described from west to east, from the Illinois/Indiana state line to the proposed interchange at I-65.

Unnamed Tributary of West Creek

The Unnamed Tributary of West Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary of West Creek has natural morphology and flows parallel to the northern edge of the Corridor. Forested riparian areas (approximately 35 to 45 feet in width) are located adjacent to the Unnamed Tributary of West Creek within the Corridor. Agricultural land is located adjacent to untilled riparian areas. The Unnamed Tributary of West Creek provides limited habitat for wildlife within the Corridor.

West Creek

West Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). West Creek flows south and is channelized within the Corridor. Vegetation

(approximately 30 to 60 feet in width) consisting of shrubs, trees, and herbaceous vegetation is located on either side of West Creek within the Corridor. Agricultural and undeveloped land is located adjacent to untilled riparian areas. West Creek provides limited habitat for wildlife within the Corridor.

Unnamed Tributary of West Creek #2

The Unnamed Tributary of West Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). This second Unnamed Tributary of West Creek has natural morphology and flows parallel to the northern edge of the Corridor. Large, forested riparian areas and wetlands (approximately 600 to 900 feet in width) are located adjacent to the Unnamed Tributary of West Creek within the Corridor. The Unnamed Tributary of West Creek provides moderate habitat for wildlife within the Corridor.

McConnell Ditch

McConnell Ditch is not identified as an RPA within the Corridor (Chicago Wilderness, 2004; CMAP *et al.*, 2013). McConnell Ditch flows southeast within the Corridor. McConnell Ditch is channelized in the northern portion of the Corridor. In the southern portion of the Corridor, McConnell Ditch has natural morphology and is surrounded by a large wetland complex. Wetlands adjacent to McConnell Ditch extend approximately 1,000 feet west of McConnell Ditch and approximately 1,900 feet east of McConnell Ditch connecting to an Unnamed Tributary of McConnell Ditch. McConnell Ditch provides moderate habitat for wildlife within the Corridor.

Unnamed Tributary of McConnell Ditch

The Unnamed Tributary of McConnell Ditch is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary of McConnell Ditch flows south and has natural morphology within the Corridor. Narrow forested areas and large wetlands (approximately 400 to 2,800 feet in width) are located adjacent to the Unnamed Tributary of McConnell Ditch within the Corridor. The Unnamed Tributary of West Creek provides moderate habitat for wildlife within the Corridor.

Cedar Creek

Cedar Creek is identified as an RPA within the Corridor (Chicago Wilderness, 2004). Cedar Creek flows south within the Corridor and has natural morphology. Forested riparian areas (approximately 170 to 400 feet in width) are located adjacent to Cedar Creek within the Corridor. Cedar Creek provides moderate habitat for wildlife within the Corridor.

Cedar Creek provides significant habitat for wildlife, which includes threatened and endangered aquatic species. Cedar Creek also provides vital upland, forested riparian areas and open water which provides passage of both aquatic and terrestrial wildlife within the Corridor.

Wetland b-w31-pem

Wetland b-w31-pem is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Wetland b-w31-pem is large forested wetland complex that has been identified as a High Quality Aquatic Resource (HQAR) during wetland delineations conducted for this project by Cardno JFNew (2013). Wetland b-w31-pem provides habitat for state-listed birds as well as species of concern within and adjacent to the Corridor. Vegetation (approximately 3,500 feet in width), which consists of trees and wetlands, is located on either side of the tributary to Cedar Creek within the Corridor. Agricultural, undeveloped, and residential land is located adjacent to untilled riparian areas.

Areas containing wildlife habitat associated with Wetland b-w31-pem include Redwing Lake (0.60 mile south) and Lake Dalecarlia (0.65 mile north). Wetland b-W31-pem provides significant habitat for wildlife, which includes threatened and endangered species and species of concern. Wetland b-W31-pem also provides passage for aquatic and terrestrial wildlife within the Corridor.

