



MID-STATES CORRIDOR

APPENDIX K – WETLAND IMPACTS

Mid-States Corridor Tier 1 Environmental Impact Study

Prepared for

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Prepared by

Mid-States Corridor Project Consultant





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1 Wetland Background

Prior to European settlement, approximately 5.6 million acres (24% of Indiana's landmass) was identified as wetland. By the late 1980's approximately 4.7 million acres of these wetlands had been converted to other uses. Wetlands are important ecologically, socially and economically to the health and integrity of Indiana's environment, infrastructure and societal function (IDEM 2020).

Wetlands currently represent about 3.5% of Indiana's land cover. However, they support large concentrations of flora and fauna. In Indiana, 11 species of waterfowl use wetlands for nesting, and 28 species use wetlands as migration/wintering habitat. Due to conversion of wetlands for development, more than 120 species of wetland plants in Indiana are endangered, threatened or rare. Approximately 900 species of wildlife in the United States require wetlands at some stage in their life cycle. In the United States, approximately 35% of all rare and endangered animal species depend on wetlands for survival, although wetlands constitute only about 5% of the nation's landmass (IDNR Fish and Wildlife).

Wetlands provide connectivity between other aquatic habitats as well as a transition zone from aquatic habitat to upland habitat. There are multiple classifications of wetlands. The five wetland types identified from the National Wetlands Inventory (NWI) maps for this Tier 1 DEIS include emergent, scrub/shrub, forested, open water and unconsolidated shore.

Due to the diversity of habitats possible in these transition environments, the nation's wetlands are estimated to contain 190 species of amphibians, 270 species of birds and over 5,000 species of plants (Hammer, 1992). Many wetlands are identified as critical habitats under provisions of the Endangered Species Act. These habitats can provide direct and/or indirect benefits for a variety of protected species.

Wetlands along riverbanks (riparian wetlands) are receiving more attention because of their valuable role in helping to stabilize banks. One of the benefits of riparian wetlands is that they act as a natural flood control or buffering for downstream areas by slowing the flow of floodwater and reducing peak flows on main rivers (Mitsch and Gosselink, 1986).

Some wetlands may function as groundwater recharge areas, allowing water to seep slowly into and replenish underlying aquifers. Other wetlands represent discharge areas for surfacing groundwaters. Wetlands serving both functions may occur within close proximity depending upon local and regional patterns of groundwater distribution (Hammer, 1992).

Section 404 of the Clean Water Act (CWA) is administered by the U.S. Environmental Protection Agency (USEPA) and regulated by the U.S. Army Corps of Engineers (USACE). It establishes a program to regulate the discharge of dredged or fill material into Waters of the United States (WOTUS), including wetlands. Activities in WOTUS regulated under this program include fill for infrastructure development such as highways and road construction projects. Section 404 of the CWA requires a permit before dredge or fill material may be discharged into any WOTUS.

Section 401 of the CWA is Water Quality Certification (WQC) and is completed in conjunction with Section 404. A Section 404 permit is contingent upon receiving WQC from certifying authorities or having WQC waived. Certifying authorities include states and tribal entities. No tribal lands are associated with the Mid-States Corridor, the Indiana Department of Environmental Management (IDEM) is the certifying authority for the state of Indiana.



2 Significant Wetland Resources in the Mid-States Corridor Project Area

There are eight high quality wetland complexes located within the 12-County Study Area, shown in the map and listed below.

