Illinois Department of Natural Resources
CONSERVATION PLAN (Revised 3/15/17)
(Application for an Incidental Take Authorization)
Per 520ILCS 10/5.5 and 17 Ill. Adm. Code 1080

150-day minimum required for public review, biological and legal analysis, and permitting

Project Applicant: BP US Pipelines & Logistics, 8230 Whitcomb St., Merrillville, IN 46410

Project Name: East Fort Madison – Manhattan 22" Pipeline Inspections Sites 2015-065 and 2015-066 in Kankakee River

County: Will County, Illinois

Amount of Impact Area: 20,365ft^2 (0.47 acres) below OHWM of Kankakee River

Excavation within existing ROW – approximately 0.07 acres

Staging – approximately 0.46 acres

Access – approximately 0.99 acres

1. **A description of the impact likely to result** from the proposed taking of the species that would be covered by the authorization, including but not limited to:

   A. Identification of the **area to be affected** by the proposed action, includes a legal description and a detailed description including: street address, map(s), and GIS shapefile. Include an indication of ownership or control of affected property. Attach photos of the project area.

BP U.S. Pipelines & Logistics (BP) must perform a physical inspection and possible repair of two (2) segments of their No. 1 System, 0.56m (22in) East Fort Madison – Manhattan pipeline within the Kankakee River in Will County, IL (Figure 2.0a). They are referenced as Sites 2015-065 and 2015-066 ("west" and "east" sites, respectively, Figure 2.0b). The project is located within a reach of the Kankakee River located in Will County, Illinois, in Section 22, Township 33N, R9E. Access for the east site is located within the confines of the Des Plaines Fish and Wildlife Area, while access for the west site is located in an area used for agricultural purposes. All equipment and work activities will be limited to within the pipeline right-of-way on both the East and West Sides of the river. The impact areas are defined below and in Table 1.A and depicted below in Figure 1.A. The latitude and longitude coordinates for the "east" and "west" sites are as follows:

- ***East Site (2015-065):***
  - *East temporary Porta-Dam is approximately 44m (143ft) into the river and 22m (72ft) wide, including the liner.*
  - *Area of Direct Impact (ADI) within the Kankakee River including a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 1,394m^2 (15,005ft^2).*
  - *41.333356, -88.184684*
  - *Des Plaines State Conservation Area near N. River Road and S. Boathouse Rd., Will County, IL*
  - *The East Site's Grant of Right of Way is provided in Appendix C.*
  - *Representative site photos are presented in Appendix D (Photo 1).*

- ***West Site (2015-066):***
  - *West temporary cofferdam (sandbags) is approximately 21m (70ft) into the river by 15m (50ft) wide.*
  - *Area of Direct Impact (ADI) within the Kankakee River including a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 498m^2 (5,360ft^2) .*
  - *41.33333, -88.186971*
  - *30115 Readman Ln., Wilmington, IL 60481*
  - *The West Site's Right of Way Contract is provided in Appendix C.*
  - *Representative site photos are presented in Appendix D (Photo 2).*

- ***Total Impacts (Both Sites Combined):***
  - *Total Area of Direct Impact (ADI) within the Kankakee River is 1,842m^2 (20,365ft^2)*

Table 1.A. Calculation of impact areas for both direct and indirect impact areas and the buffers around the direct impact areas.

Direct and Indirect Impact Area Calculations					
Area Impacted	**Temporary (Direct, No Buffers)**	**Temporary (Porta-Dam Skirt RDB Only)**	**Temporary (Buffers* Only)**	**Salvage Area (Direct and Buffers)**	**Indirect Area**
Direct (LDB)	345m^2	N/A	153m^2	498m^2	N/A
	3,714ft^2	N/A	1,647ft^2	5,360ft^2	N/A
Indirect (LDB)	N/A	N/A	N/A	N/A	5,193m^2
					55,897ft^2
Direct (RDB)	552m^2	518m^2	324m^2	1,394m^2	N/A
	5,942ft^2	5,576ft^2	3,488ft^2	15,005ft^2	N/A
Indirect (RDB)	N/A	N/A	N/A	N/A	25,830m^2
					278,032ft^2
Indirect (Marginal)	N/A	N/A	N/A	N/A	13,013m^2
					140,071ft^2
Direct (Total)	**897m^2**	**518m^2**	**477m^2**	**1,842m^2**	N/A
	9,655ft^2	**5,576ft^2**	**5,134ft^2**	**20,365ft^2**	N/A
Indirect (Total)	N/A	N/A	N/A	N/A	**44,036m^2**
					474,000ft^2

*Buffers are outside of the ADI (and Porta-Dam Skirt) and are 1m (3ft) upstream and 4m (13ft) downstream and laterally riverward.

See attached mapping and site photos in the biological survey report and revised maps (Figure 1.A. & Appendix A) with updated impact and excavation areas, and GIS shapefiles were provided to the IDNR electronically.

Figure 1.A. Action Area for Pipeline In-Line Inspection / Repairs in the Kankakee River New Wilmington, Illinois. **Revised 2/8/2017**

Pipeline
Sand Bags
Salvage Buffer
Port-a-Dam/Excavation
Port-a-Dam Skirt
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 100 200 400 Feet
0 25 50 100 Meters

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Basemap courtesy of Google

B. **Biological data** on the affected species including life history needs and habitat characteristics. Attach all pre-construction biological survey reports.

   i. Biological surveys and habitat surveys were conducted for Threatened and Endangered (T&E) species known from Will County. Findings from this report indicated that the direct and indirect impacts to T&E species would be limited to direct and indirect aquatic impacts for mussels and fish. Please see attached biological survey report (EnviroScience 2016) for complete findings.

State-listed Mussel Species*: EnviroScience (ES) completed a mussel survey in the Kankakee River, in the vicinity of the proposed project area on August 13th and 15th, 2016. The survey area encompassed a 125m (410ft) reach along each bank and extended 50m (164ft) into the river on east and west banks. The survey limits extended beyond the actual ADIs, as the west cofferdam was only proposed to be 21m (70ft) into the river by 15m (50ft) wide. Similarly, the east cofferdam was only proposed as 37m (122ft) into the river and 15m (50ft) wide. The east cofferdam (Porta-Dam brand) has since changed to 44m (143ft) into the river and 22m (72ft) wide to accommodate the liner and additional buffer (1m upstream and 4m lateral and downstream) has been applied. Overall, total aquatic direct impacts in suitable mussel and fish habitat are expected to be 1,842m^2 (20,365ft^2). The pre-construction mussel survey report found the following:*

East Site Results (Within and Adjacent to the ADI):

- *0 Federal / State Endangered Sheepnose (Plethobasus cyphyus) collected alive but many fresh shells present and dense mussel community so likely present. Estimated density of Sheepnose was 0.06/m^2.*
- *11 State Threatened Purple Wartyback (Cyclonaias tuburculata), from spot searches, additional quadrat-estimated density was 0.29/m^2.*
- *6 State Threatened Black Sandshell (Ligumia recta), estimated density 0.19/m^2.*

West Site Results (Within and Adjacent to the ADI):

- *1 Federal / State Endangered Sheepnose (Plethobasus cyphyus) within the Area of Direct Impact*
- *93 State Threatened Purple Wartyback (Cyclonaias tuburculata), estimated density 0.60/m^2.*
- *11 State threatened Black Sandshell (Ligumia recta), estimated density 0.20/m^2.*

A summary of impacts from the mussel survey, <u>before</u> relocation is shown below (sub-lethal take such as harassed, harmed, and life processes interrupted. We anticipate a >70% recovery of T&E species through salvage and relocation, and >70% long-term survival:

Table 4.1.1. Estimated Number of Threatened and Endangered and Non-listed mussels within the Areas of Direct Impact (Before 70% Salvage & Relocation).

Species	West Bank (LDB) 498m^2		East Bank (RDB) 1,394m^2		Total Mussels Both Sites 1,892m^2
	Density Est. (No./m^2)	Total Mussels	Density Est. (No./m^2)	Total Mussels	
Sheepnose (FE, SE)	0.06	30	0.06	84	114
Purple Wartyback (T)	0.60	300	0.29	404	704
Black Sandshell (T)	0.20	100	0.19	265	365
Spike	0	0	0	0	WD = Present
Non-listed	13.75	6,848	11.6	16,170	23,018
Total (All Species)	**14.61**	**7,276**	**12.1**	**16,867**	**24,143**

FE = Federally endangered; SE = State endangered; T = Threatened, WD = Weathered dead.
Note: columns will not total exactly due to rounding effects and results shown in whole mussels. The Spike was found as weathered dead shells only, but due to the possibility it could be within the project area, it was assumed to be present.

Citations found in the below species accounts

Sheepnose Mussel (Plethobasus cyphyus)

The Sheepnose is a larger-stream species occurring primarily in shallow shoal habitats with moderate to swift currents over coarse sand and gravel (Oesch, 1984). Habitats with Sheepnose may also have mud, cobble and boulders. Sheepnose in larger rivers may occur in deep runs (Parmalee and Bogan, 1998). Strayer (1999a) demonstrated in field trials that mussels in streams occur chiefly in flow refuges, or relatively stable areas that displayed little movement of particles during flood events. Flow refuges conceivably allow relatively immobile mussels to remain in the same general location throughout their entire lives (Butler 2002a).

Sheepnose glochidia are released in the form of conglutinates, which mimic fish food items. Conglutinates resemble small pink worms, which infect fish gills when the fish attempt to eat them (Butler 2002b). Glochidia must come into contact with a specific fish host(s) in order to survive. If they do not, they will perish. Little is known regarding Sheepnose host fishes (Roberts and Brenderman, 2000). The Sauger (Sander canadensis) and central stoneroller (Campostoma anomalum) are the only known natural hosts (Surber 1913, Wilson 1914; Waters et al. 2009, p 221). In many mussel species, a few weeks are spent parasitizing the fishes' gill tissue, after which time they drop off from the fish and begin a free-living existence on the stream bottom. Unless they drop off in a suitable habitat, they will die. Thus, there are several weak links in the life cycle that may prevent successful reproduction and recruitment of juveniles into existing populations (Butler 2002b). The state of Illinois lists Sheepnose as an "Endangered" species (IDNR, 2015).

Purple Wartyback Mussel (Cyclonaias tuburculata)

Adapted and citations from the IDNR (2015a)

The Purple Wartyback is found in medium to large rivers with large to medium gravel or mixed sand and gravel substrates. Cobble and boulders may be present in the substrate. The Purple Wartyback's distinguishing features include a rounded shell with a fairly prominent wing, numerous bumps (or warts), and a purple nacre, though white nacre is

present in some populations. Individuals reach maturity from 4 to 6 years of age (Jirka & Neves, 1992). Known fish hosts for the Purple Wartyback include: the black bullhead (Ameiurus melas), yellow bullhead (Ameiurus natalis), flathead catfish (Pylodictis olivaris) and the channel catfish (Ictalurus punctatus), all of which are common and widespread fish in Illinois (Cummings & Mayer 1992, Badra 2004, OSU, 2013).

The Purple Wartyback is commonly found throughout most of the Midwest and Eastern United States and is found as far west as Oklahoma. Within Illinois, Michigan, Wisconsin, Iowa and Minnesota the species' conservation status is listed as imperiled. The Purple Wartyback is state threatened in Illinois. (NatureServe, 2013).

Black Sandshell Mussel (Ligumia recta).

Adapted and citations from the IDNR (2015a)

The Black Sandshell inhabits larger streams and rivers with hard bottoms such as firm compacted sand, sandy gravel or gravel/cobble in fast flowing water. Despite its name the Black Sandshell is rarely found in readily shifting sands and is never found in silty conditions (Parmalee and Bogan, 1998, Montana, 2012). The Black Sandshell is a thick shelled, elongated mussel that is dark brown or black in maturity, though juvenile and young adults can show a pattern of green rays on a lighter colored shell surface. The Black Sandshell shows sexual dimorphism and can reach a length of approximately eight inches. (Cummings & Mayer 1992, Klocek et al. 2006).

Native freshwater mussels require a fish host to distribute their larvae (glochidia). Black Sandshells are bradytictic, or long term brooders. Females brood their glochidal larvae from August through the winter to the following July before they are released (Ortmann 1919). Host fish for the glochidia of the Black Sandshell include the Bluegill (Lepomis macrochirus), Largemouth Bass (Micropterus salmoides), Sauger (Sander canadensis), and White Crappie (Pomoxis annularis) (Watters 1994). Additionally, Yellow Perch (Perca flavescens), Green Sunfish (Lepomis cyanellus), Rock Bass (Ambloplites rupestris), and White Perch (Morone americana) were identified as suitable hosts for L. recta by Steg, (1998). Saugers are considered by some to be a primary host fish for Black Sandshell (Khym and Layzer. 2000).

Despite the relatively large number of host fish that carry larval Black Sandshell, the Black Sandshell appears to be declining throughout its Midwestern range. Although exact causes of Black Sandshell decline are not reported in the literature, general declines or extirpations in mussel populations are attributed to habitat changes and water quality changes that can be linked to pollution from siltation, and urban runoff. (Downing et al. 2010). Recent findings that mussel glochidia are acutely sensitive to small ammonia spikes (USEPA, 2009) indicate that ammonia runoff from lawns, turf grass, farms and perhaps wastewater treatment plant overflows during heavy rain events may contribute to a lack of recruitment for larval mussels. The Blackshell is a state listed "Threatened" species (IDNR, 2015).

Spike (Elliptio dilatata)

The spike is found in small to large streams and occasionally lakes and can most often be found in silt, sand, or gravel substrates in depths ranging from 2 to 24 feet. The mussel's shell is compressed to slightly inflated, attenuate, solid, and thick (Parmalee and Bogan, 1998). The colors of the periostracum are light brown or yellowish green for young individuals and dark green0sh brown to black for older individuals. Shell nacre can vary across shades of white, salmon, and deep purple (Parmalee and Bogan, 1998). Known fish hosts for the species include gizzard shad (Dorosoma cepedianum), flathead catfish (Pylodictis olivaris), white crappie (Pomoxis annularis), black crappie (P. nigromaculatus), and yellow perch (Perca flavescens) (Fuller, 1974). The Illinois state threatened Spike mussel (Elliptio dilatata) has a widespread but sporadic distribution. It is common in Missouri, Pennsylvania and Ohio and uncommon to rare in other states. Illinois Department of Natural Resources (IDNR) lists the species as "Threatened" (2015).

State-listed Fish:

BP USPL is proposing to assume presence of the state listed fish species known from the vicinity of the project since weather conditions continue to hamper field sampling. Due to continued high water during the anticipated sampling period in 2016, a fish survey has not been able to be completed to date. ES mobilized to the site on August 15th, 2016 with survey work planned for the next day but the river flows came up to unacceptable levels and have been unworkable since. There are records for the state-endangered Pallid Shiner and state-threatened River Redhorse in the project area. Records for other state-listed fishes occur in the Kankakee River include: American Brook Lamprey, Northern Brook Lamprey, American Eel, Weed Shiner, Blacknose Shiner, Greater Redhorse, Starhead Topminnow, Western Sand Darter, and Banded Killifish. See the attached biological report for a complete discussion of fish presence.

Table 4.2.0 Estimated Fish Species Present (See Biological Survey Report):

Common Name	Species	Listing	Potential Within Survey Area	Direct Effects*	Indirect Effects*	Habitat Preference
Western Sand Darter	*Ammocrypta clarum*	**E**	High	8	16	Bedrock / sand
Pallid Shiner	*Hybopsis amnis*	**E**	High	4	8	Slow shallow water
American Brook Lamprey	*Lethenteron appendix*	T	High	4	8	Large rivers
River Redhorse	*Moxostoma carinatum*	T	High	4	8	Deep runs
Greater Redhorse	*Moxostoma valenciennesi*	**E**	High	4	8	Deep pool
American Eel	*Anguilla rostrata*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Banded Killifish	*Fundulus diaphanus*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Starhead Topminnow	*Fundulus dispar*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Blacknose Shiner	*Notropis heterolepis*	**E**	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Weed Shiner	*Notropis texanus*	**E**	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Northern Brook Lamprey	*Ichthyomyzon fossor*	**E**	Low	2	4	High grad. streams adj. large rivers

E = State endangered, T = State threatened.

Pallid Shiner (Hybopsis amnis)

There is little life history information available for the Pallid Shiner, but their preferred habitat is shallow areas with moderately clear water, slow current, and a depositional substrate (Kwak, 1991). The spawning dates for pallid shiner in Illinois are unknown

(INHS, 2014), but based on spawning dates of southern populations, the pallid shiner could be expected to spawn sometime after March in the Kanakakee River (Kwak, 1991).

The Pallid Shiner is only present in the Kankakee River between the Will/Kankakee County line and its confluence with the Des Plaines River with the exception of one locality on the Mississippi River and a 2012 discovery on the Des Plaines River. Over 120 specimens of the Pallid Shiner from 10 locations within that 12-mile stretch of the Kankakee River were collected between 1978 and 2005. Populations of pallid shiner exist as far south as Texas and Louisiana. The Pallid Shiner is state listed "Endangered" in Illinois (IDNR, 2015).

River Redhorse (Moxostoma carinatum)

The River Redhorse is a sucker species that inhabits deep, swift, gravelly riffles of small and medium sized rivers and is apparently intolerant of silty bottoms, turbid waters, and pollution (Smith, 1979). It feeds on benthic organisms such as small mollusks, snails, crustaceans, and aquatic insects and can grow to lengths of approximately 75cm. This species spawns in the spring at water temperatures of 18-24° (NatureServe, 2009) over gravel substrates (www.arkive.org). In Illinois, the River Redhorse presently occurs only in the upper Illinois River basin and Vermillion River basin of the Wabash River (IDNR). It is common in the Kankakee River but extremely rare anywhere else in the state (Smith, 1979). Due to rare populations elsewhere in the Illinois, River Redhorse is state listed "Threatened" (IDNR, 2015).

American Brook Lamprey (Lethenteron appendix)

The American Brook Lamprey is a small nonparasitic species of lamprey that, although rare, can be found in the northeastern portion of Illinois. Adults prefer to live in fast riffles of large creeks and small rivers with gravel substrate and the ammocoete, or larval lamprey, live in sandy or silty pools. Adults, which do not feed, spawn in late April to early May and die shortly thereafter (Nyboer et al., 2006). The species is listed by the state of Illinois as "Threatened" (IDNR, 2015).

Northern Brook Lamprey (Ichthyomyzon fossor)

The Northern Brook Lamprey is a small nonparasitic lamprey that occurs in clean, clear gravel riffles and runs of small rivers as adults and in quiet waters over sand and silt in its larval stage. It has only been found in the Kankakee River in Illinois where it is a state listed "Endangered" species (Nyboer et al., 2006).

American Eel (Anguilla rostrate)

The American Eel is the only eel species found in North America. It is a catadromous fish, meaning it spends the majority of its life in freshwater where it grows to maturity then migrates to the sea to spawn. The American Eel is both a predator and scavenger. Although it occurs sporadically in Illinois, it prefers to live in deep pools of large rivers with mud bottoms, except in the Lake Michigan drainage (Nyboer et al., 2006). Due to the species' sporadic distribution, it is a state listed as "Threatened" (IDNR, 2015).

Weed Shiner (Notropis texanus)

The Weed Shiner is most common in sand-bottomed creeks with some submerged aquatic vegetation. Its reproductive and feeding habits are poorly known (Smith, 1979). In Illinois, it is restricted to the Kankakee and Green River systems. Although it was probably never an abundant species in Illinois, it was once more widespread prior to deteriorating water and stream quality due to pollution and siltation (Nyboer et al., 2006). The Weed Shiner is listed as "Endangered" in the state of Illinois (IDNR, 2015).

Blacknose Shiner (Notropis heterolepis)

The Blacknose Shiner occurs in clear, well-vegetated glacial lakes and clear, sand-bottomed streams. Its feeding and reproductive habits are mostly unknown (Smith, 1979). In Illinois, this shiner was once much more distributed and widespread, occurring in creeks and rivers throughout the norther two-thirds of the state and also in glacial lakes in northern Illinois (Nyboer et al., 2006). Presently, populations have been decimated and it most only occurs in glacial lakes in northern Illinois. Due to increased turbidity of lake and pool waters and the disappearance of aquatic vegetation, the Blacknose Shiner has been designated the status of "Endangered" in Illinois (IDNR, 2015).