Unnamed Tributary of Spring Run

The Unnamed Tributary of Spring Run is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary of Spring Run flows south and is channelized within the Corridor. The Unnamed Tributary of Spring Run provides habitat for species of concern adjacent to the Corridor. Vegetation (approximately 15 to 45 feet in width), which consists of shrubs, trees, and herbaceous vegetation, is located on either side of the tributary within the Corridor. Agricultural and undeveloped land is located adjacent to untilled riparian areas. The Unnamed Tributary of Spring Run provides moderate habitat for wildlife within the Corridor.

Spring Run

Spring Run is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Spring Run flows south and is channelized within the Corridor. Vegetation (approximately 30 to 55 feet in width), which consists of shrubs, trees, and herbaceous vegetation, is located on either side of Spring Run within the Corridor. Agricultural and undeveloped land is located adjacent to untilled riparian areas. Spring Run provides limited habitat for wildlife within the Corridor.

Griessel Ditch

Griessel Ditch is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Griessel Ditch flows south and has natural morphology in the southern portion of the Corridor. Griessel Ditch is channelized in the northern portion of the Corridor. Forested riparian areas (approximately 50 to 165 feet in width) are located adjacent to the Griessel Ditch within the Corridor. Agricultural land is located adjacent to untilled riparian areas. Griessel Ditch provides moderate habitat for wildlife within the Corridor.

Bryant Ditch

Bryant Ditch is not identified as an RPA within the Corridor (Chicago Wilderness, 2004). Bryant Ditch flows south and is channelized within the Corridor. Vegetation (approximately 35 to 40 feet in width), which consists of shrubs, trees, and herbaceous vegetation, is located on either side of Bryant Ditch within the Corridor. Agricultural land is located adjacent to untilled riparian areas. Bryant Ditch provides limited habitat for wildlife within the Corridor.

Unnamed Tributary of Stony Run

The Unnamed Tributary of Stony Run is identified as an RPA within the Corridor (Chicago Wilderness, 2004). The Unnamed Tributary to Stony Run flows east along the northern edge of the Corridor and continues east outside of the Corridor. The Unnamed Tributary to Stony Run has natural morphology. Large, forested riparian areas are located adjacent to the tributary (approximately 700 feet in width within the Corridor). The Unnamed Tributary to Stony Run provides moderate habitat for wildlife within the Corridor.

Recommendations

Based on the assessment of the streams and associated riparian areas as well as large wetland complexes within the Corridor, connectivity and reduction of habitat fragmentation should be considered for those areas that have the highest potential to serve as wildlife corridors. The streams listed below and summarized in Table 1 have the highest potential to provide wildlife corridors across the Corridor and aide in furthering regional green infrastructure goals. The streams and/or wetland complexes that have the highest potential to provide wildlife corridors across the Corridor and aide in furthering regional green infrastructure goals were chosen based upon the habitat provided by the stream and its associated riparian areas in the proximity of the Corridor, the presence of endangered or threatened species, or species of concern habitat, the ability to provide connectivity to protected areas (i.e., forest preserves, parks, conservation areas), as well as whether or not the area associated with the stream or wetland is identified as an RPA by the Chicago Wilderness.

Areas identified as having the highest potential to serve as wildlife corridors include the following streams/rivers and associated riparian areas and/or large wetland complexes listed in order from west to east across the Corridor:

- Illinois
 - Kankakee River
 - Unnamed Tributary of the Kankakee River
 - Jordan Creek
 - Forked Creek
 - South Branch Forked Creek
 - Black Walnut Creek
 - Pike Creek

- Indiana
 - Unnamed Tributary of West Creek #2
 - McConnell Ditch
 - Unnamed Tributary of McConnell Ditch
 - Cedar Creek
 - Wetland b-w31-pem (Tributary to Cedar Creek)
 - Unnamed Tributary of Stony Run

Potential mitigation options for impacts to wildlife corridors, which will largely focus on small mammals, amphibians, reptiles, fish, and insects, are outlined below. The mitigation options are not mutually exclusive. The Illinois Department of Transportation (IDOT) and the Indiana Department of Transportation (INDOT) will continue to coordinate mitigation options with from the regulatory agencies to determine preferred mitigation methods.

Recommendations to Provide Corridors for Wildlife Movement Across the Corridor

Specific recommendations for areas that have been identified as possessing the highest potential to serve as corridors for wildlife movement across the Corridor are discussed in the subsequent paragraphs.