- **Goose Pond Fish and Wildlife Area** - Goose Pond Fish and Wildlife Area is approximately 7,200 acres in size and located in west-central Greene County to the south of Linton in the Brewer Ditch-Black Creek, Headwaters Black Creek, and Buck Creek watersheds. The Indiana Department of Natural Resources (IDNR) purchased the property in 2005 with the help of The Nature Conservancy, Ducks Unlimited, Indiana Department of Transportation, United States Fish & Wildlife Service and many other organizations. Prior to acquisition, the previous landowner entered into a permanent easement with the Natural Resources Conservation Service (NRCS). This permanent easement was part of the Wetlands Reserve Program (WRP) and consisted of 7,200 acres. (IDNR Goose Pond Fish and Wildlife Area 2021). The property is located between the Wabash and White rivers, which makes it an ideal area to receive migratory birds such as sandhill crane, great white pelican, the endangered whooping crane and a variety of shorebirds. Goose Pond Fish and Wildlife Area is northwest of I-69 and the White River, while all Mid-States Corridor alternatives are south of the I-69 and the White River. The nearest alternative, Alternative P, is located approximately 14.5 miles southeast of Goose Pond Fish and Wildlife Area and is far removed from any direct watershed connection. Impacts to Goose Pond Fish and Wildlife Area are not anticipated due to distance and its location within a watershed not traversed by any of the proposed alternatives.
- **Glendale Fish and Wildlife Area** - Glendale Fish and Wildlife Area is located in southeast Daviess County, southeast of Washington, primarily in the Dogwood Lake-Mud Creek watershed. The acquisition of land began in 1956, and purchases were made through the 1960s with several minor purchases in the 1970s. The total land consists of 8,060 acres of upland game habitat, marshes/wetlands, shallow impoundments, a 1,400 acre lake and small woodlots. Several acres of wetland habitat including Dove Hollow Marsh and Himsel Bottoms Marsh provide recreational opportunities and refuge for wildlife (IDNR Glendale Fish and Wildlife Area 2021). Glendale Fish and Wildlife Area is situated immediately northeast of Alternative B and as close as 0.5 mile north of Alternative C. Alternative B traverses the southwest portion of the watershed, between Glendale Fish and Wildlife Area and the East Fork White River. Conversely, Alternative C crosses the extreme northern limits of the watershed through agricultural fields that form the headwater reaches feeding into Glendale Fish and Wildlife Area. Although the Alternative B alignment would fragment the Mud Creek riparian corridor connecting the East Fork White River to Glendale Fish and Wildlife Area, it is not anticipated that there would be any adverse effects to the quality or wildlife accessibility to wetlands within this IDNR managed recreational property resulting from this proposed alternative. Similarly, the minimal encroachment of Alternative C across the northernmost tip of the watershed is not anticipated to indirectly impact Dogwood Lake and its associated wetlands with the proper implementation of best management practices (BMPs).
- **Patoka River National Wildlife Refuge** - Patoka River National Wildlife Refuge is located in southeast Pike County within multiple watersheds along the Patoka River. The refuge was established in 1994 and currently encompasses 6,600 acres (with an ultimate acquisition area of 22,472 acres) of wetlands, floodplain forest and uplands along 30 miles of the Patoka River



corridor. The refuge boundary includes 12,700 acres of wetlands with the majority (55%) being bottomland hardwood forests. The refuge was established to provide resting, feeding and nesting habitat for migratory birds, to maintain and increase biodiversity, to restore, protect and manage the river corridor of bottomland hardwood wetlands, to improve the water quality of the Patoka River, to develop citizen understanding and support for natural resources and provide wildlife-related education and recreation opportunities. The Patoka River National Wildlife Refuge and satellite unit Cane Ridge Wildlife Management Area have both been designated as Important Bird Areas by the National Audubon Society because of large nesting populations of prothonotary warblers and the endangered interior least terns. The refuge is also host to nine species of salamanders, forty-two species of dragonflies and damselflies and giant cane, the only bamboo species native to the United States (USFWS 2012). The nearest alternative, Alternative B, is located approximately 6 miles east of the Patoka River National Wildlife Refuge and does not share a direct watershed connection. Therefore, impacts to Patoka River National Wildlife Refuge are not anticipated due to distance and its location within watersheds not traversed by any of the alternatives.