Greater Redhorse (Moxostoma valenciennesi)

The Greater Redhorse is a sucker species that inhabits sandy to rocky pools and runs of medium to large sized rivers and lakes (Nyboer et. al, 2006). It requires clear water with little silt accumulation on lake and river bottoms where it feeds primarily on aquatic insects, mollusks, and crustaceans, as well as some plant material. The Greater Redhorse spawns between May and July (www.arkive.org) in higher velocity riffles over gravel or cobble substrate (Healy, 2002). This species of Redhorse was long thought to be extirpated from the state of Illinois until rediscovery in 1985. Since then, it has been found in 13 localities in the upper Illinois River Basin (Nyboer et. al, 2006). Because of its limited distribution throughout the state, the Greater Redhorse is listed as "Endangered" in the state of Illinois (IDNR, 2015).

Starhead Topminnow (Fundulus dispar)

The Starhead Topminnow is a killifish species that occurs in some glacial lakes and in clear, well-vegetated floodplain lakes, swamps, and marshes, usually over sand or mud (Nyboer et. al, 2006). Its diet consists of snails, crustaceans, aquatic insects, and algae. It spawns in late spring and early summer among dense beds of aquatic vegetation (Smith, 1979). The largest known populations of this species are in the glacial lakes of northeastern Illinois. The Starhead Topminnow is listed as "Threatened" in the state of Illinois (IDNR, 2015).

Banded Killifish (Fundulus diaphanus)

The banded killifish occurs in clear glacial lakes with abundant aquatic vegetation often in schools of a few to many individuals. It feeds of a variety of organisms at the top of the water column, even at mid-level and bottom zones. It spawns in late spring and early summer (Smith, 1979). Presently, in Illinois, this topminnow is restricted only to glacial

lakes in Cook, Lane, and McHenry counties (Nyboer et al., 2006). The Banded Killifish is listed as "Threatened" in the state of Illinois (IDNR, 2015).

Western Sand Darter (Ammocrypta clarum)

The Western Sand Darter is restricted to habitats of sandy runs of medium to large rivers where it avoids strong currents and prefers the quiet margins of the stream channels and shallow backwaters. It is intolerant of excessive turbidity and siltation (Nyboer et. al, 2006). In Illinois, this species is found in the Mississippi, Kankakee, and Kaskaskia rivers. Populations of this species have been greatly reduced throughout much of the state, giving it a status of "Endangered" in Illinois (IDNR, 2015).

Terrestrial Vertebrates (Birds, Bats & Squirrels) and Invertebrates of Interest: *See attached biological survey report. A visual encounter survey for the Eastern Massassauga Rattlesnake (Sistrurus catenatus catenatus), the Blanding's Turtle (Emydoidea blandingii) and other terrestrial vertebrates and invertebrates was conducted on August 13, 2016. A total of 0.37 hectares was surveyed with no rattlesnakes or Blanding's Turtles found at either easement. Additionally, neither easement offered significant suitable habitat, making occupation by Sistrurus c. catenatus and Emydoidea blandingii unlikely. No instances of Franklin's Ground Squirrel or Upland Sandpiper were observed.*

State-listed Plant species*: See attached biological survey report. A survey for threatened and endangered plants was conducted on August 26, 2016 by botanist Tim Walters Ph.D of ES. No listed plant species or likely habitat were observed.*

C. **Description of project activities** that will result in taking of an endangered or threatened species, including practices and equipment to be used, a timeline of proposed activities, and any permitting reviews, such as a USFWS biological opinion or USACE wetland review. Please consider all potential impacts such as noise, vibration, light, predator/prey alterations, habitat alterations, increased traffic, etc.

1. *Description of Proposed Activities*
    a. *Mobilization to Site*
    b. *Equipment will be staged within BP's existing right-of-way on top the west and east banks. (Refer to attached aerial photograph depicting site access routes).*
    c. *Relocate federally and stat-listed mussels.*
    d. *Install portable dam in river from east bank*
    e. *Dewater work area (screen for aquatic life)*
    f. *Pump ground water seepage into work area through a geotextile sediment bag in an upland area*
    g. *Remove existing grout bags from over the pipeline*
    h. *Excavate approximately 0.6m (2ft) below pipeline (which is resting on the stream bed)*
    i. *Perform pipeline inspections and repairs*
    j. *Backfill excavation*
    k. *Install new grout bags over the pipeline*
    l. *Remove portable dam*
    m. *Repeat above steps for Site 2015-065, accessing the river from the west.*

2. *Permitting Activities*
    a. *U.S. Army Corps of Engineers (Chicago District) Clean Water Act Section 404 Regional Permit Program*
    b. *U.S. Fish and Wildlife Service, Section 7 ESA coordination*
    c. *U.S. Coast Guard, coordination for work in a Section 10 river*
    d. *Illinois EPA, Section 401 Water Quality Certification*
    e. *Illinois EPA NPDES Construction Stormwater General Permit authorization*
    f. *IDNR, Office of Water Resources Floodway Permit*
    g. *IDNR, Office of Realty and Environmental Planning, work in an Illinois Public Water, Endangered Species Review, and Des Plaines Conservation Area, access agreement*
    h. *Will County soil and Water Conservation District, erosion and sedimentation control*
    i. *Will County Land Use Department, sign-off for work in a floodplain.*

3. *An anticipated timeline for completing all tasks causing temporary impacts to the streambed or banks for each site is provided below. Construction is estimated to begin May 1st. Items highlighted in blue note the tasks that are to be performed within the stream. An excerpt from the Sites 2015-065 A-E and 2015-066 A-C Construction Storm Water Pollution Prevention Plan including a detailed schedule of construction activities is included in Appendix E. Overall, the project is committed to an overall duration of <21 days and in-stream work of less than 20 days. In-stream work will only occur at one bank at a time.*

Proposed Action*	***Anticipated Action Schedule***	***# Days of In-Stream Work***
Mussel salvage and relocation (Both Banks)	*(18 Days Pre-Construction)*	*Non-construction*
Site Mobilization and Pre-Job Environmental and Safety Training Meeting	*Day 1*	
Begin Project on 1st bank		
Install stabilized construction entrance and sediment control structures	*Days 1-2*	
Initiate and install instream structural BMPs	*Days 3-5*	*1*
Dewater downstream work area, clear fish from temp. dam	*Days 3-5*	*1*
Mobilize equipment into work area and excavate in-stream substrate	*Days 5-7*	*1*
Strip topsoil on banks	*Days 5-7*	
Dewater excavation as needed; excavate below existing pipeline, sandblast pipeline	*Days 7-8*	*1*
Complete pipeline inspection and repair	*Days 8-10*	*1*
Cover pipeline, fill excavations and regrade	*Days 10-12*	*1*
Remove all equipment from river (including dams)	*Days 12-14*	*1*
Install permanent erosion controls, remove construction entrance, and remove temporary erosion controls.	*Days 12-14*	
Additional schedule float for weather, other contingencies		*3*
Total Work Bank 1 (No. Days):	***<14 days***	***6 to 10 days***
Repeat process for Bank 2.	*As-above*	*As-above*
Total In-stream Work Bank 2:	***<14 days***	***6 to 10 days***
TOTAL PROJECT DURATION	***<21 days***	***<20 days***

* Proposed Actions that require in-stream construction work are highlighted in blue.

**Because many actions are concurrent and variable, the number of days for each task overestimates the total project duration. Overall, BP is committed to <21 days of construction and <20 days of in-water work. In-stream work will not occur simultaneously on both sides of the river.

The inspection and possible repair of two points on the 0.56m (22in) pipeline where it crosses the Kankakee River will result in a number of temporary impacts to the streambed, which in turn could result in an adverse impact to resident aquatic and threatened or endangered species. Those living in the direct impact area could be crushed, smothered, dislodged, or die from exposure. Temporary disturbance of the streambed and riverbanks could result in local scouring and downstream sediment deposition, which are putative sources of unionid impairment and decline (Fuller, 1974; Aldridge et al., 1987; Bogan, 1993; Williams, 1993). Additionally, host fish activity may be altered by minor changes in habitat and turbidity, which could lead to disruption of unionids' life cycles. The project construction methods were designed to minimize the above-listed effects.

D. Explanation of the anticipated **adverse effects on listed species**;

i. How will the proposed <u>action impact each of the species' life cycle stages</u>?

If not relocated, all stages of mussels and fish trapped within the portable would likely be buried, crushed or killed, or exposed to air by inspection activities. The adult fish species could be displaced from habitat or become entrapped in the temporary cofferdams installed in the work area during construction. Larval and egg stages of fish could be killed by pumps or sedimentation of spawned eggs. Mussel and fish species in the immediate area of the construction could have less efficient reproduction as the mussel / host fish interaction is disrupted. Also, mussels and fish living in the vicinity of the project could have interrupted feeding and respiration. Mussels and fish that are salvaged and relocated will have some short term adverse effects including minor mortality but these effects will be minimized by mussel and fish relocation, and post-construction monitoring.

ii. Describe potential impacts to individuals and the population. Include information on the species life history strategy (life span, age at first reproduction, fecundity, recruitment, survival) to indicate the most sensitive life history stages.

1. *Adult fish and adult mussels will be the life stages primarily directly affected due to the short duration of the project. It is anticipated that minimization measures for listed and non-listed fish species such as exclusion and netting / relocation will also protect the juvenile stages of freshwater mussels.*
2. *The number of listed species anticipated to be affected is relatively comparable to previously authorized projects with similar conservation commitments, and because the effects of this project will be short in duration and temporary, it does not represent a threat to the continuation of the affected species within Illinois. The ultimate purpose of the project is to maintain the integrity of the existing pipeline and scour protection to prevent additional impacts to the mussel resources from scour or an unintentional release from the pipeline that could potentially affect many more fish and mussels compared to the impacts from the proposed repair.*

iii. Identify where there is uncertainty, place reasonable bounds around the uncertainty, and describe how the bounds were determined. For example, indicate if it is uncertain how many individuals will be taken, make a reasonable estimate with high and low bounds, and describe how those estimates were made.

1. *Mussels: We anticipate the overall impacts to mussels are relatively accurate compared to other species (i.e. fish) because the estimates were based on quantitative sampling, mussels are relatively sessile and there were a relatively large number of samples. Some uncertainty exists for ADI-specific take estimates since mussel density estimates were based on all quadrats throughout the site to maintain statistical power, and the quadrat-calculated mussel density within the ADIs appeared to be higher than adjacent areas.*
2. *Fishes: Because fish field sampling has not been able to be completed to date due to continued high water, we have had to assume presence of many species, and likely have over-estimated the impacts to most species while potentially under-estimating others. Due to the nature of the portable dams, it would be possible although not probable to randomly capture a large group of T&E fish inside the dam. This potential situation will be minimized by using Best Management Practices (BMPS) during the installation of the dams. To further reduce uncertainty in our estimates, we conducted a literature review of each species' life history relative to the available habitat at the site, and reviewed other ITA-Conservation Plans within the Kankakee River (UPRR bridge over the Kankakee River in the City of Wilmington) where fishery surveys were performed, and used similar take estimates where appropriate.*
3. *Other species: Based on the biological survey data and nature of most of the upland impacts being just access over a maintained easement, we are fairly confident in our assessment of no additional impacts to listed species other than aquatic mussels and fish known from Will County.*

2. Measures the applicant will take to **minimize and mitigate** that impact and the **funding** that will be available to undertake those measures, including, but not limited to*:*

A. **Plans to minimize the** area affected by the proposed action, the **estimated number of individuals** of each endangered or threatened species that will be taken, and the **amount of habitat affected** (please provide an estimate of area by habitat type for each species).

i. *The proposed alternative was engineered to provide the minimum amount of unnecessary contact in the river. The working area along the pipeline and access corridor will also generally be limited to the ROW. Rather than removing and replacing the entire pipeline, only the areas of concern are being investigated.*

ii. *The areas of direct impact will be salvaged for mussels using a multiple pass design to ensure >70% recovery of T&E mussels. This multi-pass method has been shown to achieve >70% salvage efficiency under good conditions (e.g. Hunter Station PA, 130,000 mussels at 70% efficiency; EnviroScience, 2016).*
iii. *The repair will be a brief, temporary impact and habitat and biota should recover to baseline over time, post-construction.* ***We anticipate direct, but temporary take to 498m^2 (5,360ft^2) of suitable T&E species habitat on the west bank, and 1,394m^2 (15,005ft^2) of habitat on the east bank [1,842m^2 (20,365ft^2) total]****.*
iv. *Prior to construction, survey-grade profiles of the site will be established so the site can be restored to the pre-existing profiles. In particular – the top elevation (riffle crest) over the pipeline which appears to be a geomorphically important river grade control.*
v. *The top one to two feet of substrate within the excavation areas will be scraped off and set aside first before the repairs / visual inspections. Then, after the pipeline has been evaluated, replaced over the excavation once the repair is completed to restore the substrate to its preexisting condition.*
vi. *Within the repair area, the stream bed and grout bags will be installed to their preexisting elevation profiles to maintain the existing channel morphology and channel grade control.*
vii. *A biologist will oversee minimization measures and in-stream work during construction.*
viii. *Based on the above 70% salvage efficiency, the following take is anticipated for suitable mussel habitat within each respective ADI (EnviroScience, 2016)*
ix. An estimated >70% of relocated mussels will survive the relocation, with similar projects realizing between 70% and >90% success (e.g. Allison 2015; Tiemann et al 2016).

Table 5.1.8b. Estimated No. of T&E and Non-listed mussels Take after 70% Salvage and Relocation (70% Survivorship) within the Areas of Direct Impact (From Biological Assessment).

Species	West Bank (LDB) 498m²		East Bank (RDB) 1,394m²		Total Mussels Both Sites 1,892m²	Mussels Salvaged	Take from Direct Impacts	Take from Relocation Effects	Viable Mussels Relocated	Total Take (Lethal or Significant*)
	Density Est. (No./m²)	Total Mussels	Density Est. (No./m²)	Total Mussels		Total Mussels Salvaged (70% efficiency)	Total Salvage Loss (30% Missed)	Relocation Effects (30% Mortality from moving)	Total Mussel Reloc. Sucess	
Sheepnose (FE, SE)	**0.06**	**30**	**0.06**	**84**	**114**	**80**	**34**	**24**	**56**	**58**
Purple Wartyback (T)	0.60	300	0.29	404	704	493	211	148	345	359
Black Sandshell (T)	0.20	100	0.19	265	365	256	110	77	1799	186
Spike (T)	-	0	-	0	10**	7**	3**	2**	5**	5**
Non-listed	13.75	6,848	11.6	16,170	23,018	16,113	6,905	4,834	11,279	11,739
Total (All Species)	**14.61**	**7,276**	**12.1**	**16,867**	**24,143**	**16,900**	**7,243**	**5,070**	**11,830**	**12,313**

FE = Federally endangered; SE = State endangered; T = Threatened.
Note: columns will not total exactly due to rounding effects and results shown in whole mussels, and the Spike was not included in the totals due to that species numbers being based on professional judgement and not field data.
*We defined a "significant" but non-lethal take as an impact that would substantially and negatively affect an animal, but not necessarily kill. For example, T&E mussels that are missed during the mussel salvage could likely survive within many portions of the ADI during construction, but their life processes would be interrupted and their health condition likely degraded.
**The Spike (T) was not detected during the survey, however we proposed a total of 10 individuals could exist within the ADI based on professional judgement considering the site habitat and nearby records, and to avoid a construction delay if a Spike was detected, as it would require a revision of the state conservation plan. The population and take estimates for the Spike were not added to the overall site totals since it was not actually found alive.

x. Fish take estimates were provided previously in Section B, Table 4.2.0 and the effects should be largely non-lethal. We anticipate direct, but temporary take to 239m^2 of T&E fish habitat on the west bank, and 524m^2 of habitat on the east bank (763m^2 total).

xi. We anticipate indirect, temporary take to fish and mussel species within 10m upstream, and 90m downstream of the ADIs during the repair (Figure 2.0b). This "take" will be very temporary and non-lethal, such as avoidance of the area during feeding and reproduction due to minor siltation and sound disturbance from equipment operations.

B. **Plans for management of the area** affected by the proposed action that will **enable continued use** of the area by endangered or threatened species by maintaining/re-establishing suitable habitat (for example: native species planting, invasive species control, use of other best management practices, restored hydrology, etc.).

All work within the Kankakee River will be temporary. After the work is completed, the project team will backfill the excavations using existing substrate, ensuring the placement of the top substrate layer back on top of the excavation. The stream bank will be regraded to existing contours and re-seeded and matted using high quality coir matting for high impact areas. The stream channel will be replaced to the same grade and profile as the pre-existing condition. The access route will then be restored to existing condition, making an effort to de-compact and regrade any areas that have become compacted or rutted.

Construction monitoring by a biologist and post-construction monitoring of relocated mussels and the site will confirm that habitat at the repair is recovered or recovering. Any noted issues, such as scour development or remaining construction debris will be quickly coordinated with Illinois DNR and resolved.

C. Description of **all measures to be implemented to avoid, minimize, and mitigate** the effects of the proposed action on endangered or threatened species.

i. Avoidance measures include working outside the species' habitat.
    1. The upland areas are being accessed completely through non-habitat or marginal habitat through existing ROW.
    2. In-water impacts have been minimized as much as practical, the middle of the stream has been avoided by only performing the repair on the channel margins.
    3. Portable dams instead of rock-fill causeways or sheet piles are being used to preserve fish and mussel habitat on the dam footprint. It is likely that most mussels left underneath the portable dam will not be killed as there will still be some interstitial flow and the pressure of the portable dam is not enough to crush most species.

ii. Minimization measures include timing work when species is less sensitive, reducing the project footprint, or relocating species out of the impact area.
    1. Work timing will be at low flow when there is less risk of failure installing the dams.
    2. T&E species will be relocated out of the ADIs:

a. A mussel salvage will be performed in the ADIs using an IDNR / Service-approved salvage plan that will include multiple passes.
b. Mussels will be relocated upstream, or if approved, other areas of the Kankakee River or watersheds to support T&E species recovery.
c. A permitted biologist will be on-site to relocate any fish or mussels trapped behind the dams. Before the dams are completely installed, nets will be pulled through the ADI to exclude any fish present, then the dam will be closed off. Pumps will utilize fish-exclusion mesh, and once water is drawn down and noted fish or mussels will be netted / collected, identified to species, and immediately returned to the stream in suitable habitat. Any mortality or injury will be noted.

iii. Mitigation is additional beneficial action that will be taken for the species such as needed research, conservation easements, propagation, habitat work, or recovery planning.
1. If for some reason the conservation and minimization measures are not effective, such as salvage efficiency is not met, BP is committed to additional beneficial actions, specifically funding habitat work, propagation efforts, or terrestrial invasive species management of the Right of Way of.

iv. **It is the applicant's responsibility to propose mitigation measures**. IDNR expects applicants to provide species conservation benefits 5.5 times larger than their adverse impact.

To minimize and mitigate the effects of the project on the Sheepnose, Black Sandshell, Spike, and Purple Wartyback mussels, it is planned to relocate all individuals of these species from the project area before construction begins to at least 70% efficiency. A salvage effort of all mussel species will be completed within the direct impact area following an agency-approved mussel salvage and monitoring plan. All T&E and non-listed mussels will be translocated to suitable habitat (Figure 5) at least 100 meters downstream (there appears to be no nearby available habitat upstream) of the proposed impact areas during the acceptable sampling period for mussels, typically between May 1st and October 1st. BP USPL has obtained adjacent landowner permissions to relocate mussels to these site(s), and existing records from INHS indicate these sites are similar, suitable habitat relative to the project area.

- *<u>BP USPL commits $30,000 to mussel propagation research</u>. In addition to the resident mussel salvage and relocation, BP USPL agrees to commit funds to reestablish T&E species at the project area at a rate of 5.5 times the take estimate to achieve viable adult mussels. This will be done through funding propagation efforts or propagation research. These funds will be distributed to an established mussel propagation facility, likely the Ohio State University / Columbus Zoo Mussel Propagation (OSU) Facility or the Genoa National Fish Hatchery in Genoa IL. The top priority for these funds will focus on the host identification, propagation and culture of juvenile Sheepnose mussels. Depending on the availability of funds and*

broodstock, additional T&E mussels may be investigated for host research and propagation. The OSU mussel facility (Dr. G. Tom Watters) has already been contacted and is interested in performing propagation of the Purple Wartyback, which to date has had limited propagation. Other options for using these funds, and based on approved ITA / Conservation Plans may include the propagation of Purple Wartyback and Black Sandshell mussels, the release of Sauger (Stizostedion canadense) or other host fish species lab-infected with Purple Wartyback and Black Sandshell glochidia. We understand that any release of broodstock in the wild would need to be discussed with the USFWS and IDNR to ensure appropriate safeguards for maintaining genetically distinct mussel populations and other concerns were addressed such as invasive species prior to release.