Researchers have investigated wildlife use of wildlife crossings of various types, sizes, and configurations. Several types of crossings typically considered successful at maintaining connectivity across highway corridors fall into the following categories: bridges, large or small rectangular box culverts, small circular culverts that function as wildlife pipes or amphibian tunnels, and wide maintained highway shoulders (Kautz *et al.*, 2010; Forman *et al.*, 2003, Ruediger and DiGiorgio, 2007).

Bridged Crossings

Bridges that are intended to function as wildlife crossings generally are large structures typically built to span wide rivers, streams, and wetlands; but also span upland landscapes where wildlife movements commonly occur (Kautz *et al.*, 2010).

Bridged crossings can provide passage for larger mammals. For ungulates such as deer that prefer open crossing structures, tall, wide bridges are best. Specific considerations for bridge design to promote wildlife movement across the Corridor include the following.

- Bridged crossings should extend to include an upland area beyond the scour zone of the stream.
- Bridged crossings, where being considered to facilitate movement of large mammals (e.g. white-tailed deer), should be constructed at a minimum height of 8-feet above the upland area adjacent to the watercourse or wetland being bridged (i.e., dry areas wildlife will use to traverse beneath the bridge).

Table 1. Streams and Riparian Areas that Possess the Highest Potential to Provide Wildlife Corridors Across the Corridor

Watercourse/ Wetland (Crossing Number/Station)	Illinois DNR Biological Rating	Stream Habitat Assessment ¹	Known Endangered and Threatened Species or Species of Concern Habitat	Riparian Habitat	Adjacent Designated Parks, Forest Preserves, etc. (Approximate Location)	Proposed Crossing Structure
ILLINOIS						
Kankakee River (4/1103+5)	Moderate (B for Integrity, B for Diversity); BSS	98.5/Fair	State-listed fish Federal and state-listed mussels (i.e., sheepnose mussel), Blanding's turtle (upstream)	Forested (~70 to 600 feet in width)	Des Plaines Conservation Area (upstream and adjacent) Goose Lake Prairie State Natural Area (6.5 miles upstream) FPDWC Evans-Judge Preserve (6 miles downstream) Kankakee River State Park (6.8 miles downstream) INAI Site within the Corridor	Bridge
Unnamed Tributary to the Kankakee River (5 /1151+54)	N/A	ILINX-19 90.5/Fair; ILINX-20 71/Poor	None	Forested (~40 to 100 feet in width)	Des Plaines Conservation Area (upstream and adjacent) Midewin National Tallgrass Prairie (upstream and adjacent)	Bridge
Jordan Creek (11)	Moderate to Low	92.5/Fair	None	Forested, shrubs, and herbaceous vegetation (~220 to 550 feet in width)	Midewin National Tallgrass Prairie (upstream and adjacent) FPDWC Forsythe Creek Preserve (3.3 miles downstream)	Bridge
Forked Creek (18/1628+82.40)	Moderate	ILINX-14 101/Fair; ILINX-21 115/Good	State-listed mussels, northern long-eared bat (approximately 4.5 miles downstream)	Forested (~75 to 450 feet in width)	FPDWC Laughton Preserve (1.6 miles upstream) FPDWC John Wesley Preserve (3.8 miles downstream) FPDWC Donohue Grove Preserve (5.7 miles downstream) FPDWC Forked Creek Preserve (7.8 miles downstream) FPDWC Forsythe Woods Forest Preserve (8 miles downstream)	Bridge
South Branch Forked Creek (24/1841+75)	Moderate to Low	75/Poor	State-listed mussels	Shrubs, some trees, and herbaceous vegetation (~40 to 230 feet in width)	FPDWC Wayne Lehnert Forest Preserve (3.7 miles upstream) FPDWC Huyck's Preserve (0.5 miles downstream)	Bridge
Black Walnut Creek (31/2121+60)	Low	53/Poor	None	Herbaceous vegetation (~40 to 100 feet in width)	FPDWC Black Walnut Creek Preserve (9.6 miles upstream)	Bridge
Pike Creek (46/2715+00)	N/A	116/Good and 57/Poor	None	Forested (~80 to 215 feet in width)	None	Bridge
INDIANA						
Unnamed Tributary to West Creek #2 (50/2952+45)	N/A	28 (HHEI)/Class I PHWH and 24 (HHEI)/Class I PHWH	None	Forested (~600 to 900 feet in width)	None	Because a culvert is being proposed in association with the Unnamed Tributary to West Creek #2; it is proposed that the bridge associated with Wetland #a-w13- pss serve as a wildlife corridor in this area, as this bridge is immediately east of