- **Barnes-Seng Wetland Conservation Area** - Barnes-Seng Wetland Conservation Area is approximately 180 acres in size and located south of Jasper in Dubois County in the Indian Creek-Hunley Creek watershed. This wetland complex is managed by the Glendale Fish and Wildlife Area and is a popular site for hunters, but also protects valuable swamp, marsh, and bog habitat (IDNR Glendale Fish & Wildlife Area 2021). Barnes-Seng Wetland Conservation Area is situated immediately west of Alternatives C, M, O and P and approximately 2 miles east of Alternative B. Alternatives C, M, O and P traverse the northwest portion of the Hunley Creek watershed crossing Hunley Creek. The new alignment for Alternatives C, M, O and P would cross the Indian Creek-Hunley Creek watershed and bisect the Hunley Creek riparian corridor less than one mile upstream of the Barnes-Seng Wetland Conservation Area and would not require any permanent or temporary right-of-way from wetland habitat within the conservation area limits. Additionally, none of these new alignments would sever or affect the critical hydrologic connection between the Patoka River and this conservation area wetland complex. Proper implementation of best management practices (BMPs) to control erosion and contaminant runoff during and post-construction would avoid any off-site impacts to wetlands within the Barnes-Seng Wetland Conservation Area. The new alignment for Alternative B traverses the Crooked Creek-Patoka River watershed west of US 231 but avoids the Indian Creek-Hunley Creek watershed for Barnes-Seng Wetland Conservation Area. Therefore, the new alignment for Alternative B is not anticipated to impact the Barnes-Seng Wetland Conservation Area due to distance (more than 2 miles west of the wetland complex) and its location in a watershed not traversed by Alternative B. Conversely, Local Improvement 2 (all alternatives) along US 231 between Huntingburg and Jasper is immediately adjacent to wetlands within the Barnes-Seng Wetland Conservation Area, as well as similar wetlands on the opposite side (west) of US 231. Therefore, this local improvement for the alternatives has the potential for direct and/or indirect impacts to quality forested wetlands associated with Hunley Creek.
- **Buffalo Pond Nature Preserve** - Buffalo Pond Nature Preserve is approximately 390 acres in size and located northeast of Jasper in Dubois County within the Calmut Run-Patoka River watershed. The new alignments for Alternatives C, M, O and P would traverse the Calmut Run-Patoka River watershed and cross the Patoka River riparian corridor approximately 0.5 mile upstream of the wetlands within the Buffalo Pond Nature Preserve. While these alignments would not result in any direct permanent or temporary right-of-way impacts to Buffalo Pond



Nature Preserve wetlands, implementation of BMPs through the Patoka River wetlands will be instrumental to safeguard against off site impacts to wetland quality the Buffalo Pond Nature Preserve due to erosion and contaminant releases from the new roadway. Alternative B is far removed (greater than 3 miles west) from the Buffalo Pond Nature Preserve and does not traverse the Calmut Run-Patoka River watershed; therefore it is not anticipated that this alternative would result in any adverse effects to Buffalo Pond Nature Preserve wetlands.

- **Bloomfield Barrens Nature Preserve** - Bloomfield Barrens Nature Preserve is approximately 803 acres in size and located northwest of Rockport in Spencer County within the Barren Fork-Little Pigeon Creek watershed. The preserve is 3 miles west of existing US 231, the common alignment for all alternatives in Section 1 (S1) south of I-64. However, it is located approximately 11 miles southwest of the southern end of Section 2 (common to all alternatives) where new alignment development begins. Therefore, impacts to the Bloomfield Barrens Nature Preserve are not anticipated due to distance and its location in a watershed not traversed by any of the alternatives.
- **Little Pigeon Creek Wetland Conservation Area** - Little Pigeon Creek Wetland Conservation Area is approximately 1,039 acres in size and located west of Gentryville in Warrick and Spencer counties within the Barren Fork-Little Pigeon Creek watershed. The wetland complex is approximately 1.8 miles west of existing US 231, the common alignment for all alternatives, in Section 1 (S1) south of I-64. However, it is located 5.5 miles southwest of the southern end of Section 2 (common to all alternatives) where new alignment development begins. Therefore, impacts to the Little Pigeon Creek Wetland Conservation Area are not anticipated due to distance and its location in a watershed not traversed by any of the alternatives.
- **Thousand Acre Woods Nature Preserve** – Thousand Acre Woods Nature Preserve is approximately 944 acres in size and located in west central Daviess County between North Fork Prairie Creek and South Fork Prairie Creek, within the Killion Canal-Prairie Creek and Bethel Ditch-North Fork Prairie Creek watersheds. This area includes an extensive amount of quality bottomland woods with medium to large size trees. A variety of tree species include swamp white oak, pin oak, sweet gum, ash, maple, and hickory. Unique plant species include fringeless orchid, smooth phlox, blue violet, swamp milkweed, bluestar, and swamp buttercup (IDNR Thousand Acre Woods 2021). The preserve is approximately 4.0 miles north of the Alternative C connection to I-69. Therefore, impacts to the Thousand Acre Woods Nature Preserve are not anticipated due to distance and its location in watersheds not traversed by any of the alternatives.