- **Estimated Mitigation for T&E Species if No Offsite Relocation.**

Species	Total Mussels Both Sites	Take AFTER 70% Salvage	Propagation Goal (5.5 x Take)
Sheepnose (FE, SE)	114	80	440
Purple Wartyback (T)	704	493	2,712
Black Sandshell (T)	365	256	1,408

- FE = Federally endangered; SE = State endangered; T = Threatened

We anticipate most direct effects to fish will be in the form of harassment and avoidance of the ADIs during construction. However, to minimize and mitigate the effects of the project on the endangered and threatened fish species, per above, it is planned to capture and relocate any individuals (or any other fish or mussel) that becomes entrapped in the cofferdams. Again, we anticipate most effects to T&E fish populations to be minimal and non-lethal, and the primary proposed conservation measure for fish species in is the continued monitoring of resident fish species and habitat at the site post-construction to add to the IDNR's natural resource database.

No other significant environmental impacts are anticipated as a result of this project. Temporary impacts to the riparian zone are expected to be minimal as areas to be used as a staging area are in the BP ROW. Any disturbed areas, including the riverbank, will be regraded to preexisting morphological conditions, re-seeded, and replanted with native vegetation.

D. Plans for **monitoring** the effects of the proposed actions on endangered or threatened species, such as monitoring the species' survival rates, reproductive rates, and habitat before and after construction, include a plan for follow-up **reporting to IDNR**. Monitoring surveys should be targeted at reducing the uncertainty identified in Section 1.d.

(a) *Post project monitoring will be performed at the project site and at the relocation site to determine how well fish and freshwater mussels were able to repopulate the project area and survive in that location. Five monitoring events are proposed for mussels and fish, respectively. The first will be two years from completion of the relocation and then every other year after that for ten (10) years:*

(i) Mussels: The mussel monitoring protocol will be in general accordance with the approach used for the initial mussel survey but only using quantitative searches and spot dives, since transect searches were ineffective. Also, a subset of at least 300 mussels that are relocated will be affixed with a Passive Integrated Transponder (PIT) tag and alpha-numeric ID tag, and monitored at each event. Changes in growth, movement and mortality will all be recorded and reported. Three of the five monitoring events (years 2, 6, and 8) will include non-intrusive monitoring (limited excavation). Years 4 and 10 will have full excavations to record growth and confirm survivorship.

(ii) Fishes: The fish survey protocol will be identical to the pre-construction survey protocol, and lengths and weights of a subset of individuals will be collected to compare over time, but only on years 2 and 6.

E. **Adaptive management practices** that will be used to deal with changed or unforeseen circumstances that may affect the endangered or threatened species.

i. Consider environmental variables such as flooding, drought, and species dynamics as well as other catastrophes. Management practices should include contingencies and specific triggers. Note: Not foreseeing any changes does not qualify as an adaptive management plan.

1. *A qualified biologist will be on site during key in-water construction tasks to ensure environmental commitments from the Conservation Plan, BO and storm water / erosion control plan are met, and any unforeseen circumstances are quickly addressed and communicated to the resource agencies. For example, if heavy rain is forecast during construction BP will cover un-stabilized soils near the water and perform a pre-check on all sediment controls.*

2. *A site kickoff meeting will be conducted by a qualified biologist to clearly communicate the sensitive nature of the site and biota to the site crew and review construction steps with site management relative to the conservation commitments. In particular, the Spill Prevention Plan (SPP) will be reviewed by all parties and a confirmation of the appropriate spill or incident response and responsibilities will be completed.*

3. *If ≥ 1" of rain is forecast and if the site is left unattended for more than a day (i.e. weekends) un-stabilized terrestrial soils will be covered and*

a pre-check on all sediment controls will be completed. All non-essential equipment and tools will be secured out of the floodplain.

4. *In the event the temporary dams may be overtopped due to high water during construction, any uncured grout water will be neutralized by a controlled partial flooding of the work area or other method. If necessary, a diversion dam could also be installed upstream to divert high flows.*

5. *A spill kit, 100ft of boom, and a small boat will be staged and ready during critical construction periods for spill response.*

6. *Mussels from the project area will be collected and relocated to an appropriate location outside of the project area using approved methods for handling mussels with minimal stress using qualified surveyors.*

7. *Siltation during all phases of construction will be minimized through use of erosion control devices such as silt fences to prevent runoff from entering the river and affecting threatened or endangered mussel habitat and fish species.*

8. *BP will follow specifications on erosion control and water quality best management practices (BMPs). All runoff will be diverted prior to discharge into the river. Increasing retention time of runoff water will reduce sediment load and particulate/dissolved pollutants.*

9. *After construction is completed, portable dams will be removed and the stream bottom will be restored to its approximate original condition and flow pattern, allowing for re-colonization of biota.*

10. All equipment refueling areas will be staged at least 30m (100ft) from stream, and within secondary containment.

F. Verification that adequate funding exists to support and implement all minimization and mitigation activities described in the conservation plan. This may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the conservation plan.

   i. BP USPL commits the financial resources to support and implement all minimization and mitigation activities as described in the conservation plan.

3. A description of **alternative actions** the applicant considered that would reduce take, and the reasons that each of those alternatives was not selected. A **"no-action" alternative** shall be included in this description of alternatives. Please describe the economic, social, and ecological tradeoffs of each action.

   - Consideration of **alternative actions** is an important tool in conservation planning as it allows for thinking of other option and evaluating the potential outcomes in terms of all relevant objectives. However, to be useful it requires creativity in developing alternatives and systematic analysis in evaluating the alternatives.

- In evaluating alternatives, describe the economic, social, and ecological tradeoffs of each.

The following alternatives were considered by BP:

- *The No Action Alternative*
- *Alternative 1: Pipe Replacement by Horizontal Directional Drilling*
- *Alternative 2: Pipe Replacement by Open-Cut Trenching across the Kankakee River*

A. *The No Action Alternative - Per PHMSA (DOT) regulations, the pipelines were examined with an inline inspection tool (ILI) which is required on a routine basis to validate the integrity of the systems. Upon analysis of the ILI, the data indicated a change in the conditions of the pipeline indications crossing the Kankakee River. While these changes may be the result of ILI tolerance, BP errs on the side of caution by assuming the change (anomaly) is valid. PHMSA (DOT) requires further assessment within 180 days (October 10, 2016). If unable to assess the pipeline indications within the timeframe, the pipeline indications will be re-categorized by PHMSA as Immediates and BP will be required to apply a pressure de-rate to the crude oil pipeline. The de-rate will remain in effect until BP has examined, and repaired if appropriate, the pipeline indications. The pressure de-rate has the potential to affect BP's ability to keep the BP Whiting refinery fully supplied with crude oil, which then has the potential to affect the price of gas regionally. Additionally, BP is concerned that prolonged timeframes to assess and repair lines (as needed) could result in more integrity issues that could adversely impact the environment. A No Action Alternative suggests that there would be no further assessment or possible repair to the pipeline, and this would place BP at risk for regulatory noncompliance with PHMSA and its license to operate on this line segment could be adversely impacted.*

   In summary, the No Action Alternative would not meet the project objectives of inspecting the pipeline indications to meet the PHMSA (DOT) regulatory deadline.

B. *Alternative 1: Pipe Replacement by Horizontal Directional Drilling – Alternative 1 involves the use of Horizontal Directional Drilling (HDD) method of pipe replacement for the entire Kankakee River crossing. In general, BP prefers to avoid the use of HDD except where there is no alternative option because once the pipe is installed at great depths, it becomes difficult or impossible to inspect and/or repair. For these locations, the only available repair option is to perform another HDD replacement. Pipe replacement by way of HDD are typically long lead, high cost, and considerable temporary construction impact to the surrounding areas.*

   BP has neither developed a proposed HDD alignment nor completed any soil borings to determine HDD feasibility in the area of the Kankakee River at this stage, but as a preliminary assessment there are some high-level concerns with this approach. The width of the river along the pipeline alignment is approximately 223m (730ft) and the area has not been evaluated for good candidate locations for HDD entry, HDD exit, or new pipe construction locations. It is possible that after site characterization and HDD design the pipe pullback length may exceed 1000' which may make construction

difficult on the land location between the Kankakee River and Milliken Lake. It is also possible that the presence of shallow bedrock or unsuitable soils may result in a higher than normal risk of frac out (i.e. escape of drilling mud/bentonite clay at some point along the bore path to the river bottom) into the Kankakee River. The construction footprint of an HDD would far surpass the footprint of a pipeline repair.

With lead time to complete the site characterization, engineering and HDD design necessary to submit environmental permits for a new HDD, and then the additional lead time for permitting, right of way acquisition, job planning, contracting, etc., BP estimates that an HDD would not be completed until late summer of 2017.

In summary, Alternative 1 would not meet the project objective of inspecting the pipeline indications to meet the DOT deadline

C. *Alternative 2: Pipe Replacement by Open-Cut Trenching across the Kankakee River – Alternative 2 involves the use of open-cut trenching across the Kankakee River for the entire Kankakee River crossing. The new river crossing would be in the existing BP right of way, parallel to the existing river crossing but offset by approximately 10'.*

Construction would require the use of a coffer dam dewatering structure to enable the trenching for pipe installation. The coffer dam would need to extend all the way across the river. Depending on the flow of the river and depending on requirements from the Coast Guard, the coffer dam and pipeline installation may need to be executed such that only half of the river is dammed at a time. The construction footprint for an open-cut pipe replacement would be similar to the HDD in that an 800' pipe string would need to be constructed and hydrotested onsite.

Lead time for open-cut trenching is expected to be similar to that of the proposed repair except that the Coast Guard may place greater restrictions on the ability to dam across the entire river.

In summary, Alternative 2 would not meet the project objective of inspecting the pipeline indications to meet the DOT regulatory deadline. Alternative 2 would likely also have a greater impact on mussel beds due to the need to trench across the entire river.

4. Data and information to indicate that the proposed taking will **not reduce the likelihood of the survival** of the endangered or threatened species **in the wild within the State of Illinois**, the biotic community of which the species is a part, or the habitat essential to the species existence in Illinois.

A. *Please see the attached biological report (Appendix E), which supports the conclusion that impacts to T&E species will be limited to aquatic impacts (no upland impacts along site access routes). We believe the existing alignment and scour armoring has historically enhanced mussel and fish habitat at and downstream from the alignment by providing a grade control and stream stability. As a result, a quite extensive reach of high quality riffle / run mussel and fish habitat has been created. While the present project represents a brief, temporary impact to resident T&E species, the long terms maintenance and stewardship of this site by BP USPL is in the best interest for T&E*

species, as opposed to decommissioning or a no-build alternative where the pipeline is abandoned and the grade control is not maintained to prevent undermining.

5. An **implementing agreement**, which shall include, but be limited to (on a separate piece of paper containing signatures):

   A. Names and signatures of all participants in the execution of the conservation plan;
   B. The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the IDNR. The estimated schedule for submission of these progress reports to the IDNR is as follows:

      i. Reporting Schedule and Subject Activities of Progress Reports:

REPORTING			ACTIVITIES			
Year	**Report Due on the 30th of**	**Report Type**	**Construction**	**T&E Fishes**	**Resident Mussels**	**Relocated T&E Mussels**
2017	May	Year 0a Draft Progress	Progress Const. to-date	Pre-Const. Electrofishing Const. Relocation	Salvage and Relocation	
2017	June	Year 0b Draft Progress	Progress Post-Project Habitat	Pre-Const. Electrofishing Const. Relocation	Salvage and Relocation	
2017	September	Year 0c Final	Final Post-Project Habitat	Pre-Const. Electrofishing (Full) + Const. Relocation	Salvage and Relocation	
2019	September	Year 2 Final	Post-Project Habitat	Post-Const. Electrofishing (Inventory)		Relocation Site Monitoring (non-intrusive)
2021	September	Year 4 Final	Post-Project Habitat	Post-Const. Electrofishing (Full)	Full Site Re-Survey	Relocation Site Monitoring (Excavation)
2023	September	Year 6 Final	Post-Project Habitat	Post-Const. Electrofishing (Inventory)		Relocation Site Monitoring (non-intrusive)
2025	September	Year 8 Final	Post-Project Habitat	Post-Const. Electrofishing (Inventory)		Relocation Site Monitoring (non-intrusive)
2027	September	Year 10 Final	Post-Project Habitat	Post-Const. Electrofishing (Full)	Full Site Re-Survey	Relocation Site Monitoring (Excavation)
2017	January 31	Final Summary Years 0-10	Summary Years 0-10	Summary Years 0-10	Summary Years 4, 10	Summary Years 0-10

C. Certification that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan;
D. Assurance of compliance with all other federal, State, and local regulations pertinent to the proposed action and to execution of the conservation plan;
E. Copies of any final federal authorizations for a taking already issued to the applicant, if any.

Assurance of compliance with all other federal, state, and local regulations pertinent to the proposed action and to the execution of the conservation plan: Coordination by BP USPL with the U.S. Army Corps of Engineers Chicago District is ongoing. In addition, the project is under continued coordination with the resource agencies. Since completion of the EcoCAT and IPAC, regular email and call updates have been conducted to keep agencies informed of progress on the project, including the status of mussel surveys. Coordination has occurred or is occurring concurrently with the following agencies:

- U.S. Army Corps of Engineers
- U.S. Fish & Wildlife Service
- U.S. Coast Guard
- Illinois Environmental Protection Agency
- Illinois Department of Natural Resources
- Illinois Historic Preservation Agency

E) Coordination with the U.S. Army Corps of Engineers, Rock Island, St. Louis, and Chicago Districts is ongoing and a Biological Assessment (Appendix F) similar in composition to this Conservation Plan is concurrently in the process of being submitted. Copies of the final biological assessments and Biological Opinion / federal incidental take statement will be forwarded to the IDNR office when completed / received.

6. Please see Assurance of Compliance and Certifications below:

CERTIFICATION:

BP USPL certifies that it has the authority to complete the project as described in this Conservation Plan once USFWS federal approvals are received to address the issues proposed in the Incidental Take Plan in the event state listed threatened or endangered species are encountered. The BP USPL is in charge of construction and directly or through designees will assure that all applicable state laws will be adhered to during the completion of the project and through the agreed-to monitoring commitments.

Javier E. Garcia District Operations Manager

Name, Title

Date: 10/10/2016

BP USPL Representative

PLEASE SUBMIT TO: Incidental Take Authorization Coordinator, Illinois Department of Natural Resources, Division of Natural Heritage, One Natural Resources Way, Springfield, IL 62702 OR DNR.ITAcoordinator@illinois.gov

References

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ATTACHMENT A

Sites 065 and 066 BP-USPL Threatened and Endangered Biological Survey Final Report:

2016-10-07 (V14)

SITE 065 AND SITE 066 PIPELINE IN-LINE INSPECTION REPAIRS

Threatened and Endangered Species Report for BP USPL Pipeline In-Line Inspection Repairs, Kankakee River Near Wilmington, Illinois

Prepared for:

CSU
CentralStates Underwater Contracting, Inc
Inland & Offshore Diving Services • Pipeline Construction Services

and

bp

BP USPL

Project No.: ES 8695, IDNR 1610630, USFWS IPaC Reference EFM-MAN 2015-065A-C

Date: 10/7/2016

Prepared by:

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Excellence In Any Environment

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ACKNOWLEDGMENTS

Central States Underwater Contracting, Inc. (CSU) provided funding for this project through a direct contract with BP USPL, and EnviroScience, Inc. (ES) was a subcontractor to CSU. Ms. Diane Hoeting was the BP USPL / EPIC HSSE Project Coordinator, and Mr. Christian Philips was the Project Manager for BP USPL. Mr. Mickey Dodson was the project manager for CSU with additional coordination support from Ms. Sarah Dille (CSU). Additional CSU commercial divers provided fieldwork support.

Mr. Greg Zimmerman was the project manager and malacologist (mussel expert) for ES ES and was the lead report author. Dr. Marty Huehner (ES) was the lead malacologist and Mr. Phil Mathias (ES) was another malacologist. Mr. Matthew Igleski was the ES herpetologist / ecologist and Dr. Tim Walters was the ES botanist. Mr. Dave Czayka, Mr. Kevin Reed and Mr. Andrew Zimmerman were the ES fisheries biologists. Ms. Rachael Goliver provided GIS mapping. Ms. Melissa Vaccarino and Ms. Nicole Jordan provided QA/QC and technical writing support.

2.0 INTRODUCTION

EnviroScience, Inc. (ES) has been contracted by Central States Underwater Contracting (CSU) and BP USPL to support pipeline in-line inspection repairs in the Kankakee River. BP must perform a physical inspection of two (2) segments of their No. 1 System, 22" East Fort Madison – Manhattan crude pipeline within the Kankakee River in Will County, IL (Figure 2.0a and Figure 2.0b). The project area is located 2.5 miles NW of Wilmington, IL in an unincorporated area in Section 22, Township 33N, R9E, at approximately Latitude 41.333374°, Longitude -88.185814°. The two segments are referenced as Sites 2015-065 and 2015-066 ("east" and "west" sites, respectively) in this document. Anomalies on the pipeline were identified during a recent routine in-line inspection of the pipeline using a smart tool (pipeline pig). The planned physical inspections of the line are in compliance with United States Department of Transportation (USDOT) Hazardous Liquids Pipeline Integrity Management Regulations. These sites have an inspection/repair deadline of October 10, 2016.

The East Site will be accessed through the Des Plaines State Conservation Area and the West site will be accessed from South Readman Lane. The site description is as follows and is presented in Figure 2.0a and Figure 2.0b:

- ***East Site (2015-065):***
  - *East temporary cofferdam is approximately 122ft into the river and 50ft wide.*
  - *Area of Direct Impact (ADI) within the Kankakee River (temporary dam footprint is 6,100sf [566m^2],* ***of which 5,639sf [524m^2] is wetted riverbed at normal flow****).*
  - *41.333356, -88.184684*
  - *Des Plaines State Conservation Area near N. River Road and South Boathouse Road, Will County, IL*
- ***West Site (2015-066):***
  - *West temporary cofferdam is approximately 70ft into the river by 50ft wide.*
  - *Area of Direct Impact (ADI) within the Kankakee River (temporary dam footprint is 3,500sf [325m^2],* ***of which 2,577sf [239m^2] is wetted riverbed at normal flow****).*
  - *41.33333, -88.186971*
  - *30115 Readman Ln., Wilmington, IL 60481*

- ***Total Impacts (Both Sites Combined):***
  - *Total Area of Direct Impact (ADI) within the Kankakee River (temporary dam footprints of both banks is 9,600sf [892m^2],* ***of which 8,216sf [763m^2] is wetted riverbed at normal flow****).*

Project construction and access activities could affect protected natural resources known from the vicinity, including state or federally listed threatened and endangered (T&E) species inhabiting the sites. The site "Action Area" was defined as the required construction access along the existing easements, the areas of direct impacts (ADIs) to the Kankakee River riverbed, and potential indirect impact areas upstream and downstream from the repair.

Survey methods were proposed by EnviroScience and submitted to the respective resource agencies for review, primarily the Illinois Department of Natural Resources (IDNR) and the U.S. Fish and Wildlife Service (USFWS). All methods were approved by the IDNR and USFWS prior to fieldwork. Resource agencies were notified via email of any modifications to the protocol made during the fieldwork.