Table 1. Streams and Riparian Areas that Possess the Highest Potential to Provide Wildlife Corridors Across the Corridor

Watercourse/ Wetland (Crossing Number/Station)	Illinois DNR Biological Rating	Stream Habitat Assessment ¹	Known Endangered and Threatened Species or Species of Concern Habitat	Riparian Habitat	Adjacent Designated Parks, Forest Preserves, etc. (Approximate Location)	Proposed Crossing Structure
						the Unnamed Tributary to West Creek #2 and forested wetlands are present between the two.
McConnell Ditch (59/3178+19.0)	N/A	57 (QHEI)/ more diverse	Northern leopard frog	Wetlands (in southern portion, ~1,000 feet west and 1,900 feet east)	None	Bridge
Unnamed Tributary of McConnell Ditch (58/3152+91)	N/A	No data	Northern leopard frog	Forest and wetlands (~400 to 2,800 feet in width)	None	Bridge
Cedar Creek (60/3200+85)	N/A	57 (QHEI)/ more diverse	Threatened and endangered aquatic species, northern long- eared bat, northern leopard frog	Forested (~170 to 400 feet in width)	None	Bridge
Wetland b-w31-pem (61/ 3228+20)	N/A	No data	Black crowned night-heron, great blue heron, great egret, midland brown snake, painted turtle	Forested wetland complex, ~ 3,500 feet in width	Redwing Lake (0.60 miles south), Lake Dalecarlia (0.65 miles north)	Bridge
Unnamed Tributary to Stony Run (88/126+20)	N/A	53 (HHEI)/ Class II PHWH	None	Forested (~700 feet in width)	None	The Unnamed Tributary to Stony Run is located east of the ramp proposed at I-65. There would be no crossing of this tributary per se, but measures could be taken to “funnel” wildlife movement through the forested area to the east of the ramp in an effort to prevent wildlife travel on roadways.

Note: QHEI = Qualitative Habitat Evaluation Index; HHEI = Headwater Habitat Evaluation Index; PHWH (Primary Headwater Habitat)

¹ Some streams have multiple sample sites. In Illinois, a modified USEPA method was used for the habitat assessment. A score less than 80 = poor; 80-109.9 = fair; 110-129.9 = good; greater than 130 = excellent. In Indiana, the QHEI or HHEI method was used. Data was retrieved from the Aquatic Resource Assessment Report (CBBEL, 2013).

- A minimum width of 5-feet shall be used in upland areas (i.e., dry areas wildlife will use to traverse beneath the bridge) adjacent to either side of the watercourse or wetland being bridged.
- Upland areas (i.e., dry areas wildlife will use to cross beneath the bridge) shall consist of natural substrate. Riprap, large rocks, and revetment matting shall not be placed within the areas intended to be used as wildlife crossings. The dry upland area should remain relatively level to allow for wildlife passage. Steep slopes from the abutment to the edge of the scour zone are not conducive to wildlife passage.
- If practical, bridge runoff should not be directly routed to waterways (i.e., scuppers should not be utilized).
- Vegetative cover should be provided or maintained near wildlife crossings to provide security to wildlife and reduce negative effects of lighting and noise.
- Structures should be monitored for, and cleared of, obstructions such as detritus or silt blockages that impede movement. Small mammals, carnivores, and reptiles avoid crossing structures with significant detritus blockages.
- Fencing should not block entrances to crossing structures, and instead should direct animals towards crossing structures.
- Fencing or low-profile barrier walls may be needed to prevent animals from entering the highway corridor and to direct animals to the crossing.
- Bridged crossings have potential to serve as corridors for movement of larger mammals such as deer and coyotes. Because of this, attention should be given to provide design features such as vegetation that attracts deer in order to “funnel” species to the designated crossing.
- Raised sections of road adjacent to wildlife crossings discourage animals from crossing roads, and should be used when possible to encourage animals to use crossing structures.