3 National Wetland Inventory

The National Wetland Inventory (NWI) system was developed through the U.S. Fish and Wildlife Service to provide detailed information on the abundance, characteristics and distribution of wetlands in the United States. Classification of wetlands within the NWI system is based on the *Classification of Wetlands and Deepwater Habitats of the United States* (U.S. Fish and Wildlife Service 1979). This method provides a standardized approach to classify wetlands into systems, subsystems, classes and subclasses. There are five system level classifications: marine, estuarine, riverine, lacustrine and palustrine. The marine and estuarine systems are exclusively coastal classifications that do not occur in the Midwest. The riverine system includes rivers, streams, creeks and ditches. These are analyzed in **Section 8.3.19 – Stream Impacts**. The remaining two systems, lacustrine and palustrine, include lakes and vegetated wetlands.



The lacustrine system is divided into two subsystems: limnetic (L1) and littoral (L2). The limnetic system includes deepwater areas, typically considered lakes. The littoral system extends from the shoreward boundary to a depth of 2 meters. Notable examples of limnetic resources within the Mid-States Corridor study area include Patoka Lake, Dogwood Lake, Huntingburg Lake and Beaver Creek Reservoir. There are no littoral system resources mapped within the Mid-States Corridor study area.

The palustrine system is divided into eight classes: rock bottom (PRB), unconsolidated bottom (PUB), aquatic bed (PAB), unconsolidated shore (PUS), moss lichen (PML), emergent (PEM), scrub-shrub (PSS) and forested (PFO). There are no rock bottom, aquatic bed or moss lichen palustrine wetlands mapped within the Mid-States Corridor study area. The unconsolidated bottom, unconsolidated shore, emergent, scrub-shrub and forested classes are further divided into subclasses with modifiers describing water regime, water chemistry, soil and special modifiers.

4 Tier 1 Mid-States Corridor NWI Analysis

For the purposes of the NWI wetland analysis conducted for the Tier 1 Mid-States Corridor project in **Chapter 3.18**, impacts were only reported for the six system/class levels impacted by Alternatives B, C, M, O and P. This approach was used for the sake of simplicity. **Table 1** is a detailed listing of all NWI wetland types impacted by the Mid-States alternatives.

System	Class	Subclass	Water Regime	Special Modifier	NWI Code	Alts
Lacustrine	Unconsolidated Bottom		Permanently Flooded	Diked/Impounded	L1UBHh	B
Palustrine	Emergent	Persistent	Temporarily Flooded		PEM1A	B,C,M,O,P
				Excavated	PEM1Ax	O
			Saturated		PEM1B	O
			Seasonally Flooded		PEM1C	B,C,M,O,P
				Diked/Impounded	PEM1Ch	B,C
				Excavated	PEM1Cx	M,O
			Semipermanently Flooded		PEM1F	M
	Forest	Broad-Leaved Deciduous	Temporarily Flooded		PFO1A	B,C,M,O,P
				Diked/Impounded	PFO1Ah	M
			Seasonally Flooded		PFO1C	B,C,M,O,P
	Scrub/Shrub	Broad-Leaved Deciduous	Temporarily Flooded		PSS1A	B,C,M,O,P
			Seasonally Flooded		PSS1C	C,M,O,P
	Unconsolidated Bottom		Semipermanently Flooded		PUBF	M
				Diked/Impounded	PUBFh	C,M,O,P
				Excavated	PUBFx	C,M,O,P
			Intermittently Exposed		PUBG	C,M,O,P
				Diked/Impounded	PUBGh	B,C,M,O,P
				Excavated	PUBGx	B,C,M,O,P
	Unconsolidated Shore		Seasonally Flooded		PUSC	M

TABLE 1: NWI Wetland Classes Impacted by Mid-States Corridor Alternatives

In **Chapter 3.18**, **Table 3.18-1** provides the range of anticipated NWI impacts for each alternative (including local improvements) by wetland class. **Table 2** below provides the new alignment wetland impact data broken down into Section 2 and Section 3 of each alternative. Since the freeway facility type no longer is under consideration, no impacts are anticipated in Section 1 of any alternative. Section 1 is existing US 231, which is an expressway. No wetland impacts are anticipated in Section 1.