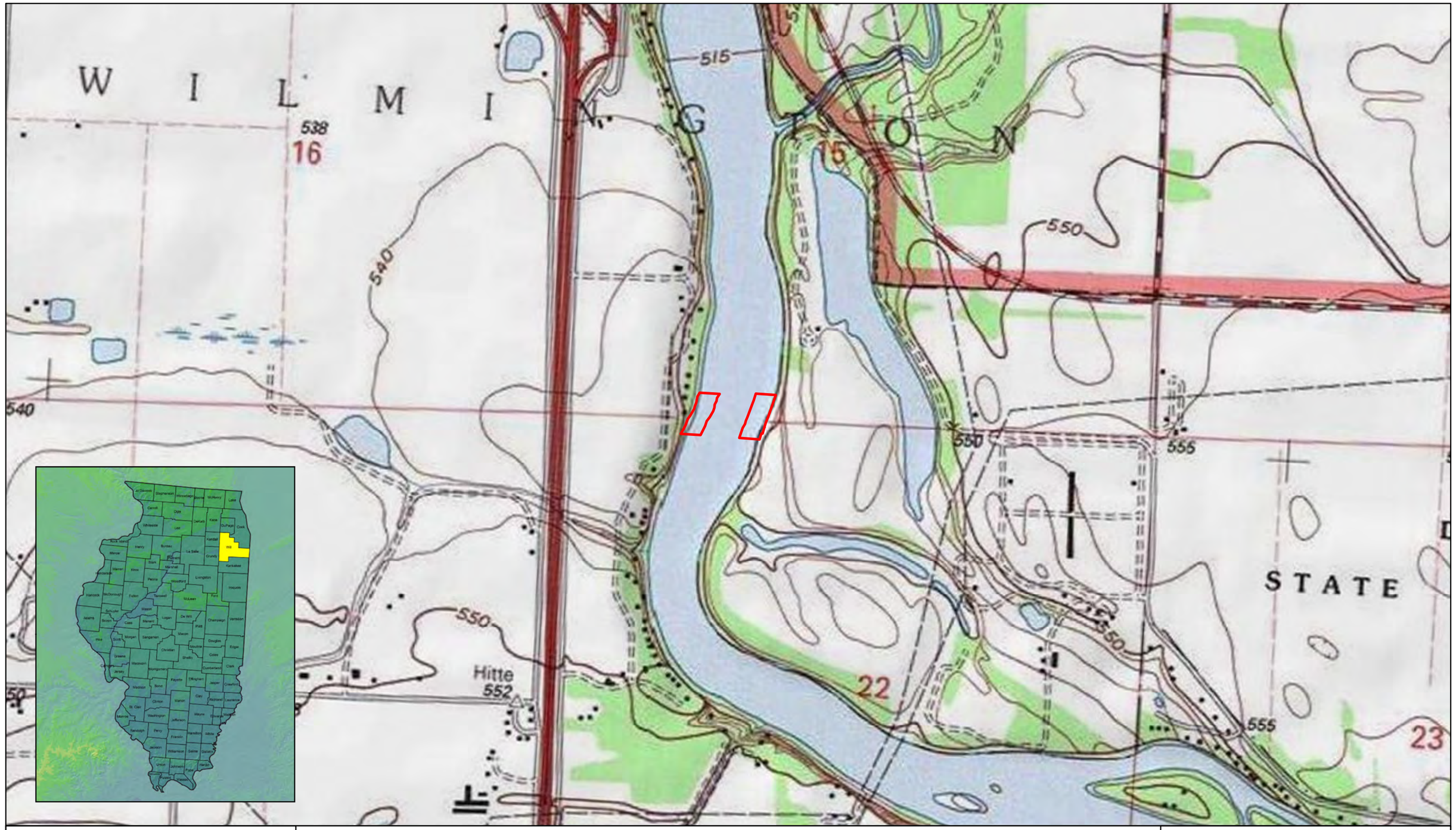

Figure 2.0a. USGS 7.5-minute Topographic Map of Site in Will Country.

Action Area

0 1,000 2,000 4,000 Feet

0 250 500 1,000 Meters

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Date: 9/29/2016 Path: \\FileServer\common\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map1_Topo.mxd

Basemap courtesy of National Geographic Society (2013).

This sectrion is the likely access for project and farmer and IDNR.

This section is on farm land and farmer will be reimbursed for any damages.

This is the western access route to the easement and gets mowed per regulatory requirements.

90m DS

60m DS

30m DS

West ADI (LDB)

ADI-D
ADI-C
ADI-U

10m US

96m DS

56m DS

26m DS

East ADI (RDB)

ADI-D
ADI-C
ADI-U

10m US

Kankakee River

This is the eastern access route to the easement and gets mowed per regulatory requirements.

Google

Figure 2.0b Action Area for Pipeline
In-Line Inspection / Repairs in the Kankakee River
New Wilminton, Illinois.

Temp. Dam / ADI Limits
Pipeline
Direct Excavation
Aquatic Survey Limits
Area of Direct Impact
Action Area

0 100 200 400 Feet

0 25 50 100 Meters

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Date: 10/5/2016 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_Action_Area.mxd

Basemap courtesy of Google.

3.0 METHODS

3.1. MUSSEL SURVEY METHODS

The following freshwater mussel species were listed as species of concern and potentially present by the resource agencies (Appendix A).

Common Name	Species Name	Code	Federal Listing	IL State Listing
Sheepnose	*Plethobasus cyphyus*	PLCY	E	E
Black Sandshell	*Ligumia recta*	LIRE	FE	T
Spike	*Elliptio dilatata*	ELDI		T
Purple Wartyback	*Cyclonaias tuberculata*	CYTU		T

Survey methods for the presence/ absence of target threatened and endangered (T&E) mussel species used a combination of semi-quantitative search transects, quantitative quadrats, and spot searches both within, around and downstream from the areas of direct impact (ADI). The ADIs for the project are each assumed to be <15m (<50ft) wide along the bank and extend riverward 21m (70ft) from the west bank, and 37m (122ft) from the east bank. While the repairs will be contained within a portable cofferdam system and silt curtains will be used for construction, the resource agencies have requested the presence/absence survey extend at least 91m (300ft) downstream of the ADIs to cover any potential indirect impacts (Figure 2.0a).

3.1.1. Qualitative Searches (20-min Spot Searches)

Spot searches were completed in areas of mussel concentrations, with seven (7) searches performed parallel to each bank. A qualified malacologist (Dr. Marty Huehner) surveyed the river bottom by snorkeling. The substrate was visually surveyed and occasional excavations by hand were completed to search for buried mussels. Data and location were recorded separately in 20-minute intervals. While qualitative searches are useful for detecting rare species, used alone they are a poor tool for assessing mussel density and distribution, and small, buried species. For this reason, additional search methods were employed.

3.1.2. Semi-quantitative Searches (Metered Transects)

Semi-quantitative transect searches were completed to assess the distribution and relative abundance of mussel concentrations and T&E species within the survey area. Transect searches are a semi-quantitative method, meaning that the area surveyed is approximately known, but the data is not as precise as quantitative sampling methods (i.e. quadrats) which is a more time and resource-intensive method.

A series of thirteen 50m (164ft) transects were placed perpendicular to flow and between 10m (33ft) upstream and 91m (300ft) downstream from the ADI along the left descending bank. Surveyors collected mussels in a 1.0m (3.3ft) swath along the transect by tactile and visual searches, occasionally excavating for buried mussels. Along each transect, data was recorded every 10m (33ft) so that the relative density and distribution of mussels within the project area could be recorded.

The methods of the right bank were modified from those used on the left bank. No semi-quantitative transect sampling was completed on the right bank due to the anticipated rise of water

level due to pending storms, the relatively high numbers of mussels that were being encountered causing transect searches to be inefficient, and, in light of a comprehensive species list already being established for the site from the left bank data. Spot dives and quadrat sampling were instead used to establish mussel distributions and species densities specific to the right bank.

3.1.3. Quantitative Searches (Quadrats)

A total of 205 quadrat (0.25m^2) samples were excavated along transects and examined on the surface by the ES malacologist. Quadrats on the left bank were collected every 10m into the river and every 5m on the right bank since the mussel distribution was only narrowly distributed there. Quadrat sampling provided additional detection of smaller species, juveniles, and mussels that live deeper in the river bottom sediments, and the ability to estimate mussel density for the calculation of take estimates.

3.1.4. Mussel Processing

All live mussels were identified, counted, and sexed (sexually dimorphic species only). All dead shells were scored as either fresh dead (lustrous nacre, dead <1yr), weathered dead (dull or chalky nacre, dead one to many years), or subfossil (heavily weathered and fragmented, dead many years to many decades) and noted as present. Live mussels were kept submersed in ambient river water before and after processing. Mussels were kept cool and moist during processing and were not out of the water more than 2min. All prescribed data for mussels (size, species, % zebra mussel infestation, etc.) and habitat (substrate composition) was collected and included in this report. Digital images of representative specimens were recorded and are provided in Appendix A.

3.2. FISH SURVEY METHODS

The following fish species were listed as species of concern and potentially present by the resource agencies (Appendix A). Only state-listed fish species were a concern.

Common Name	Species Name	IL State Listing
American Brook Lamprey	*Lethenteron appendix*	T
American Eel	*Anguilla rostrata*	T
Banded Killifish	*Fundulus diaphanus*	T
Blacknose Shiner	*Notropis heterolepis*	**E**
Greater Redhorse	*Moxostoma valenciennesi*	**E**
Northern Brook Lamprey	*Ichthyomyzon fossor*	**E**
Pallid Shiner	*Hybopsis amnis*	**E**
River Redhorse	*Moxostoma carinatum*	T
Starhead Topminnow	*Fundulus dispar*	T
Weed Shiner	*Notropis texanus*	**E**
Western Sand Darter	*Ammocrypta clarum*	**E**

At the time of reporting, the fish survey had not been completed due to high water. General fish habitat throughout the area was assessed during the mussel survey transect searches. Once the fish survey is complete, the results will be attached to this report as an addendum or revision.

Survey methods for the presence/ absence of state threatened and endangered (T&E) fish species will use a combination of boat electrofishing and low pulse backpack electrofishing both within, around and downstream from the areas of direct impact (ADI). The survey extents of the fish survey will be the same as the mussel survey, with special attention to the presence of any lamprey ameocetes directly within the ADI.

3.2.1. Boat Electrofishing (To Be Completed)

Boat electrofishing will be completed in each of two ADI / indirect impact areas, corresponding to the mussel survey extents (Figure 2.0b). Sampling will consist of 30 minutes (1,800 seconds) of active sampling on each bank. Day boat electrofishing will be used to collect fish. Boat electrofishing gear will consist of a Smith-Root 5.0 (10hp) Pulsed DC Boat Electrofisher / boom system mounted on a 16 to 18ft johnboat with a 25 horsepower outboard motor. Sampling will start at the upstream extent of each site and continue downstream including all near-shore areas and representative habitat types. A backpack electofishing unit set to standard voltage / pulses may be used in areas that the boat cannot access due the shallow water depths. An aerated live well will be used to keep fish alive until processing and fish will be held in flow-through baskets or aerated coolers at the processing station.

Records of weather conditions, flow levels and visual turbidity, water temperature, pH, dissolved oxygen, and conductivity will be collected at the time and location of the fisheries fieldwork.

3.2.2. Low Voltage / Low Pulse Electrofishing (To Be Completed)

EnviroScience will target larval lamprey (ameocetes) using modified electrofishing techniques. These techniques use low voltage power relative to standard methods and at <10 pulses per second to draw larval lamprey from the substrate. ES has used this method in western Pennsylvania with good results. This modified method will stun other species present, thus facilitating the collection of additional fish species. Sampling for larval lamprey will focus within the proposed cofferdam locations.

If living or fresh dead state listed species are found, they will be returned to their place of collection, and the IDNR will be consulted.

3.2.3. Fish Processing

All fish collected will be identified to species, counted, and examined for deformities, erosions, lesions and tumors (DELT anomalies). It is not anticipated that fish will be weighed. Except those preserved for laboratory identification, all fish will be released unharmed. Data will be recorded on ES fisheries standard field sheets. Digital images of representative specimens for each fish species will be recorded against a measurement scale and site reference points will be recorded.

3.3. REPTILE HABITAT SURVEY METHODS

The following reptile species were listed as species of concern and potentially present by the resource agencies (Appendix A):

Common Name	Species Name	Federal listing	IL State Listing
Eastern Massasauga Rattlesnake	*Sistrurus catenatus catenatus*	T	E
Blanding's Turtle	*Emydoidea blandingii*		E

A Visual Encounter Survey was conducted for the Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) and the Blanding's Turtle (*Emydoidea blandingii*) on August 13, 2016 by a local herpetologist / ecologist. Six transects were surveyed on the West Easement and four transects on the East Easement, as well as searches along each shoreline for a total of 0.37 hectares surveyed. During the reptile transect survey, birds, mammals, dragonflies and damselflies (order Odonata) and other organisms observed were also documented (see below). The survey was observational only and no reptiles were handled or directly disturbed during the survey.

3.4. PLANT SURVEY METHODS

The following plant species were listed as species of concern and potentially present by the resource agencies (Appendix A) or were a target species:

Common Name	Species Name	Federal listing	IL State Listing
Eastern Prairie Fringed Orchid	*Platanthera leucophaea*	T	E
Lakeside Daisy	*Hymenopsis herbacea*	T	E
Leafy-prairie Clover	*Dalea foliosa*	E	E
Mead's Milkweed	*Asclepias meadii*	T	E
Forked Aster	*Aster furcatus*		T
Rattlesnake-master*	*Eryngium yuccifolium*		

* Not listed but is the host of the FC / SE Rattlesnake-master borer moth (*Papaipema eryngi*i).

3.4.1. Botanical Survey / Wetland Habitat Assessment

A USFWS-approved and experienced ES botanist searched the area of potential impact for the presence of suitable habitat for the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*), Lakeside Daisy (*Hymenopsis herbacea*), Forked Aster *(Aster furcatus)*, as well as a search for the other potential species listed above and in Appendix A within suitable habitats. The presence of any wetlands as defined by the U.S. Army Corps of Engineers was also noted, although a formal delineation was not performed at the time of the initial plant survey. Any suitable habitat or individuals that were encountered within the study area were photographed and documented. Any such individuals or habitats were marked in the field using flagging tape, and coordinates were collected using a submeter-accurate dGPS. Also during the plant survey, the botanist looked for any suitable bat habitat within the action area, including suitable roost trees, hibernacula, and structures.

3.4.2. Waters of the United States / Wetland Delineation (To be Completed)

It was initially believed that all wetland and waterway resources within the Action Area were already included in the USACE permit and defined as areas below the ordinary high water mark of the Kankakee River. Based on field observations during the botanical survey, additional work was planned. To further clarify and categorize wetlands within the project area, a full wetland delineation and report is scheduled to be completed and will be submitted under separate cover. Fieldwork is scheduled to be performed prior to October 15th, 2016 because potential wetlands above the ordinary high water mark were noted during the plant survey.

Wetlands will be delineated to the standards of the Corps of Engineers Wetlands Delineation Manual (1987) and applicable regional supplements. To complete the formal delineation, sample

locations will be established within each major plant community and potential wetland. Vegetation, hydrology and soils information will be investigated at each sample location and recorded on the Corps Wetland Determination Data Form. The assessment will include percent cover estimates for each vegetative strata, identification of dominant species, and documentation of hydric soils and hydrologic indicators. Most potential areas must have at least one wetland indicator from each of the three parameters, hydrophytic vegetation, wetland hydrology and hydric soils, to be considered a wetland. EnviroScience will determine wetland boundaries by the disappearance of one of the required parameters. Each sample location and the perimeter of each wetland will be flagged with orange and pink surveyors tape reading "wetland" or "wetland boundary", and surveyed using a Trimble differential global positioning system (dGPS, accuracy <0.5m). EnviroScience will flag the external boundaries of delineated areas with flags or flagging approximately every 20 feet to show the extent of the delineation. Wetland boundaries will be flagged clearly enough so they are easily discernable by non-biologists. The beginning of each on-site stream will be flagged with pink flagging and the flow regime and Ordinary High Water Mark (OHWM) will be noted with GPS every 30 feet. The boundaries of ponds that are not easily discernable on aerial photography will be noted using GPS every 20 feet. GIS / CAD software as appropriate will be used to determine the size and locations of all wetlands and other waters and to produce scale maps of the site. Principal wetland functions and values will be determined using professional judgment and based on the the Hydrogeomorphic Classification method (Brinson, 1993), and local (e.g. USACE Chicago District floristic index) requirements. Any streams or waterways will be identified, classified by type and boundaries recorded by dGPS.

3.5. MAMMAL SURVEY METHODS

The following mammal species were listed as species of concern and potentially present by the resource agencies (Appendix A) or were a target species:

Common Name	Species Name	Federal listing	IL State Listing
Northern Long-eared Bat	*Myotis septentrionalis*	T	T
Franklin's Ground Squirrel	*Poliocitellus franklinii*		T

During the plant survey, the biologist looked for any suitable bat or Franklin's Ground Squirrel habitat within the action area. Searches included looking for suitable roost trees, hibernacula, and structures for cave-dwelling bats, and for squirrel, looking for tallgrass prairie with dense vegetation cover, often along the boundaries of woods or wetlands.

3.6. INSECT SURVEY METHODS

The following insect species were listed as species of concern and potentially present by the resource agencies (Appendix A) or were a target species:

Common Name	Species Name	Federal Listing	IL State Listing
Hine's Emerald Dragonfly	*Somatochlora hineana*	E	E
Rattlesnake-master Borer Moth	*Papaipema eryngii*	C	T

During the plant survey, the botanist looked for any Rattlesnake-master (*Eryngium yuccifolium*) which is the host plant for the Rattlesnake-master Borer Moth (*Papaipema eryngii*). Also, during the reptile survey transects the ecologist scanned for the Hine's Emerald Dragonfly (*Somatochlora hineana*) and other dragonfly / damselfly species (Odonates).

3.7. BIRD SURVEY METHODS

A visual encounter survey was conducted for bird species of concern within the project Action Area. Birds were surveyed by simple casual observation, paying particular attention to the Upland Sandpiper (*Bartramia longicauda*) habitat such as open upland areas. The following bird species were listed as species of concern and potentially present by the resource agencies (Appendix A) or were a target species:

Common Name	Species Name	Federal Listing	IL State Listing
Upland Sandpiper	*Bartramia longicauda*	BCC	E
Acadian Flycatcher	*Empidonax virescens*	BCC	
Bald Eagle	*Haliaeetus leucocephalus*	BCC	
Bell's Vireo	*Vireo bellii*	BCC	
Black-billed Cuckoo	*Coccyzus erythropthalmus*	BCC	T
Black-crowned Night-heron	*Nycticorax nycticorax*	BCC	E
Blue-winged Warbler	*Vermivora pinu*	BCC	
Dickcissel	*Spiza american*	BCC	
Field Sparrow	*Spizella pusilla*	BCC	
Henslow's Sparrow	*Ammodramus henslowii*	BCC	
Kentucky Warbler	*Oporornis formosus*	BCC	
Least Bittern	*Ixobrychus exilis*	BCC	T
Loggerhead Shrike	*Lanius ludovicianus*	BCC	E
Northern Flicker	*Colaptes auratus*	BCC	
Peregrine Falcon	*Falco peregrinus*	BCC	
Pied-billed Grebe	*Podilymbus podiceps*	BCC	
Prothonotary Warbler	*Protonotaria citrea*	BCC	
Red-headed Woodpecker	*Melanerpes erythrocephalus*	BCC	
Rusty Blackbird	*Euphagus carolinus*	BCC	
Short-eared Owl	*Asio flammeus*	BCC	E
Willow Flycatcher	*Empidonax traillii*	BCC	
Wood Thrush	*Hylocichla mustelina*	BCC	

BCC = Bird of Conservation Concern

4.0 RESULTS

4.1. MUSSEL SURVEY RESULTS

EnviroScience, Inc. and Central States Underwater (BP's representatives) completed the fieldwork for the mussel survey for the west (LDB) bank portion of the project Saturday, August 13, 2016 and the east (RDB) bank on Monday, August 15th, 2016. The project was led by Dr. Marty Huehner who was in possession of the federal, state general, and state T&E permits to complete the mussel work. Mr. Greg Zimmerman assisted with survey work and Mr. Phil Mathias provided topside data entry. Field conditions were very good, with a water temperature of 78ºF and below average flows (~1,000cfs). Representative digital images are presented in Appendix B.

The site was found to have high quality freshwater mussel habitat and resources (Figures 3.1a – 3.1f). The west bank search area was predominantly a large, shallow riffle and was found to have an extensive mussel bed that began at the upstream margin of the ADIs and extended downstream beyond the limits of the survey. The east bank also was found to contain high quality mussel resources but these were limited to a shallow riffle at the ADIs and in primarily a narrow band running near (3 to 15m) the right bank. The survey detected a large proportion of the species described in the recent IDNR / Illinois Natural History Survey Kankakee River watershed mussel study (Price et al 2012) at the site alive, including live federally and state listed Sheepnose (*Plethobasus cyphyus*), state threatened Black Sandshell (*Ligumia recta*) Purple Wartyback (*Cyclonaias tuberculata*), and a live Pistolgrip (*Tritogonia [=Quadrula]. verrucosa*) although not listed, was not picked up alive in Price et al. (2012).