Kankakee River Bridge

Best Management Practices (BMPs) can be utilized to improve the quality of runoff draining into the Kankakee River. Stormwater runoff from the proposed Kankakee River bridge should be routed to treatment basins on either side of the river. No runoff will be routed directly to the river if practical (i.e., scuppers should not be utilized for drainage on the Kankakee River bridge). Permanent BMPs would be included in the proposed project to ensure that drainage from the proposed bridge over the Kankakee River does not degrade the quality of water within the river and does not negatively influence biological organisms that rely on this water source for survival.

The proposed Kankakee River bridge (all three alternatives) is located in proximity to sensitive ecological systems consisting of a forested seep, endangered mussel species, and state listed plant species located along the bluffs of the river

A 100-foot riparian buffer BMP area is not practical along the Kankakee River crossing due to existing infrastructure features on both sides of the river. The maximum buffer will be proposed to provide water quality, wildlife passage through this corridor, and bank stability benefits. This area would be established with native species selected for the expected hydrologic regimes. Existing trees adjacent to the proposed the Corridor will remain where practical.

Upstream treatment methods, such as treatment forebays and sedimentation basins have the ability to reduce the required capacity of downstream mechanical devices used for sediment removal. Sediment forebays may be used in proposed detention areas. A sediment forebay is a small pool, typically designed for 5 to 10 percent of the total design volume. In many cases the forebay is designed for first flush and functions as a pre-treatment area, to settle sediment before storm water runoff drains into the detention basin.

Culverted Crossings

Despite their disadvantages, well-designed and located culverts can mitigate the effects of roads for small and medium sized mammals (Clevenger *et al.*, 2001; McDonald & St. Clair, 2004). Culverts and concrete box structures are used by many species, including mice, shrews, foxes, great blue heron, amphibians, and snakes (Yanes *et al.*, 1995; Brudin, 2003; Dodd *et al.*, 2004; Ng *et al.*, 2004).

As required by state and federal regulatory agencies, new and replacement stream crossings will be designed to maintain continuity of aquatic habitat and accommodate the passage of fish and other aquatic organisms. To the extent possible, the bottom of new or replacement box or pipe culverts will be buried below streambed elevations to maintain a more natural appearance and streambed structure, given the size of the structure and context of location.

The INDOT design manual specifies how culverts are to be installed for road crossings. The process of installing a culvert below the grade of the crossing is called sumping. The primary reason for sumping is to provide water quality benefits for Section 401 Water Quality Certification; however, this design enhances wildlife crossings by providing a natural bottom substrate for the culvert crossings (INDOT, 2013).

Specific considerations for culvert design to promote wildlife movement across the Corridor include the following.

- Native rock and soils/natural substrate bottom at the base of streams should be used beneath roadways as culvert usage can be enhanced by providing a natural substrate bottom.
- Lower ends of culverts should be flush with the surrounding terrain which can be accomplished through sumping of the culverts or the use of three-sided, natural bottom culverts.

- Design culverts without a concrete pour-off as a sheer pour-off of several inches makes it unlikely that many small mammals, snakes, and amphibians will find or use the culvert.
- Provide or maintain existing vegetative cover near culverts/riparian areas to give animals security and reduce negative effects of lighting and noise.
- Structures should be monitored for, and cleared of, obstructions such as detritus or silt blockages that impede movement.
- Fencing should not block entrances to crossing structures, and instead should direct animals towards crossing structures.
- Grating should not be used for smaller culverts so that wildlife can pass through these structures.

Wide Maintained Shoulders

Wide maintained shoulders along transportation corridors maximize visibility and maneuverability of wildlife and motorists (Kautz *et al.*, 2010). For these reasons, wide maintained shoulders can be an effective preventative measure for wildlife mortality as a result of vehicle impact. The visibility provided with wide shoulders improves the motorist's opportunity to react and avoid collisions with large mammals (Kautz *et al.*, 2010). Signs should also be installed to identify corridor segments where wildlife crossing of the roadway is significant.