Alternatives	Wetland Impacts*							
Sections	Alternatives**	Forested Wetland	Scrub/Shrub Wetland	Emergent Wetland	Unconsolidated Shore	Ponds	Lake	Total
Section 2	Alt. B	18-22	0	8-9	0	7-9	0	34-41
	Alt. C	18-24	1	0	0	2-3	0	21-28
	Alt. M	18-24	1	0	0	2-3	0	21-28
	Alt. O	18-24	1	0	0	3-5	0	22-30
	Alt. P	18-24	1	0	0	2-3	0	21-28
Section 3	Alt. B	27	0	0	0	3	0	30
	Alt. C	4-5	1-2	1	0	8-9	0	14-16
	Alt. M	23-26	0	11	1	24-27	5	64-70
	Alt. O	5	0	2	0	5	0	12-13
	Alt. P	2-8	0	0	0	3-7	0	5-14

* Tier 1 Alternative Impacts are reported in ranges including all the alternative bypass and facility type options.
 ** The freeway facility type no longer is under consideration. Therefore, no modifications to existing US 231 in Section 1 and existing SR 37 in Section 3 are anticipated.

Table 2: Wetland Impact Ranges by Section and Alternatives for New Alignment

Table 3 below provides the local improvement wetland impact data. The new alignment and local improvement wetland impact data from **Table 2** and **Table 3** are combined together for each alternative and included in **Table 3.18-1** of **Chapter 3.18**.

Local Improvements*				Wetland Impact (acres)				
LI-#	Existing Road	Alternatives	Section	Forest	Scrub/Shrub	Emergent	Ponds	Total
LI-1	US 231	B, C, M, O, P	2	0.02			0.09	0.11
LI-2	US 231	B, C, M, O, P	2	8.75	1.53	1.07	0.16	11.51
LI-3	US 231	B, C, M, O, P	2				<0.01	<0.01
LI-4	US 231	C, M, O, P	2					
LI-5	US 231	C, M, O, P	2					
LI-6	US 231	M, P	3	1.19		0.06	0.17	1.42
LI-7	US 231	M, P	3				<0.01	<0.01
LI-8	US 231	P	3					
LI-9	US 231	P	3					
LI-10	SR 56	B	2					
LI-11	SR 257	B	2	0.02	0.23			0.25
LI-12	SR 257	B	3	0.45				0.45
LI-13	SR 450	M	3	0.20				0.20
LI-14	SR 450	M	3					
LI-15	SR 56	O	3				0.05	0.05
LI-16	SR 56	O	3				0.01	0.01
LI-17	SR 145	O	3	0.24			0.03	0.27
LI-18	US 150	O	3	0.09		0.59		0.68

*Local Improvements are associated with the alternatives, although variations may be developed in Tier 2 for these local improvements, they are estimated as having the same impact regardless of which alternative it is associated with in Tier 1.

Table 3: Wetland Impacts for Local Improvements



5 Wetland Mitigation

Throughout the alternative corridor selection process, alignment development and design phases, impacts to wetlands will be avoided or minimized to the extent possible. For unavoidable impacts, compensatory wetland mitigation is anticipated to address the “no net loss” objective for each of the proposed alternatives in accordance with the Clean Water Act and Executive Order 11990. The amount of wetland mitigation acreage required typically is dependent upon the type of wetland community impacted. Generally, wetlands that take longer to develop and offer multi-strata habitat, such as forested floodplain wetlands, are mitigated at higher ratios. Less complex systems, such as cattail marshes are mitigated at lower ratios. These ratios may vary based on unique factors and degree of quality of a particular wetland. Standard replacement ratios are 4:1 or 3:1 for forested wetland, 2:1 for scrub/shrub wetland, 1:1 for emergent wetland and 1:1 for open water systems such as ponds and lakes. **Table 3** provides an estimate of the anticipated wetland mitigation acreage ranges for each alternative and estimated mitigation based on the designated ratios and estimated impact acreage.

Alternatives	Wetland Mitigation*						
Alternatives**	Forested Wetland 3:1 ratio	Scrub/Shrub Wetland 2:1 ratio	Emergent Wetland 1:1 ratio	Unconsolidated Shore 1:1 ratio	Ponds 1:1 ratio	Lake 1:1 ratio	Estimated Mitigation (Acres)
B	163-177	4	9-11	0	10-12	0	186-204
C	91-112	7-8	2	0	10-13	0	110-135
M	154-181	4-5	12	1	26-31	5	202-235
O	96-115	4-5	4	0	8-10	0	112-134
P	90-125	4-5	1	0	5-10	0	100-141

* Tier 1 Alternative Mitigation Estimates are reported in ranges including all the alternative bypass and facility type options.
 ** Facility type 1, freeways, has been removed from consideration. Therefore, no modifications to existing US 231 in Section 1 and existing SR 37 in Section 3 are anticipated. No impacts are anticipated on either of these facilities.