Overall, a total of 1,587 living mussels and 24 species were detected alive or as fresh dead shells, and only one additional species was represented by weathered dead shells (Table 1). The project area was found to contain extensive and significant freshwater mussel resources including federally and state listed species. The state threatened Purple Wartyback (*Cyclonaias tuberculata*) and Black Sandshell (*Ligumia recta*) were commonly detected in both right and left bank survey areas. One live federally endangered Sheepnose (*Plethobasus cyphyus*) was collected within the west bank ADI and numerous fresh dead shells along the east bank, indicating the species was likely present along both sides of the river. A few weathered dead state threatened Spike (*Elliptio dilatata*) valves were collected but none of the specimens appeared to be recently extant. See Table 3.1.0 for federal and state status definitions. The Mucket (*Actinonaias ligamentina*) was the most abundant species found; comprising over 74% of the living mussels encountered.

Per the requirements of our federal and state permits, the draft results of the mussel survey were reported to the resource agencies within 36 hours after listed species were picked up. No live mussels were sacrificed; however representative dead valve specimens were retained and delivered to the INHS office to be vouchered.

Table 3.1.0. Status, Numbers, and Relative Abundance of Freshwater Mussels, from Kankakee River Mussel Survey (All Methods).

					LDB Best Condition[2]		RDB[3] Best Condition[2]		TOTAL Best Condition[2]			
Species	Common Name	Code	Federal Status[1]	IL Status[1]	Live	Relative frequency (% total)	Live	Relative frequency (% total)	Live	FD	D	Relative frequency (% total)
Actinonaias ligametina	Mucket	ACLI			975	79.9%	198	54.0%	1173			73.9%
Alasmidonta marginata	Elktoe	ALMA			6	0.5%	1	0.3%	7			0.4%
Amblema plicata	Threeridge	AMPL			33	2.7%	23	6.3%	56			3.5%
Cyclonaias tuberculata	**Purple Wartyback**	**CYTU**		**T**	**93**	**7.6%**	**11**	**3.0%**	**104**			**6.6%**
Elliptio dilatata	**Spike**	**ELDI**		**T**	**0**	**0.0%**	**0**	**0.0%**	**0**		**x**	**0.0%**
Fusconaia flava	Wabash Pigtoe	FUFL			4	0.3%	0	0.0%	4			0.3%
Lampsilis cardium	Plain Pocketbook	LACA			11	0.9%	5	1.4%	16			1.0%
Lampsilis siliquoidea	Fat Mucket	LASI			1	0.1%	0	0.0%	1			0.1%
Leptodea fragilis	Fragile Papershell	LEFR			4	0.3%	4	1.1%	8			0.5%
Ligumia recta	**Black Sandshell**	**LIRE**		**T**	**11**	**0.9%**	**6**	**1.6%**	**17**			**1.1%**
Lasmigona complanata	White Heelsplitter	LSCO			1	0.1%	0	0.0%	1			0.1%
Lasmigona costata	Flutedshell	LSCS			11	0.9%	2	0.5%	13			0.8%
Megalonaias nervosa	Washboard	MENE			5	0.4%	0	0.0%	5			0.3%
Obliquaria reflexa	Threehorn Wartyback	OBRX			3	0.2%	6	1.6%	9			0.6%
Pleurobema sintoxia	Round Pigtoe	PLSI			3	0.2%	2	0.5%	5			0.3%
Potamilus alatus	Pink Heelsplitter	POAL			10	0.8%	69	18.8%	79			5.0%
Plethobasus cyphyus	**Sheepnose**	**PLCY**	**E**	**E**	**1**	**0.1%**	**FD**	**0.0%**	**1**			**0.1%**
Quadrula metanevra	Monkeyface	QUME			4	0.3%	4	1.1%	8			0.5%
Quadrula pustulosa	Pimpleback	QUPU			34	2.8%	24	6.5%	58			3.7%
Toxolasma parvum	Lilliput	TXPA			FD	0.0%				x		
Tritogonia verrucosa	Pistolgrip	TRVE			1	0.1%	0	0.0%	1			0.1%
Truncilla donaciformis	Fawnsfoot	TRDO			2	0.2%	4	1.1%	6			0.4%
Truncilla truncata	Deertow	TRTR			6	0.5%	6	1.6%	12			0.8%
Utterbackia imbecillis	Paper Pondshell	UTIM			FD	0.0%				x		0.0%
Venustaconcha ellipsiformis	Ellipse	VEEL			1	0.1%	2	0.5%	3			0.2%
Total:					**1220**	**100.0%**	**367**	**100.0%**	**1587**			**100.0%**
No. of Species (Total Live + Fresh / Weathered Dead):	**25**				22		16		22	2	1	

[1] E = Endangered; SC = Special Concern; T = Threatened

[2] FD=fresh dead shell, D=includes weathered dead and subfossil shells

[3]. No transect searches were performed at the RDB site due to time / weather constraints, so comparison of number of mussels and species between banks is somewhat skewed since more effort was expended at the LDB.

4.1.1. Qualitative Searches (20-min Spot Searches)

A total of 565 live mussels from 19 species were collected from 14 "spot searches". These timed searches were completed in areas of mussel concentrations, with seven (7) searches performed along each bank. A total of 15 species were detected on the west (left descending) bank and 16 species were detected on the east (right descending) bank. Results from the spot searches are presented in Table 3.1.1 and Figure 3.1a.

Table 3.1.1. Mussel 20-minute Spot Search Results for West (Left Descending) and East (Right Descending) Bank Sites

20-minute Spot Search Results for West (Left Descending) Bank

Row Labels	ACLI	ALMA	AMPL	CYTU	FUFL	LACA	LEFR	LIRE	LSCS	OBRX	MENE	PLSI	POAL	PLCY	QUPU	QUME	QUPU	TRDO	TRTR	VEEL	Total	No. Species
T_ADI-C-ADI-U	38		2						1		1				1			2	1		46	7
T_ADI-D-ADI-C	10		1	2	1				1			1	1		3						20	8
T_10-D-20-D	1			1																	2	2
T_30-D-40-D	51		1	11	1	2		2	1			1	2		1						73	10
T_50-D-60-D	50		1	4		1			1						1				2		60	7
T_70-D-80-D	50		2	9			2														63	4
T_80-D-90-D	50	1	2	4		1									3						61	6
Total West Bank	**250**	**1**	**9**	**31**	**2**	**4**	**2**	**2**	**4**		**1**	**2**	**3**		**9**			**2**	**3**		**325**	**15**

20-minute Spot Search Results for East (Right Descending) Bank

Row Labels	ACLI	ALMA	AMPL	CYTU	FUFL	LACA	LEFR	LIRE	LSCS	OBRX	MENE	PLSI	POAL	PLCY	QUPU	QUME	QUPU	TRDO	TRTR	VEEL	Total	No. Species
T_10-U-ADI-U	25			2		1		3		2			3			1	4			1	42	9
T_ADI-C-ADI-D	45		1	2		1	1					1				1	7	2	1	1	63	11
T_16-26	30	1	3	4		1	1						1			1	6	2	2		52	11
T_26-36	10		5					1	1				9								26	5
T_46-56	4		1				1			1			3				1		1		12	7
T_66-76													12								12	1
T_86-96	3		4							1			22				2		1		33	6
Total East Bank	**117**	**1**	**14**	**8**		**3**	**3**	**4**	**1**	**4**		**1**	**50**			**3**	**20**	**4**	**5**	**2**	**240**	**16**
Grand Total	**367**	**2**	**23**	**39**	**2**	**7**	**5**	**6**	**5**	**4**	**1**	**3**	**53**	**0**	**9**	**3**	**20**	**6**	**8**	**2**	**565**	**19**

Outlined cells indicate listed species. Shaded cells indicate ADI .

4.1.2. Semi-quantitative Searches (Metered Transects)

A total of 13 (50-meter long) semi-quantitative search transects were completed along the left descending bank initially, with mussel data collected every 10m. No search transects were completed subsequently along the right descending bank in the interest of time; because the relatively high numbers of mussels (primarily Muckets) being collected along transects was resulting in processing backlog issues. Also, by then a sufficient species list for the site had already been generated and the relative mussel density / distribution at the site was high enough to be assessed with quadrats rather than semi-quantitative transect searches.

Overall, 800 mussels and 21 species were collected along search transects. Results from the transect searches are presented in Table 3.1.2 and Figure 3.1a. The federally and state endangered Sheepnose was detected within the west bank ADI, and 20 to 30m from shore. The state listed Purple Wartyback and Black Sandshell were found throughout the survey area, with the Black Sandshell being distributed primarily mid-river. The Spike was collected as a weathered dead shell only.

The Mucket was dominant, comprising 80.6% of the mussels collected. The Purple Wartyback was the second most abundant species (7.3%) and the Black Sandshell (1%) the fifth most abundant. Because the transect search method uses visual and tactile searches, there was likely considerable detection bias towards larger species.

Table 3.1.2. Mussel Transect Search Results for West (Left Descending Bank) *

Transect / Dist.(m) from ADI	ACLI	ALMA	AMPL	CYTU	ELDI	FUFL	LACA	LASI	LEFR	LIRE	LSCO	LSCS	MENE	OBRE	PLSI	POAL	QUME	QUPU	TRTR	VEEP	PLCY	Total / Transect	Species / Transect
10-U	1			1																		2	3
ADI-U																						0	1
ADI-C	78		3	21		1	1			2		1		2		2	2	10	1			124	13
ADI-D	62	1	2	13			1				1	1				1	1	5			1	89	12
10-D	33		1	3			1															38	5
20-D	41		1	2										1				1				46	6
30-D	54			2						1			1					1		1		60	7
40-D	29																					29	2
50-D	25			1									1					1				28	5
60-D	8		1	2								1										12	5
70-D	26		2						1				2			1		1				33	7
80-D	33		5	3			1			3												45	6
90-D	255	1	8	11			2	1	1	2		3			1	3	1	4	1			294	15
Grand Total	**645**	**2**	**23**	**59**		**1**	**6**	**1**	**2**	**8**	**1**	**6**	**4**	**3**	**1**	**7**	**4**	**23**	**2**	**1**	**1**	**800**	**21**
Species Status:				T						T											E		

T = State threatened, E = Federally and State endangered.

*Transect searches were not performed on the east (right descending) bank due to shift to more quantitative work and time constraints with pending poor weather.

4.1.3. Quantitative Searches (Quadrats)

A total of 62 quadrat (0.25m^2) samples were excavated along transects and examined on the surface by the ES malacologist. Quadrats on the left bank were collected every 10m into the river to 50m along 5 transects surrounding the ADI. For the right bank, quadrats were collected every 5m on the right bank out to 35m since the mussel distribution was only narrowly distributed there, and there was little mussel habitat beyond 10m from the right bank.

A total of 20 quadrats (0.25m^2) were collected within the west bank from the ADI and immediately downstream along established transects (Figure 3.1d). A total of 73 mussels were collected. The average mussel density for all species was 14.6/m^2, with only 4 quadrats being empty. The maximum observed density was 60/m^2 and this sample was within the ADI, 20m from the bank. The Mucket was dominant at 11.4/m^2. The state endangered Purple Wartyback and Black Sandshell were detected at 0.6/m^2 and 0.2/m^2, respectively. The federally and state endangered Sheepnose was not detected. Results from the quadrat excavations are presented in Table 3.1.3 and Figures 3.1d – 3.1f.

A total of 42 quadrats (0.25m^2) were collected along the east bank throughout the entire survey reach and a total of 127 mussels were collected from 13 live species. The average mussel density for all species was 12.1/m^2, with 13 quadrats being empty. The maximum observed density was 56/m^2 and this sample was 10m downstream from the ADI. The Mucket was dominant at 7.7/m^2. The state endangered Purple Wartyback and Black Sandshell were detected at 0.29/m^2 and 0.20/m^2, respectively. The federally and state endangered Sheepnose was not detected but a density estimate was calculated based on relative abundance (see Discussion). Results from the quadrat excavations are presented in Table 3.1.3 and Figures 3.1d – 3.1f.

Table 3.1.3. Mussel Quantitative (Quadrat) – Based Estimated Density Results for West (Left Descending) and East (Right Descending) Banks.*

					West (LDB) Density			East (RDB) Density			Total Average Density		
Species	Common Name	Code	Federal Status[1]	IL Status[1]	Live	No/m^2	Relative frequency (% total)	Live	No/m^2	Relative frequency (% total)	Live	No/m^2	Relative frequency (% total)
Actinonaias ligametina	Mucket	ACLI			57	11.40	78.1%	81	7.71	63.8%	138	8.903	69.0%
Alasmidonta marginata	Elktoe	ALMA			3	0.60	4.1%			0.0%	3	0.194	1.5%
Amblema plicata	Threeridge	AMPL			1	0.20	1.4%	9	0.86	7.1%	10	0.645	5.0%
Cyclonaias tuberculata	**Purple Wartyback**	**CYTU**		**T**	**3**	**0.60**	**4.1%**	**3**	**0.29**	**2.4%**	**6**	**0.387**	**3.0%**
Elliptio dilatata	**Spike**	**ELDI**		**T**			**0.0%**			**0.0%**			**0.0%**
Fusconaia flava	Wabash Pigtoe	FUFL			1	0.20	1.4%			0.0%	1	0.065	0.5%
Lampsilis cardium	Plain Pocketbook	LACA			1	0.20	1.4%	2	0.19	1.6%	3	0.194	1.5%
Lampsilis siliquoidea	Fatmucket	LASI					0.0%			0.0%			0.0%
Leptodea fragilis	Fragile Papershell	LEFR					0.0%	1	0.10	0.8%	1	0.065	0.5%
Ligumia recta	**Black Sandshell**	**LIRE**		**T**	**1**	**0.20**	**1.4%**	**2**	**0.19**	**1.6%**	**3**	**0.194**	**1.5%**
Lasmigona complanata	White Heelsplitter	LSCO					0.0%			0.0%			0.0%
Lasmigona costata	Flutedshell	LSCS			1	0.20	1.4%	1	0.10	0.8%	2	0.129	1.0%
Megalonaias nervosa	Washboard	MENE					0.0%			0.0%			0.0%
Obliquaria reflexa	Threehorn Wartyback	OBRX					0.0%	2	0.19	1.6%	2	0.129	1.0%
Pleurobema sintoxia	Round Pigtoe	PLSI					0.0%	1	0.10	0.8%	1	0.065	0.5%
Potamilus alatus	Pink Heelsplitter	POAL					0.0%	19	1.81	15.0%	19	1.226	9.5%
Plethobasus cyphyus	**Sheepnose**	**PLCY**	**E**	**E**	**0**	**0.06**	**0.0%**	**0**	**0.06**	**0.0%**	**0**	**0.06**	**0.0%**
Quadrula metanevra	Monkeyface	QUME					0.0%	1	0.10	0.8%	1	0.065	0.5%
Quadrula pustulosa	Pimpleback	QUPU			3	0.60	4.1%	4	0.38	3.1%	7	0.452	3.5%
Tritogonia verrucosa	Pistolgrip	TRVE			1	0.20	1.4%			0.0%	1	0.065	0.5%
Truncilla donaciformis	Fawnsfoot	TRDO					0.0%			0.0%			0.0%
Truncilla truncata	Deertoe	TRTR			1	0.20	1.4%	1	0.10	0.8%	2	0.129	1.0%
Venustaconcha ellipsiformis	Ellipse	VEEL					0.0%			0.0%			0.0%
Total:					**73**	**14.66**	**100.0%**	**127**	**12.16**	**100.0%**	**200**	**12.96**	**100.0%**
No. of Species (Total Live + Dead):					11			13			16		
No. Samples (Quadrats)					20			42			62		

[1] E = Endangered; SC = Special Concern; T = Threatened

[2] FD=fresh dead shell, D=includes weathered dead and subfossil shells

Because a Sheepnose was not detected in quadrat sampling, a density estimate is presented based on the species' observed relative abundance, comparable to the density of other rare species that were detected in quadrat sampling.

4.2. FISH SURVEY RESULTS (PENDING WEATHER)

ES mobilized on August 14th, 2016 immediately after state permit approvals to complete the fisheries survey on the 15th. However, during the night the Kankakee Watershed received a large amount of rain which caused flooding and turbid water conditions when ES arrived on-site. Since that point, the Kankakee River has been well above 2000cfs which is the preferable sampling level. On October 2nd, 2016 the team again mobilized but once again a rain event caused river levels to exceed 3000cfs and the event was cancelled. Once river levels are acceptable, the results of the fishery survey will be provided as an addendum or as a revised version to this report.

4.3. REPTILE SURVEY RESULTS

A local herpetologist and ecologist (Matthew J. Igleski) performed a habitat survey for the Eastern Massasauga Rattlesnake (*Sistrurus c. catenatus*) and other target species (e.g. Blanding's Turtle; *Emydoidea blandingii*) concurrent with the mussel survey on August 13th, 2016. A total of 0.37 hectares was surveyed with no rattlesnakes or Blanding's Turtles found at either easement. The west easement was characterized by mostly tall grasses (>1m). The east easement was mostly goldenrod, with a section (about 15m of the 200m) of short grasses (<1m) near the river. No crayfish burrows were observed on either side of the river, which can be important for *Sistrurus c. catenatus* to overwinter. Neither site offered significant deadfall or the like which might offer cover for snakes and other small animals. No animals considered prey for *Sistrurus c. catenatus* were observed at either site. Overall, neither easement offered significant suitable habitat, making occupation by *Sistrurus c. catenatus* or *Emydoidea blandingii* unlikely. One water snake was briefly observed by a non-specialist at the west bank just upstream of the ADI, but could not be positively identified in the few seconds it was observed. It was considered likely to be a Northern Water Snake (*Nerodia sipedon*). Representative digital images of the reptile and upland species survey are presented in Appendix C.

4.4. VEGETATION SURVEYS / BAT HABITAT RESULTS

4.4.1. Endangered Plant Survey / Bat Habitat Results

The vegetation survey was conducted on August 26, 2016 by Dr. Timothy Walters, Botanist / Ecologist. The entire corridor was walked and checked for the presence of rare plant species. No rare plants or the typical community that supports a rare plant species was observed present within the corridor. Representative digital images of the vegetation and mammal habitat survey are presented in Appendix C.

The corridor on the west side of the river was a sloped old field community characterized by Smooth Fescue (*Rhus glabra*) shrubs. A less shrubby old field community characterized the east side of the river, which was dominated by Canada Goldenrod (Solidago canadensis), among others. The last community was a densely shrubby community along the edge of an active soybean field. Plant species that were detected in each community included:

<u>West Corridor</u>
Smooth Sumac *Rhus glabra*
Tall Fescue *Festuca arundinacea*
Common Milkweed *Asclepias syriaca*

Sweet Clover *Melilotus*
Canada Goldenrod *Solidago canadensis*
Solomon's Seal *Polygonatum canaliculatum*

East Corridor
Canada Goldenrod *Solidago canadensis*
Field Thistle *Cirsium discolor*
Allegheny Blackberry *Rubus allegheniensis*
Autumn Olive *Elaeagnus umbellata*
Purpletop (*Triodia flava*)
Jerusalem artichoke (*Helianthus tuberosus*)
Tall Fescue (*Festuca arundinacea*)
Black Walnut (*Juglans nigra*)
Reed Canarygrass (*Phalaris arundinacea*)

Edge of Active Soybean Field
White Mulberry (*Morus alba*)
Allegheny Blackberry (*Rubus allegheniensis*)
Black Walnut (*Juglans nigra*)
Siberian Elm (*Ulmus pumila*)
Japanese Bristlegrass (*Setaria faberi*)
Great Ragweed (*Ambrosia trifida*)
Canada Goldenrod (*Solidago canadensis*)
Hedge Bindweed (*Calystegia sepium*)

4.4.2. Wetland Assessment / Delineation Results (Delineation Report Pending)

As previously discussed, it was initially thought by BP USPL that all significant wetland and waterway resources within the Action Area were included in the submitted USACE permit application and defined as areas below the ordinary high water mark of the Kankakee River. However, based on the botanist's observations of potential wetland areas during the botanical survey, additional work is now planned. It is believed two to three small wetland areas may exist within the Action above or partially above the ordinary high watermark. While the botanical survey categorized the plant communities within these areas, some additional soil descriptions, hydrology observations and GPS are needed in these areas to confirm and accurately delineate the boundaries of these wetlands to USACE standards.