Fencing and Barriers

Most wildlife crossings, particularly those for large and mid-sized carnivores, include fencing along both sides of a road to direct animals to the crossing and to prevent animals from accessing the road. Fencing dimensions are usually determined based on site-specific circumstances.

Fences, guard rails, and embankments at least 6.5 feet in height discourage animals from crossing roads (Kautz *et al.*, 2010). One-way ramps on roadside fencing can allow an animal to escape if it is trapped on a road (Forman *et al.*, 2003). Fences that are very visible allow wild animals to easily jump over or slip under the wires or rails (Hanophy, 2009). Recommendations for wildlife friendly fencing include:

- Smooth wire or rounded rail should be used for the top of fencing and smooth wire on the bottom of fencing;
- Height of top rail or wire of fences should be 42 inches or less;
- There should be at least 12 inches between the top two wires of fences;
- There should be at least 16 inches between the bottom wire or rail of fences and the ground;
- Fence posts should be at minimum intervals of 16 feet;

- Using a rail, high-visibility wire, flagging, or other visual markers for the top of fences.

Deer are more likely to use openings at fence corners than in the middle of a fence run, unless there is cover, habitat or natural corridors or trails to attract them through (Hanophy, 2009). Intermittent openings should be placed where animals naturally travel: in riparian corridors and along gullies and ridges.

The length of fencing needed along either side of the road is a function of the habitat types and configurations along either side of the road. For example, narrow forested wetland corridors through open pasturelands may need to be fenced for a relatively short distance beyond the edge of forest. However, wildlife crossings located in areas with wide habitat features such as broad swamps may require longer fencing. Barrier walls are most suitable along roads that pass through low herbaceous wetlands systems and where highway mortality of reptiles and amphibians is high. Barrier walls could be utilized west of the Kankakee River adjacent to Wetland Site 283, where the state listed Blanding's turtle (*Emydoidea blandingii*) was observed as well as near the Unnamed Tributary of McConnell Ditch within Indiana where the northern leopard frog (*Rana pipiens*) Species of Special Concern was observed.

Other Wildlife and Fish Passage Considerations

- Suitable habitat for species should occur on both sides of the crossing structure (Ruediger, 2001; Barnum, 2003; Cain *et al.*, 2003; Ng *et al.*, 2004). This applies to both local and landscape scales. On a local scale, vegetative cover should be present near entrances to give animals security, and reduce negative effects of lighting and noise (Clevenger *et al.*, 2001; McDonald & St. Clair, 2004). A lack of suitable habitat adjacent to culverts originally built for hydrologic function may prevent their use as potential wildlife crossing structures (Cain *et al.*, 2003). On the landscape scale, "Crossing structures will only be as effective as the land and resource management strategies around them" (Clevenger *et al.*, 2005). Suitable habitat must be present throughout the linkage for animals to use a crossing structure.
- Multiple crossing structures should be constructed at a crossing point to provide connectivity for all species likely to use a given area.
- Inadequate size and insufficient number of crossings are two primary causes of poor use by wildlife (Ruediger, 2001). Whenever possible, suitable habitat should occur within the crossing structure. This can best be achieved by having a bridge high enough to allow enough light for vegetation to grow under the bridge, and by making sure that the bridge spans upland habitat that is not regularly scoured by floods.
- Structures should be monitored for, and cleared of, obstructions such as detritus or silt blockages that impede movement. Small mammals, carnivores, and reptiles

avoid crossing structures with significant detritus blockages (Yanes *et al.*, 1995; Cain *et al.*, 2003; Dodd *et al.*, 2004). Bridged crossings rarely have similar problems.

- Fencing should not block entrances to crossing structures, and instead should direct animals towards crossing structures (Yanes *et al.*, 1995; Gagnon *et al.*, 2007).
- Limit of construction can be minimized during final design and actual construction.
- Limiting combined grubbing and grading operations area to seven acres of exposed soil at any one time during construction.
- Provide site-specific landscape re-vegetation plans at proposed wildlife crossings.
- Provide an 8-hour construction-free gap every 24-hours to allow passage of wildlife across corridor during construction.

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