Table 4: Alternatives Anticipated Wetland Mitigation Acreage



MID-STATES CORRIDOR App K – Wetland Impacts

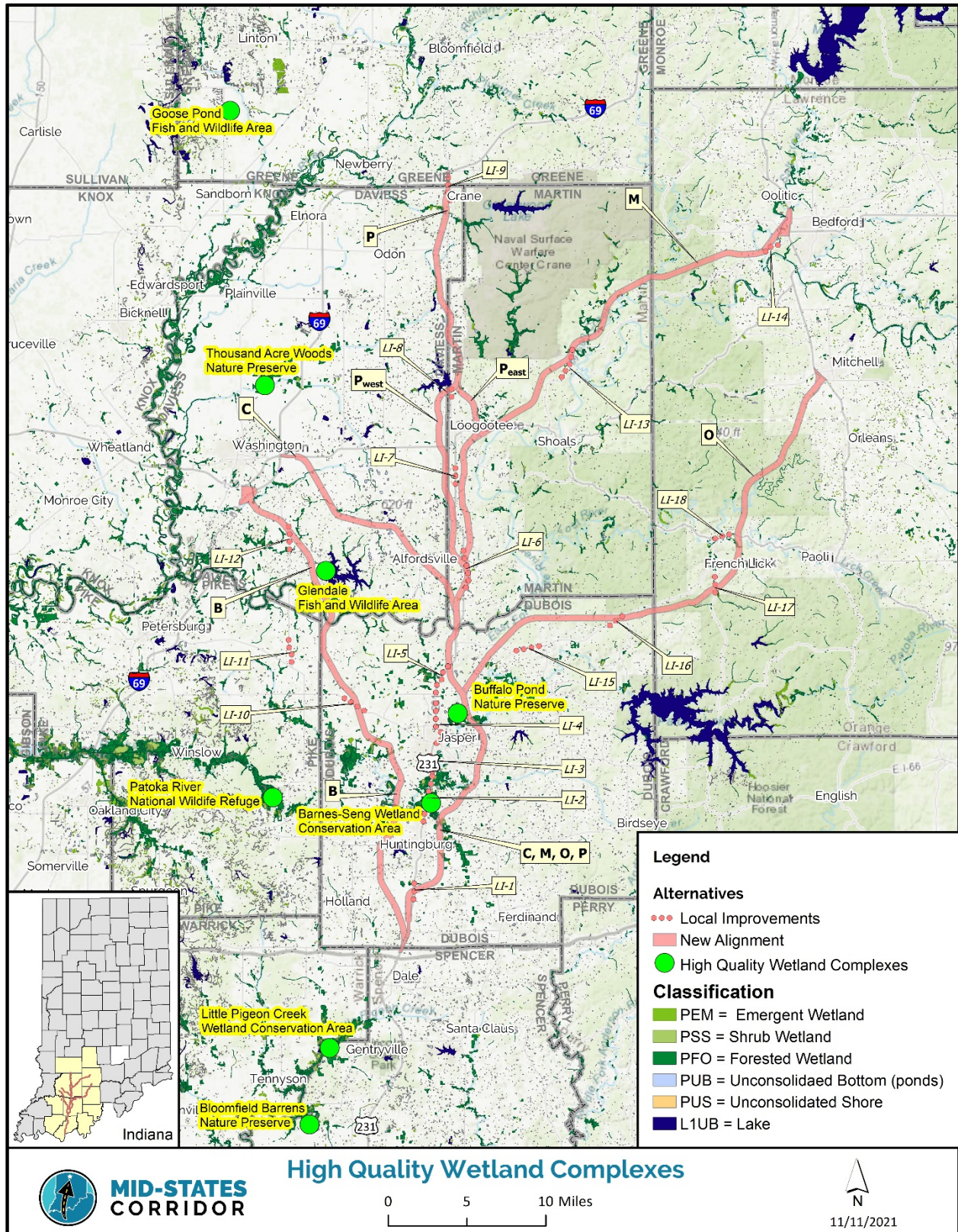


Figure 1: High Quality Wetland Complexes