One potential narrow wetland was observed on the west bank running parallel to the of the river, approximately 20ft wide and running perpendicular through the right of way and approximately 30ft from the water's edge. This wetland was located on a floodplain shelf near and possibly above the ordinary high waterline. A second potential wetland of similar configuration was observed on the east bank and likely perched likely above the ordinary high watermark. A third area that could potentially meet the definition of a wetland was a patch of reed canary grass (*Phalaris arundinacea*) that was observed on the east bank near the turn along the row crop site access. It is likely that these potential wetland areas will only need to be temporarily impacted by construction equipment access and will not be otherwise excavated or filled. A full wetland delineation and report is scheduled to be completed and will be submitted under separate cover. Fieldwork for the wetland delineation is scheduled to be performed prior to October 15th, 2016.

4.5. MAMMAL SURVEY RESULTS

No evidence of bats or potential endangered cave-dwelling bat habitat, such as trees or structures with suitable roosting areas, or hibernacula, were observed within the survey area. No tallgrass prairie with dense vegetation cover along the boundaries of woods or wetlands was observed, although the western easement was considered a low quality shrub / scrub habitat adjacent to woods and wetlands and could possibly provide some marginal habitat for the Franklin's Ground Squirrel.

4.6. TERRESTRIAL INSECT SURVEY RESULTS

Terrestrial insect surveys were performed by ecologist Matthew J. Igleski concurrent with the reptile survey transect searches, and along both river banks on August 13th, 2016. Also, botanist Dr. Tim Walters surveyed the site on August 26th, 2016 for the plant species Rattlesnake-master (*Eryngium yuccifolium*), which is the host plant for the Rattlesnake-master Borer Moth (*Papaipema eryngii*). No listed insects were observed during the surveys, and the Rattlesnake-master plant was not detected. Insect species observed were:

Odonates (Dragonflies and Damselflies)
- Blue-fronted Dancer *Argia apicalis*
- Widow Skimmer *Libellula luctuosa*
- Eastern Amberwing *Perithemis tenera*
- Darner spp.

Diapheromeridae (Walking Sticks)
- Northern Walkingstick *Diapheromera femorata*

Mantidae
- Praying Mantis *Mantis religiosa*

Lepidoptera (Butterflies and Moths)
- Black Swallowtail *Papilio polyxenes*
- Monarch Butterfly *Danaus plexippus*

4.7. BIRD SURVEY RESULTS

Bird surveys were performed by ecologist Matthew J. Igleski concurrent with the reptile survey transect searches, and along both river banks. No federal or state listed species were detected. Additional species that were detected on-site included:

West Easement
- Tufted Titmouse *Baeolophus bicolor*
- Song Sparrow *Melospiza melodia*
- White-breasted Nuthatch *Sitta carolinensis*
- Downy Woodpecker *Picoides pubescens*
- American Robin *Turdus migratorius*
- Black-capped Chickadee *Poecile atricapillus*

East Easement
- Gray Catbird *Dumetella carolinensis*
- Downy Woodpecker *Picoides pubescens*
- Blue Jay *Cyanocitta cristata*
- American Robin *Turdus migratorius*
- Northern Cardinal *Cardinalis cardinalis*
- Eastern Towhee *Pipilo erythrophthalmus*
- Indigo Bunting *Passerina cyanea*

Song Sparrow *Melospiza melodia*
American Goldfinch *Spinus tristis*

River
Belted Kingfisher *Megaceryle alcyo*n
Caspian Tern (3) *Hydroprogne caspia*
Ring-billed Gull *Larus delawarensis*
Turkey Vulture *Cathartes aura*
Killdeer (3) *Charadrius vociferus*
Northern Rough-winged Swallow *Stelgidopteryx serripennis*

5.0 DISCUSSION

5.1. FRESHWATER MUSSELS

A relatively dense and diverse freshwater mussel community was found within and immediately adjacent to the project area ADIs, including federally and state listed species on both sides of the river. Ironically, the presence of this high quality mussel community is probably due in part or enhanced by the presence of the existing pipelines at this location. The effects of the pipeline on river flow can be observed as far back as 1988 in aerial photography. The pipeline armoring effect of placed grout bags appears to have raised and stabilized the stream bed slightly and created a grade control and stable riffle / flow refuge downstream from the alignment. Immediately upstream from the pipeline the river has a slow, lake-like pool habitat and expanses of bedrock that is often poor habitat for sensitive mussel species, and again 200m downstream the river begins to slow down and increase in depth. As a result, the area at the pipeline and for a few hundred meters downstream may represent the best mussel habitat within at least a kilometer or more upstream and downstream.

While the Sheepnose was detected in transect surveys, none were detected in quadrat sampling, which presented somewhat of a challenge to calculate a density estimate for the species. A density estimate for the federally and state listed Sheepnose would be needed for any Biological Assessment and Incidental Take Authorization permit applications. We proposed that the density estimates in Table 3.1.3, simply based on the species' observed relative abundance, would be comparable to other rare species picked up in quadrat sampling (e.g. Pistolgrip), with an estimated overall site density of 0.06/m^2. We considered this the best method, since the Sheepnose was known to exist at the west bank and likely existed at the east bank based on the presence of numerous fresh dead valves. The estimated density of the Sheepnose using this method was therefore considered 0.06/m^2 at all locations (Table 3.1.3 and Table 4.1.1).

Alternately, because the single Sheepnose was detected in a semi-quantitative transect search, the density of the species could have been assessed using the number of transect segments surveyed. A total of eleven (50m) transects were surveyed on the west bank only, for a total of 550m^2 of habitat surveyed. Transect searches typically are not 100% efficient at mussel detection, so a commonly cited efficiency rate of 50% could be applied, resulting in 1 Sheepnose detected in 225m^2 of habitat, or a density of 0.004/m^2. We dismissed this method as greatly underestimating the Sheepnose population. A comparison of quadrat sampling results to the semi-quantitative sampling results indicated transect search efficiency may have been as low as 10%. A total of 800 mussels were collected during transect survey of 550m^2 but based on the more-precise excavated quadrat-calculated density in the area, there should have been approximately 8,035 mussels in the transect searches at 100% search efficiency. Low search efficiency is common in high density mussel concentrations where the efforts required to detect all mussels present greatly exceeds the allocated survey time (G. Zimmerman, pers. obs.). We believe the low efficiency observed on the transect searches here was a combination of high mussel density, and the partial use of commercial divers with limited mussel survey experience. Again, for this reason we proposed basing the density estimate of the Sheepnose on the lowest observed density found within the quantitative quadrat sampling.

5.1.1. Estimated T&E Mussel Density within the ADI

The west (left descending) bank ADI was estimated to contain 239m^2 (2,577sf) of mussel / fish habitat and the east (right descending) bank ADI was estimated to contain 524m^2 (5,639sf) of mussel / fish habitat based on draft construction drawings provided by BP USPL and GPS locations of the shore waterline at low flow. In total, 763m^2 (8,216sf) of suitable T&E habitat is likely within the ADI. Applying the mussel density estimates to these areas suggests that approximately 7,805 mussels, including 36 Sheepnose, 241 Purple Wartyback, 116 Black Sandshell, and 7,427 non-listed species inhabit the direct impact areas of the project (Table 4.1.1).

Table 4.1.1. Estimated Number of Threatened and Endangered, and Non-listed mussels within the Areas of Direct Impact (Before 70% Salvage & Relocation).

Species	**West Bank (LDB) 239m^2 (2,577sf)**		**East Bank (RDB) 524m^2 (5,639sf)**		**Total Mussels Both Sites**
	Density Est. (No./m^2)	Total Mussels	Density Est. (No./m^2)	Total Mussels	
Sheepnose (FE, SE)	0.06	14	0.06	31	46
Purple Wartyback (T)	0.60	143	0.29	152	295
Black Sandshell (T)	0.20	48	0.19	100	147
Non-listed	13.75	3,286	11.6	6078	9,375
Total (All Species)	**14.61**	**3,492**	**12.1**	**6,340**	**9,832**

FE = Federally endangered; SE = State endangered; T = Threatened.
Note: columns will not total exactly due to rounding effects and results shown in whole mussels.

An effective mussel salvage effort using a grid system and multiple (2 to 3) passes, coupled with long-term habitat and mussel monitoring, and effective best management practices at this site would be likely conservation measures employed to offset the temporary impacts from the proposed repair. As previously stated, the mussel resources at this site may exist in part due to the presence of the pipeline, so a repair of the problem areas would be more beneficial to mussel species compared to other construction alternatives such as decommissioning and removing the existing pipeline.

5.2. FISHES

While field sampling for fish species has not been completed at the site to date, some idea of species present can be inferred from the habitats observed during the mussel survey (Table 4.2.0). Habitat with in the study varies from left descending back to right descending bank. The left bank is shallow riffle ranging from 1.0 to 2.5ft in depth at low flow with a substrate composition of predominately gravel mixed with cobble and sand. Some bedrock is also present toward the downstream side of the sampling area. The right descending bank is made up of glide / pool stream morphology and with a greater maximum depth (4 to 6ft) closer to the bank (40 to 50m

from the RDB). The substrate is predominately gravel and cobble with sand in interstitial spaces, and there are expanses of bedrock immediately upstream of the survey area. Emergent vegetation (Knotweed [*Polygonum spp*.]) is present on both banks, however only a narrow line of vegetation is present on the right bank due to increased water depth.

The Pallid Shiner (*Hybopsis amnis*) and River Redhorse *(Moxostoma carinatum)* are likely to be to be found within the sampling reach, but in different places. Pallid Shiner prefers slow shallow water more represented on the left descending bank, whereas, the River Redhorse prefers deeper runs of the right descending bank. Some species that have habitat preferences similar to smaller sections of the study reach are the Greater Redhorse (*Moxostoma valenciennesi*), (deep pool), American Brook Lamprey (*Lethenteron appendix*) (large river) and Western Sand Darter (*Ammocrypta clarum*) (bedrock / sand). It should be noted that no lamprey of any type were observed during extensive bottom excavations during the mussel survey. Lamprey can be commonly encountered during mussel surveys within some watersheds in northwestern Pennsylvania (G. Zimmerman, pers. obs.).

Other state listed fish species are present in the Kankakee River watershed but probably have only a moderate potential for collection or impact due to habitat preferences. These species, including Blacknose Shiner *(Notropis heterolepis)*, Weed Shiner *(Notropis texanus),* Banded Killifish *(Fundulus diaphanus)*, Starhead Topminnow (*Fundulus dispar*) and American Eel (*Anguilla rostrata*), prefer low gradient rivers / lakes with sandy bottoms and aquatic vegetation. The Northern Brook Lamprey (*Ichthyomyzon fossor*) is unlikely to be present as they typically prefer small, high gradient streams near a larger river for rearing ameocetes (Troutman 1957).

Table 4.2.0. Threatened and Endangered Fish Species Potentially within Survey Area based on Desktop Analysis.

Common Name	Species	Listing	Potential Within Survey Area	Direct Effects*	Indirect Effects*	Habitat Preference
Western Sand Darter	*Ammocrypta clarum*	**E**	High	8	16	Bedrock / sand
Pallid Shiner	*Hybopsis amnis*	**E**	High	4	8	Slow shallow water
American Brook Lamprey	*Lethenteron appendix*	T	High	4	8	Large rivers
River Redhorse	*Moxostoma carinatum*	T	High	4	8	Deep runs
Greater Redhorse	*Moxostoma valenciennesi*	**E**	High	4	8	Deep pool
American Eel	*Anguilla rostrata*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Banded Killifish	*Fundulus diaphanus*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Starhead Topminnow	*Fundulus dispar*	T	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Blacknose Shiner	*Notropis heterolepis*	**E**	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Weed Shiner	*Notropis texanus*	**E**	Moderate / Low	4	8	Low gradient, sand, aq. veg.
Northern Brook Lamprey	*Ichthyomyzon fossor*	**E**	Low	2	4	High grad. streams adj. large rivers

E = State endangered, T = State threatened.

5.3. TERRESTRIAL T&E SPECIES

Terrestrial / nearshore field surveys did not observe any other listed or species of concern not noted above such as dragonflies (Odonates), ground squirrels, birds, birds of prey, plants, or bats as shown on the EcoCat natural resource review results and IPaC Trust Resources Report previously provided to BP, or any federal species known from Will County with the exception of the Sheepnose Mussel (Table 4.3). Due to the relatively disturbed, periodically mowed habitat of most of the upland easements, the potential for additional species not identified above was considered to be low. Care should be taken during construction, if approved, to implement best management practices including sediment and erosion controls, an adequate spill prevention

plan, and invasive species decontamination of new equipment and invasive species management of disturbed areas.

Table 4.3. Federal T&E Species of Concern and Site Findings.

Species	Status	Details	Proposed Determination
Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests and woods.	Presence uncertain. No roost trees or habitat will be affected by construction. Not likely to adversely affect.
Hine's emerald dragonfly *Somatochlora hineana*	Endangered	Spring fed wetlands, wet meadows and marshes	None observed, habitat lacking. Not likely to adversely affect.
Hine's emerald dragonfly *Somatochlora hineana*	Critical Habitat Designated	Map and written description of the areas designated as Critical Habitat (PDF)	None observed, outside of designated critical habitat. Not likely to adversely affect.
Eastern Massasauga rattlesnake *Sistrurus c. catenatus*	Proposed as Threatened	Graminoid dominated plant communities (fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands)	None observed, habitat marginal. Not likely to adversely affect.
Sheepnose mussel *Plethobasus cyphyus*	Endangered	Shallow areas in larger rivers and streams	**Present,** likely found throughout the survey area in low numbers (0.06/m^2). May affect, likely to adversely affect.
Rattlesnake-master Borer Moth	Candidate	Undisturbed prairie and woodland openings that contain their only food plant, rattlesnake-master (*Eryngium yuccifolium*).	None observed, no forage food found on site. Not likely to adversely affect.
Eastern prairie fringed orchid *Platanthera leucophaea*	Threatened	Emergent wetland, wet meadow, sedge meadow, fen, wet to mesic prairie, or marsh edges.	None observed. Non-habitat. Not likely to adversely affect.
Lakeside daisy *Hymenopsis herbacea*	Threatened	Open, sunny grassland areas with a limestone substrate.	None observed. Non-habitat. Not likely to adversely affect.
Leafy-prairie Clover *Dalea foliosa*	Endangered	Prairie remnants along the Des Plains River.	None observed. Non-habitat. Not likely to adversely affect.
Mead's milkweed *Asclepias meadii*	Threatened	Perennial plant of tallgrass prairies.	None observed. Not likely to adversely affect.

6.0 REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classifications of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Price, A.L. Shasteen D.K. and Bales S.A. 2012. *Freshwater Mussels of the Kankakee River*, INHS Technical Report 2012 (12), Prepared for: Illinois Department of Natural Resources: Office of Resource Conservation, U.S. Fish & Wildlife Service, Illinois Natural History Survey, Issued March 26, 2012. Prairie Research Institute, University of Illinois at Urbana Champaign. 16p+Appendix.

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Transect and 20min Spot Search CPUE Results (All Species)

No. Mussels (Sheepnose)/ 10m Transect

- 0
- 1

No. Mussels (All Species) /10m Transect

- 0
- 1 - 7
- 8 - 16
- 17 - 29
- 30 - 44
- 45 - 73

No. Mussels (All Species) /Spot Search (20min)

- 2 - 10
- 11 - 30
- 31 - 55
- 56 - 65
- 66 - 73

90m DS
60m DS
30m DS
10m US
96m DS
56m DS
26m DS
6m DS
10m US
West ADI (LDB)
East ADI (RDB)
ADI-D
ADI-C
ADI-U
Kankakee River-->
Transect searches not completed on East Bank

Highlighted transect search points at ADI-U were estimated.

Figure 3.1a. Transect and Spot Search CPUE Results (All Species).

- Temporary Dam / ADI Limits
- Transects
- Pipeline
- Direct Excavation

0 50 100 200 Feet
0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_Mussels.mxd
Date: 10/5/2016

Basemap courtesy of Google.

No. Mussels (Sheepnose)/ 10m Transect

- 0
- 1

No. Mussel (Purple Wartyback)/ 10m Transect

- 0
- 1 - 2
- 3 - 5
- 6 - 8
- 9 - 11

90m DS

60m DS

30m DS

10m US

96m DS

56m DS

26m DS

10m US

Kankakee River

Westt ADI (LDB)

ADI-D

ADI-C

ADI-U

East ADI (RDB)

ADI-D

ADI-C

ADI-U

Google

Figure 3.1b. Transect and Spot Search CPUE Results (Sheepnose and Purple Wartyback).

- Temp. Dam / ADI Limits
- Transects
- Pipeline
- Direct Excavation

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Date: 10/5/2016 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU+BP_Kankakee\8695_GIS\Map2_CYTU.mxd

Basemap courtesy of Google.

No. Mussels (Sheepnose)/ 10m Transect

0

1

No. Mussel (Black Sandshell)/ 10m Transect

0

1

2

3

90m DS

60m DS

30m DS

10m US

Westt ADI (LDB)

ADI-D

ADI-C

ADI-U

<--Kankakee River-->

96m DS

56m DS

26m DS

East ADI (RDB)

ADI-D

ADI-C

ADI-U

10m US

Google

Figure 3.1c. Transect and Spot Search CPUE Results (Sheepnose and Black Sandshell).

Temp. Dam / ADI Limits

Transects

Pipeline

Direct Excavation

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Date: 10/5/2016 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_LIRE.mxd

Basemap courtesy of Google.

No. Mussels (All Species) / 0.25m²

- 0
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 31

90m DS

60m DS

30m DS

96m DS

56m DS

26m DS

10m US

Westt ADI (LDB)

ADI-D

ADI-C

ADI-U

East ADI (RDB)

ADI-D

ADI-C

ADI-U

10m US

-Kankakee River->

Google

Figure 3.1d. Quadrat Search CPUE Results (All Species).

- Temp. Dam / ADI Limits
- Transects
- Pipeline
- Direct Excavation

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Basemap courtesy of Google.

Date: 10/5/2016 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsALL.mxd

Figure 3.1e. Quadrat Search
CPUE Results (P. Wartyback).

Temp. Dam / ADI Limits
Transects
Pipeline
Direct Excavation

0 50 100 200 Feet
0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Basemap courtesy of Google.

Date: 10/5/2016 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsCYTU.mxd

Figure 3.1f. Quadrat Search
CPUE Results (Black Sandshell).

Temporary Dam
Transects
Pipeline
Direct Excavation

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Basemap courtesy of Google.

Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsLIRE.mxd
Date: 10/5/2016

Appendix A: Agency Coordination Documents

- USFWS May 10, 2016 IPaC Trust Resources Report
- IDNR May 5, 2016 EcoCAT Natural Resource Review Results
- IDNR August 3, 2016 Correspondence

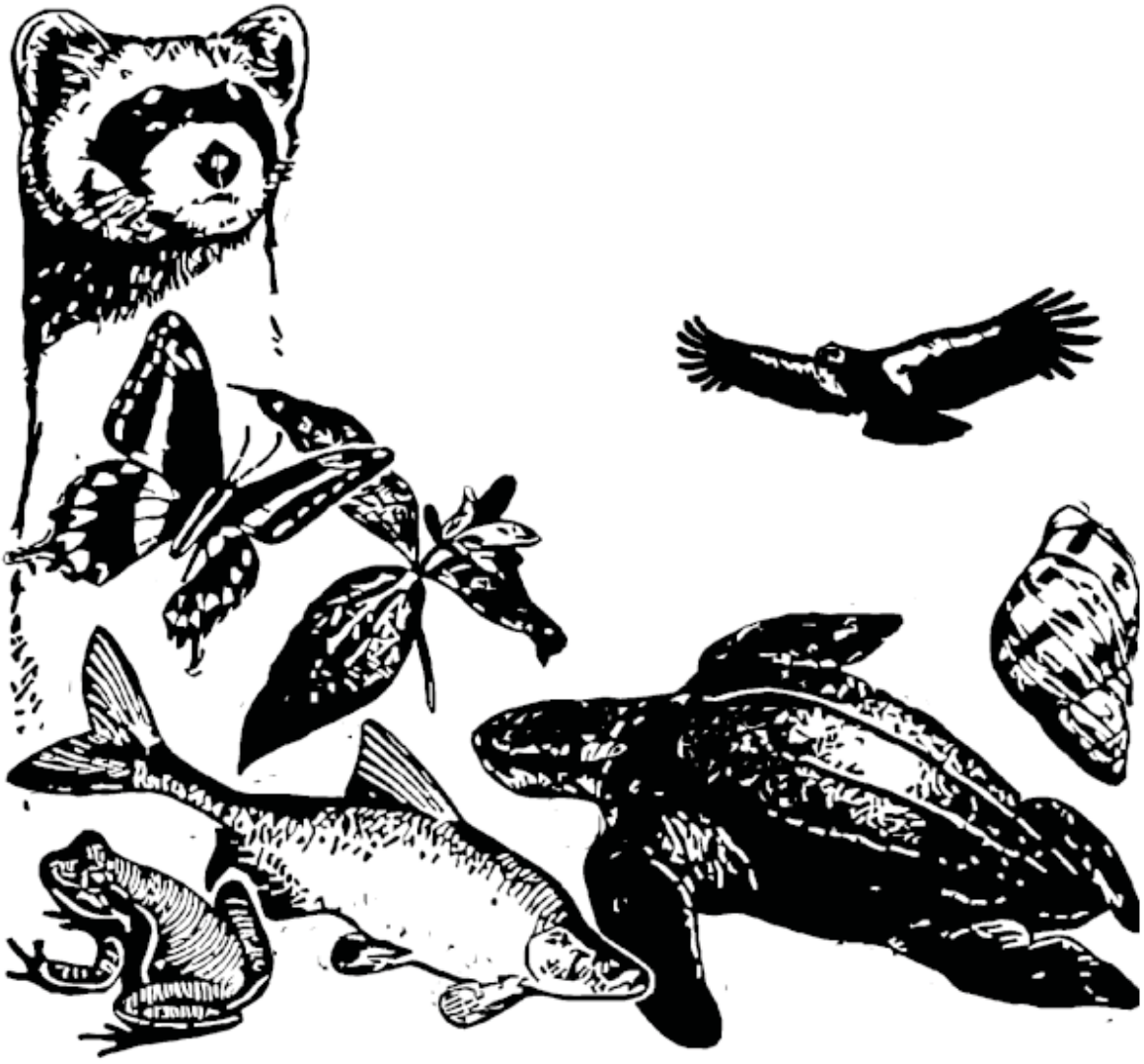
U.S. Fish & Wildlife Service

EFM-MAN 2015-065A-C

IPaC Trust Resources Report

Generated May 10, 2016 11:21 AM MDT, IPaC v3.0.7

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

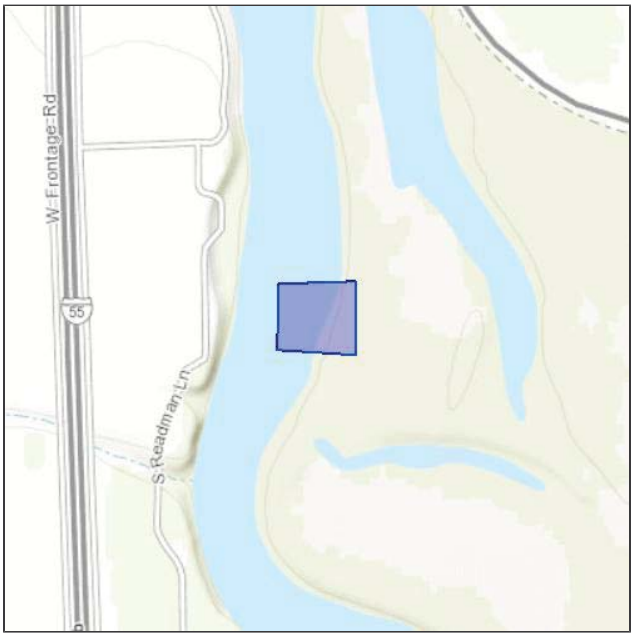
EFM-MAN 2015-065A-C

LOCATION

Will County, Illinois

IPAC LINK

https://ecos.fws.gov/ipac/project/RCZE2-F36FV-GXLFL-TIK2O-HNXAYQ



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Chicago Ecological Service Field Office
1250 South Grove Avenue Suite 103
Barrington, IL 60010-5010
(847) 381-2253

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Clams

Sheepnose Mussel Plethobasus cyphyus — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F046

Flowering Plants

Eastern Prairie Fringed Orchid Platanthera leucophaea — Threatened

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Will this project impact, directly or indirectly, emergent wetland, wet meadow, sedge meadow, fen, wet to mesic prairie, or marsh edges?

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2GG

Lakeside Daisy Hymenoxys herbacea — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2U6

Leafy Prairie-clover Dalea foliosa — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q28M

Mead's Milkweed Asclepias meadii — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1T6

Insects

Hine's Emerald Dragonfly Somatochlora hineana — Endangered

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=I06P

Rattlesnake-master Borer Moth Papaipema eryngii — Candidate

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=I0LJ

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Reptiles

Eastern Massasauga (=rattlesnake) Sistrurus catenatus — Proposed Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C03P

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Acadian Flycatcher Empidonax virescens — Bird of conservation concern
Season: Breeding

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Black-crowned Night-heron Nycticorax nycticorax — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EU

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Field Sparrow Spizella pusilla — Bird of conservation concern
Season: Breeding

Henslow's Sparrow Ammodramus henslowii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09D

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Northern Flicker Colaptes auratus — Bird of conservation concern
Year-round

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii

Bird of conservation concern

Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina

Bird of conservation concern

Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Forested/shrub Wetland

PFO1A

Riverine

R2UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

EcoCAT
Ecological Compliance Assessment Tool

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: BP US Pipeline & Logistics
Contact: Abigail Burns
Address: 150 W. Warrenville Road
Naperville, IL 60563

Project: EFM-Man ILIs
Address: 30399 S Readman Ln, Wilmington

IDNR Project Number: 1610630
Date: 05/10/2016

Description: Utility Maintenance

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Kankakee River INAI Site
Black Sandshell *(Ligumia recta)*
Blanding's Turtle *(Emydoidea blandingii)*
Franklin's Ground Squirrel *(Spermophilus franklinii)*
Loggerhead Shrike *(Lanius ludovicianus)*
Pallid Shiner *(Hybopsis amnis)*
Purple Wartyback *(Cyclonaias tuberculata)*
River Redhorse *(Moxostoma carinatum)*
Sheepnose *(Plethobasus cyphyus)*
Spike *(Elliptio dilatata)*
Upland Sandpiper *(Bartramia longicauda)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Will

Township, Range, Section:
33N, 9E, 15
33N, 9E, 22

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

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Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

Bruce Rauner, Governor
Wayne A. Rosenthal, Acting Director

August 3, 2016

Diane Hoeting
BP US Pipeline & Logistics
150 W. Warrenville Road
Naperville, IL 60563

RE: Pipeline Repair, Kankakee, EFM-MAN 2015-065 A-E; 066 A-C
Project Number(s): 1610907
County: Will

Dear Ms. Hoeting:

This letter is in reference to the project you recently submitted for consultation regarding pipeline repairs in the Kankakee River approximately 3.5 miles downstream of the Wilmington Dam. The repair work will involve the use of cofferdams. The Department has evaluated this information and provides the following recommendations:

Freshwater Mussels
Records for the state- threatened black sandshell (*Ligumia recta*), spike (*Elliptio dilatata*), purple wartyback (*Cyclonaias tuberculate*), and state and federally-endangered sheepnose (*Plethobasus cyphyus*) occur in the project vicinity. The Department has requested a mussel survey and concurred with survey proposal via email dated July 21, 2016. A salvage authorization for non-listed mussels was issued on July 27, 2016.

The Department looks forward to the results of the mussel survey and final comments on potential impacts to protected mussel resources. Please coordinate with the US Fish and Wildlife Service given the possible presence of federally-listed mussel species.

Fish
Records for the state-threatened river redhorse (*Moxostoma carinatum*) and state-endangered pallid shiner (*Hybopsis amnis*) exist in the project area. Records for other state-listed fishes occur in the Kankakee River, including greater redhorse (*Moxostoma valenciennesi*), American eel (*Anguilla rostrate*), American brook lamprey (*Lethenteron appendix*), northern brook lamprey (*Ichthyomyzon fossor*), starhead topminnow (*Fundulus dispar*), western sand darter (*Ammocrypta clarum*), weed shiner (*Notropis texanus*), blacknose shiner (*notropis heterolepis*), and banded killifish (*Fundulus diaphanus*).

The Department recommends boat based and backpack electrofishing techniques be utilized in the area of direct impact (ADI, as described in the mussel survey proposal) to determine presence or absence of these species. Appropriate electrofishing methods for detecting lamprey ammocoetes should also be used. The Department recommends a minimum of 30 minutes of effort be used for each collection method, or longer as necessary to cover the ADI.

The fish and mussel survey report should include a discussion about potential impacts from the proposed cofferdam use and measures being implemented to reduce impingement, entrainment, entrapment, and water quality impacts.

Terrestrial Species
EnviroScience will conduct a presence/absence survey of the access right-of-way for terrestrial listed-species using qualified personnel. No tree clearing is anticipated. Therefore, impacts to state and federally-listed bat species are not expected. State-listed plant species known to occur in the general vicinity include the forked aster (*Aster furcatus*). Animal species known to occur in the general vicinity include the Blanding's turtle (*Emydoidea blandingii*), Franklin's ground squirrel (*Poliocitellus franklinii*), and upland sandpiper (*Bartramia longicauda*). Although the project area may not contain appropriate habitat for these species, the Department recommends their potential presence/absence be assessed in the field. The Department looks forward to reviewing the results.

Consultation under 17 Ill. Adm. Code Part 1075 will remain open pending survey results and final comments from the Department on the biological surveys.

Please contact me if you have questions regarding this review.

Nathan Grider
Division of Ecosystems and Environment
217-524-0501

cc: USACE – Stasi brown
USFWS – Shawn Cirton
ES – Greg Zimmerman

Appendix B: Representative Images from the Mussel Survey

Image 1. Monkeyface (*Quadrula metanevra*)

Image 2. Pimpleback (*Quadrula pustulosa*)

Image 3. Wabash Pigtoe (*Fusconaia flava*).

Image 4. Fragile Papershell (*Leptodea fragilis*)

Image 5. Plain Pocketbook (*Lampsilis cardium*), male.

Image 6. Ellipse (*Venustaconcha ellipsiformis*)

Image 7. Fawnsfoot (*Truncilla donaciformis*)

Image 8. Pistolgrip (*Tritogonia verrucosa*).

Image 9. Sheepnose (*Plethobasus cyphyus*), fresh dead from east bank.

Image 10. Sheepnose (*Plethobasus cyphyus*), fresh dead from east bank.

Image 11. Sheepnose (*Plethobasus cyphyus*), live from west bank ADI.

Image 12. Monkeyface (*Quadrula metanevra*)

Image 13. Washboard (*Megalonaias nervosa*).

Image 14. Ellipse (*Venustaconcha ellipsiformis*)

Image 15. Threehorn Wartyback (*Obliquaria reflexa*)

Image 16. Spike (*Ellliptio dilatata*), weathered dead.

Image 17. Black Sandshell (*Ligumia recta*), male, state threatened.

Image 18. Elktoe (*Alasmidonta marginata*)

Image 19. Elktoe (*Alasmidonta marginata*), juvenile.

Image 20. Lilliput (*Toxolasma parvum*).

Image 21. Fragile Papershell (*Leptodea fragilis*)

Image 22. Pimpleback (*Quadrula pustulosa*).

Image 23. Purple Wartyback (*Cyclonaias tuberculata*), state threatened.

Image 24. Deertoe (*Truncilla trunata*)

Image 25. Plain Pocketbook (*Lampsilis cardium*), female, dorsal view.

Image 26. Plain Pocketbook (*Lampsilis cardium*), female, profile view.

Image 27. Threeridge (*Amblema plicata*).

Appendix C: Representative Images from the Visual Encounter Survey for Reptiles and Upland Species

Visual Encounter Survey for Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus)* and other Terrestrial Vertebrates and Invertebrates of Interest

Date: 13 August 2016
Surveyor: Matthew Igleski
EnviroScience, Inc.
matt.igleski@gmail.com

Site:
30009-30399 South Readman Lane
Wilmington, IL
41.333397, -88.187523

West easement
6 Transects
Approximate area: 688 m^2
Start Time: 09:07 Central Time
End Time: 10:21 Central Time
Start Temp (°C): 25.5
End Temp (°C): 25.5
Start Relative Humidity: 90 %
End Relative Humidity: 88 %
Start Wind: SW 8 mph
End Wind: SW 6 mph
Start % Cloud Cover: 90 %
End % Cloud Cover: 80 %

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5070 Stow Road
Stow, Ohio 44224

Toll-Free: (800) 940-4025 | Office: (330) 688-0111 | Fax: (330) 688-3858

East Easement
4 Transects
Approximate area: 3045 m^2
Start Time: 10:45 Central Time
End Time: 13:03 Central Time
Start Temp (°C): 26.1
End Temp (°C): 26.6
Start Relative Humidity: 88 %
End Relative Humidity: 76 %
Start Wind: SW 8 mph
End Wind: W 10 mph
Start % Cloud Cover: 70 %
End % Cloud Cover: 60 %

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Summary:
A total of 0.37 hectares was surveyed with no rattlesnakes found at either easement. The west easement is characterized by mostly tall grasses (>1 m) and Tree of Heaven *Ailanthus altissima* near the road. The east easement is mostly Tall Goldenrod *Solidago altissima*, a section (about 15 m of the 200 m) of short grasses (<1 m) exists near the river. No crayfish burrows were observed at either site, which can be important for *Sistrurus c. catenatus* to overwinter. Neither site offered significant deadfall or the like which might offer cover for snakes and other small animals. No animals considered prey for *Sistrurus c. catenatus* were observed at either site. Overall, neither easement offered significant suitable habitat, making occupation by *Sistrurus c. catenatus* unlikely. One snake was detected by another surveyor in the river near the west easement, likely *Nerodia sipedon*.

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Other Species Detected

Birds

West easement

Tufted Titmouse *Baeolophus bicolor*
Song Sparrow *Melospiza melodia*
White-breasted Nuthatch *Sitta carolinensis*
Downy Woodpecker *Picoides pubescens*
American Robin *Turdus migratorius*
Black-capped Chickadee *Poecile atricapillus*

East easement

Gray Catbird *Dumetella carolinensis*
Downy Woodpecker *Picoides pubescens*
Blue Jay *Cyanocitta cristata*
American Robin *Turdus migratorius*
Northern Cardinal Cardinalis cardinalis
Eastern Towhee *Pipilo erythrophthalmus*
Indigo Bunting *Passerina cyanea*
Song Sparrow *Melospiza melodia*
American Goldfinch *Spinus tristis*

River

Belted Kingfisher *Megaceryle alcyon*
Caspian Tern (3) *Hydroprogne caspia*
Ring-billed Gull *Larus delawarensis*
Turkey Vulture *Cathartes aura*
Killdeer (3) *Charadrius vociferus*
Northern Rough-winged Swallow *Stelgidopteryx serripennis*

Invertebrates

Blue-fronted Dancer *Argia apicalis*
Widow Skimmer *Libellula luctuosa*
Eastern Amberwing *Perithemis tenera*
Darner spp.

Northern Walkingstick Diapheromera femorata

Praying Mantis *Mantis religiosa*

Black Swallowtail *Papilio polyxenes*
Monarch *Danaus plexippus*

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Appendix D: Representative Images from the Vegetation and Mammal Habitat Survey

Image 1: Old field community along east side of river.

Image 2: West side looking west, upslope.

Image 3: Rivers edge along west side of river.

Image 2: Beginning of corridor.

Image 5: Shrubby edge along soybean field near beginning (east side) of corridor.

Image 6: Shrubby edge along soybean field.

APPENDIX A

Revised maps from Attachment A. (Sites 065 and 066 BP-USPL Threatened and Endangered Biological Survey Final Report: 2016-10-07 (V14)) with updated direct impact areas and excavation areas

Figure 2.0a Project Location. **Revised 2/8/2017**

Figure 2.0b Action Area. **Revised 2/8/2017**

Figure 3.1a. Transect and Spot Search CPUE Results (All Species). **Revised 2/8/2017**

Figure 3.1b. Transect and Spot Search CPUE Results (Sheepnose and Purple Wartyback). **Revised 2/8/2017**

Figure 3.1c. Transect and Spot Search CPUE Results (Sheepnose and Black Sandshell). **Revised 2/8/2017**

Figure 3.1d. Quadrat Search CPUE Results (All Species). **Revised 2/8/2017**

Figure 3.1e. Quadrat Search CPUE Results (P. Wartyback). **Revised 2/8/2017**

Figure 3.1f. Quadrat Search CPUE Results (Black Sandshell). **Revised 2/8/2017**

Figure 3.1f. Quadrat Search CPUE Results (Black Sandshell). **Revised 2/8/2017**

Figure 4.0a Action Area (In-Stream Detail) **New 3/12/2017**

Figure 4.0b Action Area (West Bank In-Stream Detail) **New 3/12/2017**

Figure 4.0c Action Area (East Bank In-Stream Detail) **New 3/12/2017**

Figure 2.0a Project Location. USGS 7.5-minute Topographic Map of Site in Will Country.
Revised 2/8/2017

Pipeline
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 1,000 2,000 4,000 Feet
0 250 500 1,000 Meters

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Basemap courtesy of National Geographic Society (2013).

Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map1_Topo.mxd

Date: 2/8/2017

This sectrion is the likely access for project and farmer and IDNR.

This section is on farm land and farmer will be reimbursed for any damages.

This is the western access route to the easement and gets mowed per regulatory requirements.

90m DS

60m DS

30m DS

96m DS

56m DS

26m DS

West ADI (LDB)

East ADI (RDB)

ADI-D

ADI-C

ADI-U

10m US

10m US

Kankakee River

This is the eastern access route to the easement and gets mowed per regulatory requirements.

Google

Figure 2.0b Action Area for Pipeline
In-Line Inspection / Repairs in the Kankakee River
New Wilmington, Illinois. **Revised 2/8/2017**

Pipeline
Sand Bags
Salvage Buffer
Port-a-Dam/Excavation
Port-a-Dam Skirt
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 100 200 400 Feet

0 25 50 100 Meters

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Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_Action_Area.mxd

Basemap courtesy of Google.

Transect and 20min Spot Search CPUE Results (All Species)

No. Mussels (Sheepnose)/ 10m Transect

- 0
- 1

No. Mussels (All Species) /10m Transect

- 0
- 1 - 7
- 8 - 16
- 17 - 29
- 30 - 44
- 45 - 73

No. Mussels (All Species) /Spot Search (20min)

- 2 - 10
- 11 - 30
- 31 - 55
- 56 - 65
- 66 - 73

90m DS
60m DS
30m DS
10m US
96m DS
56m DS
26m DS
6m DS
West ADI (LDB)
East ADI (RDB)
ADI-D
ADI-C
ADI-U
Kankakee River-->
Transect searches not completed on East Bank

Highlighted transect search points at ADI-U were estimated.

Figure 3.1a. Transect and Spot Search CPUE Results (All Species).
Revised 2/8/2017

- Area of Direct Impact
- Excavation
- Pipeline
- Transects

0 50 100 200 Feet
0 15 30 60 Meters

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Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_Mussels.mxd

Basemap courtesy of Google.

No. Mussels (Sheepnose)/ 10m Transect

- 0
- 1

No. Mussel (Purple Wartyback)/ 10m Transect

- 0
- 1 - 2
- 3 - 5
- 6 - 8
- 9 - 11

90m DS

60m DS

30m DS

96m DS

56m DS

26m DS

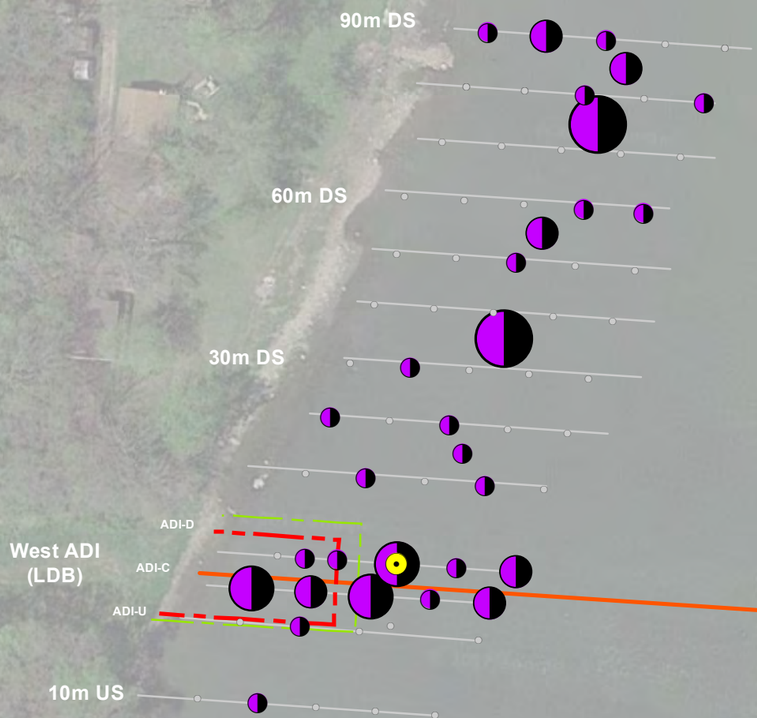

Figure 3.1b. Transect and Spot Search CPUE Results (Sheepnose and Purple Wartyback).
Revised 2/8/2016

- Area of Direct Impact
- Excavation
- Pipeline
- Transects

0 50 100 200 Feet

0 15 30 60 Meters

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Basemap courtesy of Google.

Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_CYTU.mxd

No. Mussels (Sheepnose)/ 10m Transect

0

1

No. Mussel (Black Sandshell)/ 10m Transect

0

1

2

3

90m DS

60m DS

30m DS

10m US

West ADI (LDB)

ADI-D

ADI-C

ADI-U

<-Kankakee River->

96m DS

56m DS

26m DS

East ADI (RDB)

ADI-D

ADI-C

ADI-U

10m US

Google

Figure 3.1c. Transect and Spot Search CPUE Results (Sheepnose and Black Sandshell).
Revised 2/8/2017

Area of Direct Impact

Excavation

Transects

Pipeline

0 50 100 200 Feet

0 15 30 60 Meters

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Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_LIRE.mxd

Basemap courtesy of Google.

Figure 3.1d. Quadrat Search CPUE Results (All Species).
Revised 2/8/2017

Area of Direct Impact
Excavation
Pipeline
Transects

0 50 100 200 Feet
0 15 30 60 Meters

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Basemap courtesy of Google.

Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsALL.mxd

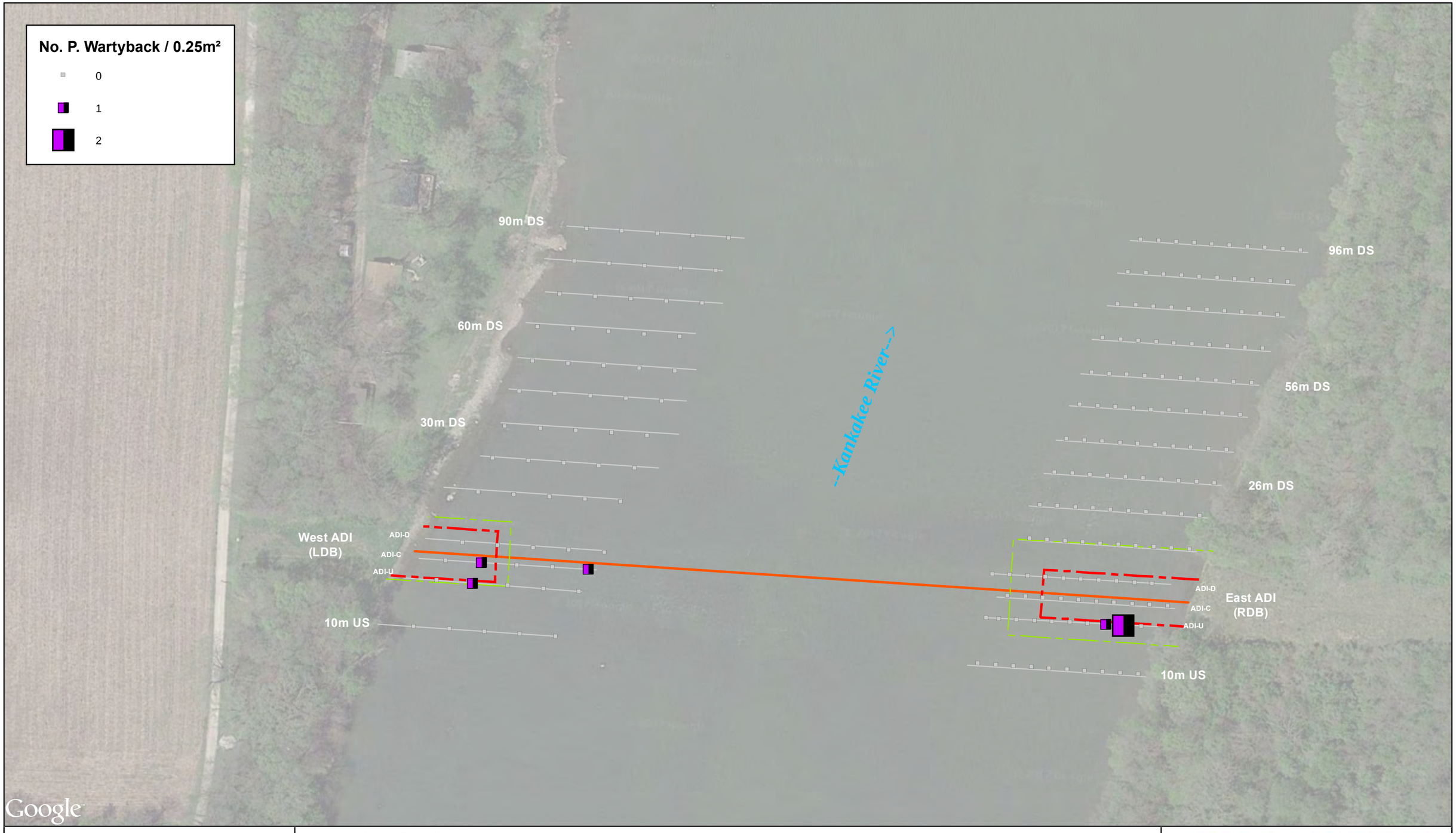

Figure 3.1e. Quadrat Search CPUE Results (P. Wartyback).
Revised 2/8/2017

Area of Direct Impact
Excavation
Pipeline
Transcribes

0 50 100 200 Feet
0 15 30 60 Meters

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Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsCYTU.mxd

Basemap courtesy of Google.

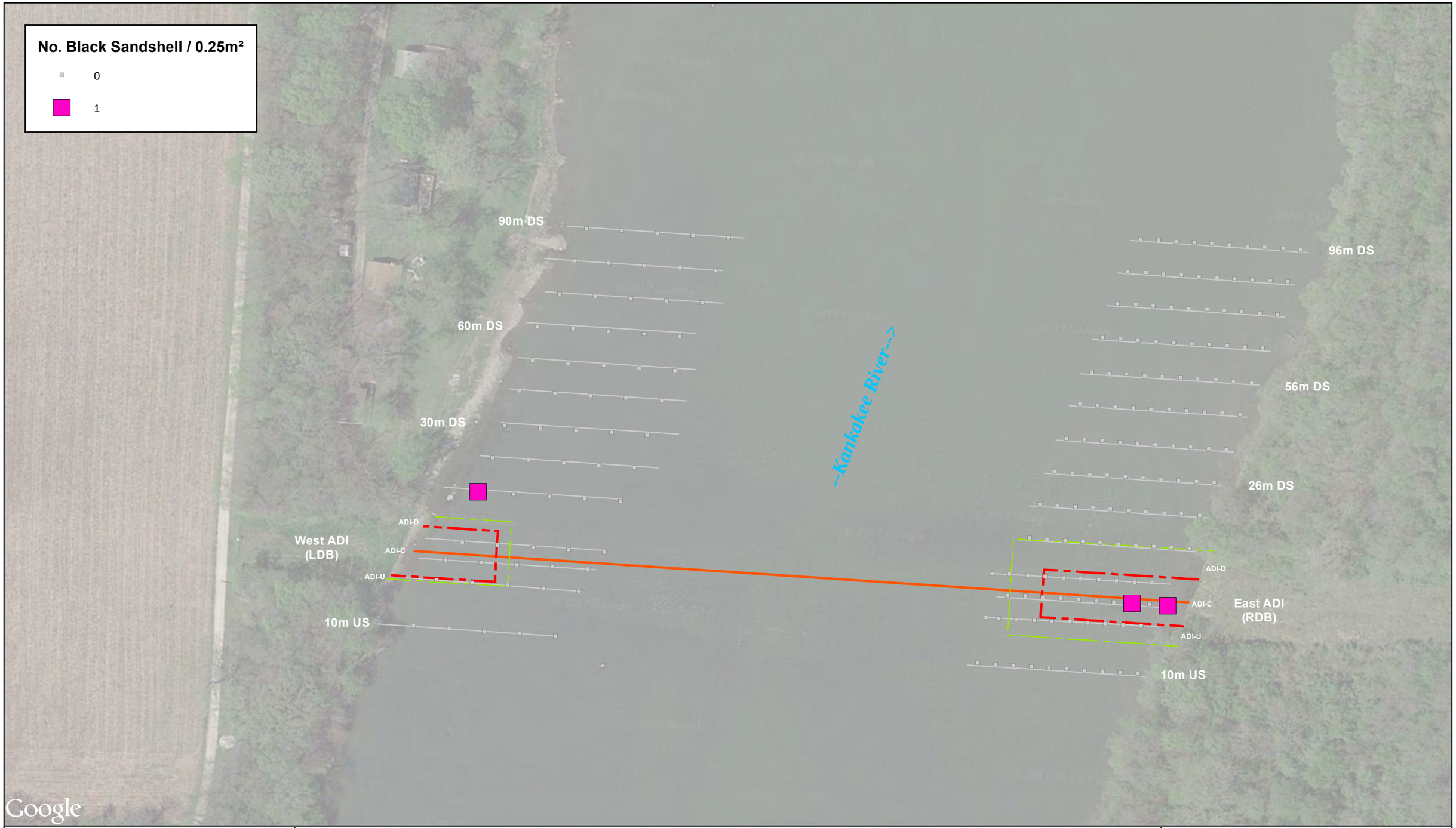

Figure 3.1f. Quadrat Search
CPUE Results (Black Sandshell).
Revised 2/8/2016

Area of Direct Impact
Excavation
Pipeline
Transects

0 50 100 200 Feet
0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Basemap courtesy of Google.

Date: 2/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map3_QuadsLIRE.mxd

Figure 4a. In-Stream Impacts
for Pipeline In-Line Inspection / Repairs
in the Kankakee River New Wilminton, Illinois.

Pipeline
Direct Excavation
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 50 100 200 Feet
0 15 30 60 Meters

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Date: 3/14/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_Action_Area.mxd

Basemap courtesy of Google.

West ADI - 498 sq. m.

Direct Excavation West - 345 sq. m.

Indirect Impacts
(Marginal Habitat) - 13013 sq. m.

Google

Figure 4.0b West Bank Action Area
for Pipeline In-Line Inspection / Repairs
in the Kankakee River New Wilminton, Illinois.

Pipeline
Sand Bags
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 20 40 80 Feet
0 5 10 20 Meters

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Excellence In Any Environment

Date: 3/14/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_Action_Area.mxd

Basemap courtesy of Google.

Indirect Impacts
(Marginal Habitat) - 13013 sq. m.

26m DS

East ADI - 1394 sq. m.

Port-a-Dam Skirt - 518 sq. m.

Direct Excavation East - 552 sq. m.

10m US

Figure 4.0c East Bank Action Area
for Pipeline In-Line Inspection / Repairs
in the Kankakee River New Wilminton, Illinois.

- Pipeline
- Port-a-Dam/Excavation
- Port-a-Dam Skirt
- Action Area
- Area of Direct Impact
- Indirect Impacts : Suitable Habitat
- Indirect Impacts : Marginal Habitat

0 20 40 80 Feet

0 5 10 20 Meters

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Date: 3/14/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map2_Action_Area.mxd

Basemap courtesy of Google.

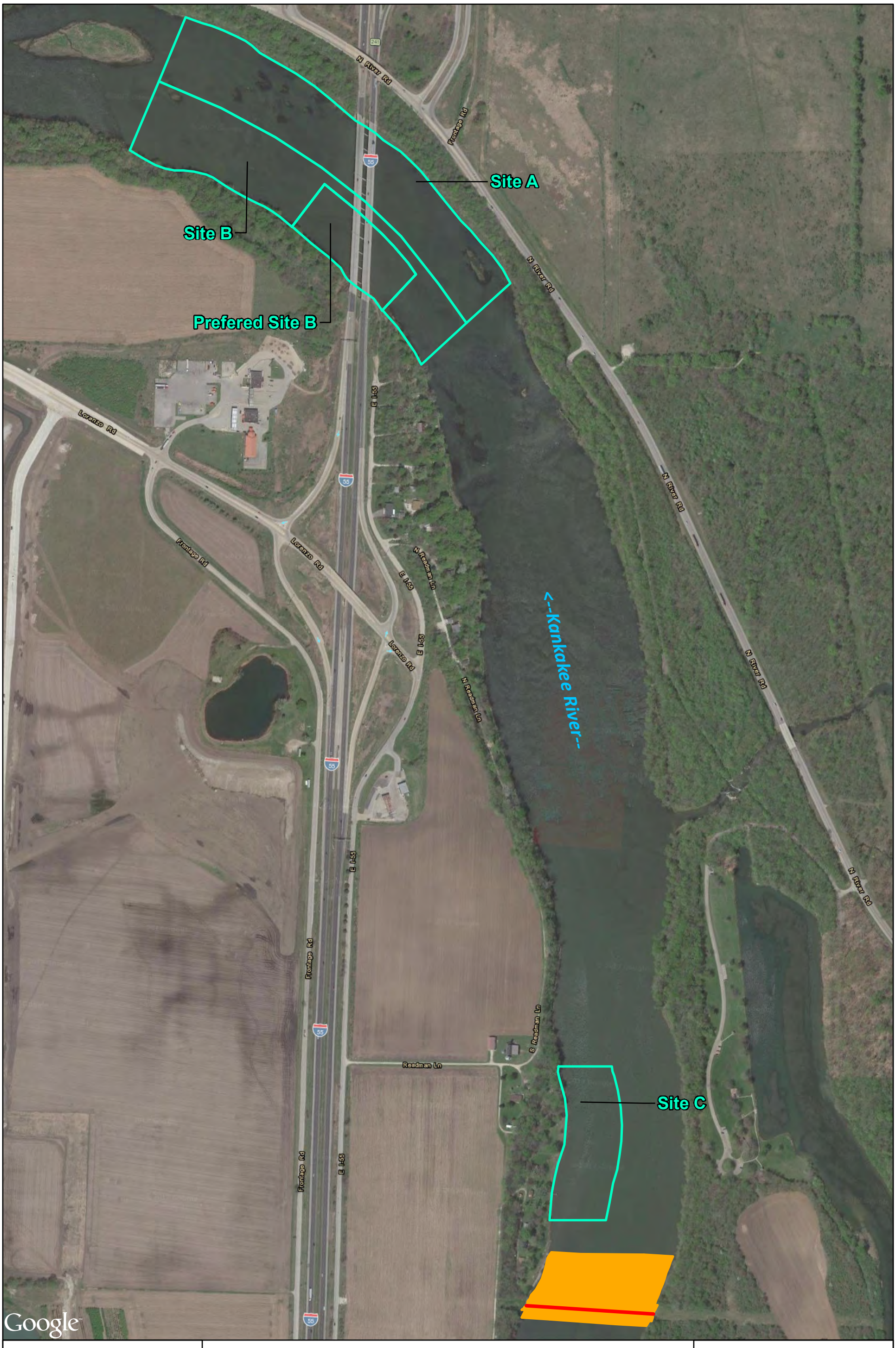

Figure 5.
Possible Relocation Sites
on the Kankakee River
New Wilmington, Illinois.

Pipeline
Relocation Sites
Survey Area

0 150 300 600 Feet
0 50 100 200 Meters

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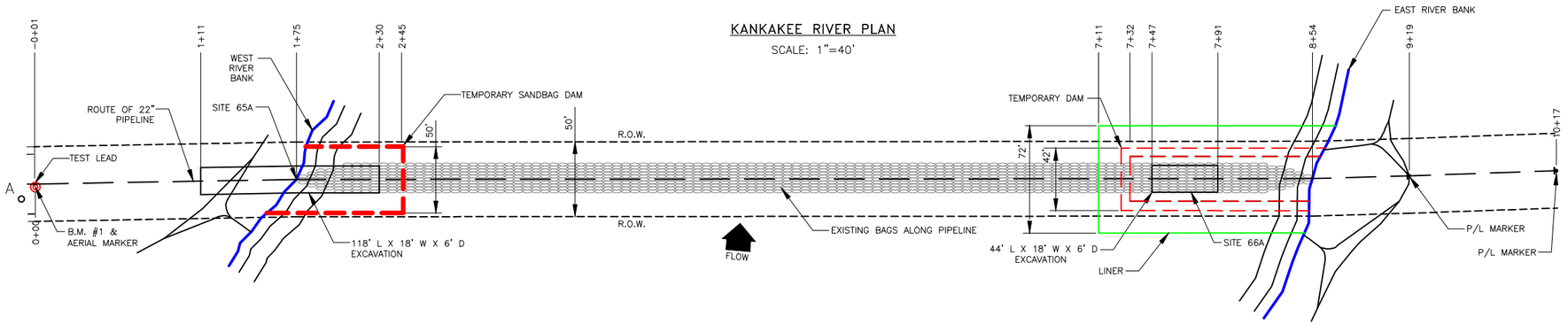
Date: 3/8/2017 Path: P:\10_Projects\C\Central_States_Underwater\480M\8695_CSU-BP_Kankakee\8695_GIS\Map4_Relocation.mxd

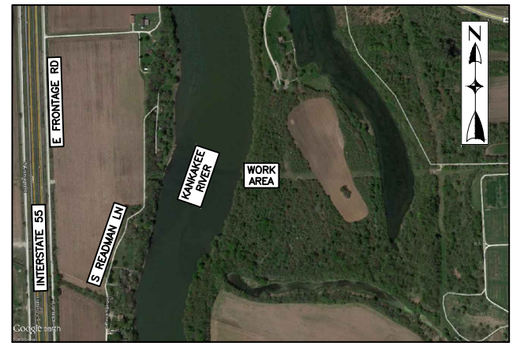
Basemap courtesy of Google.

APPENDIX B

Appendix B. Construction plan for the USDOT compliance inspection and possible repair of two (2) segments of the existing 22" East Fort Madison – Manhattan crude pipeline on the Kankakee riverbed in Will County, IL; sites: 2015-065 and 2016-066

PLOT DATE: 17-AUG-16 DRAWING NAME: Kankakee River 22" Line Rev 1.d





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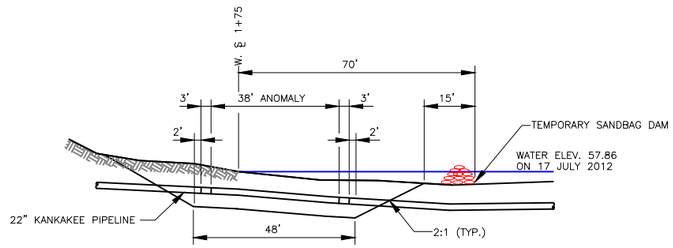
NOT TO SCALE



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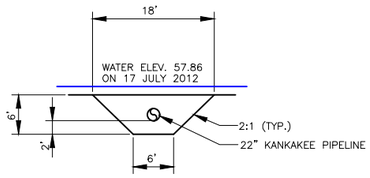

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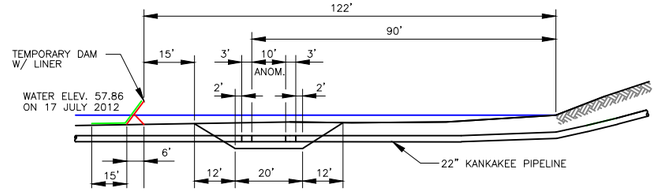

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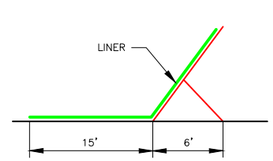
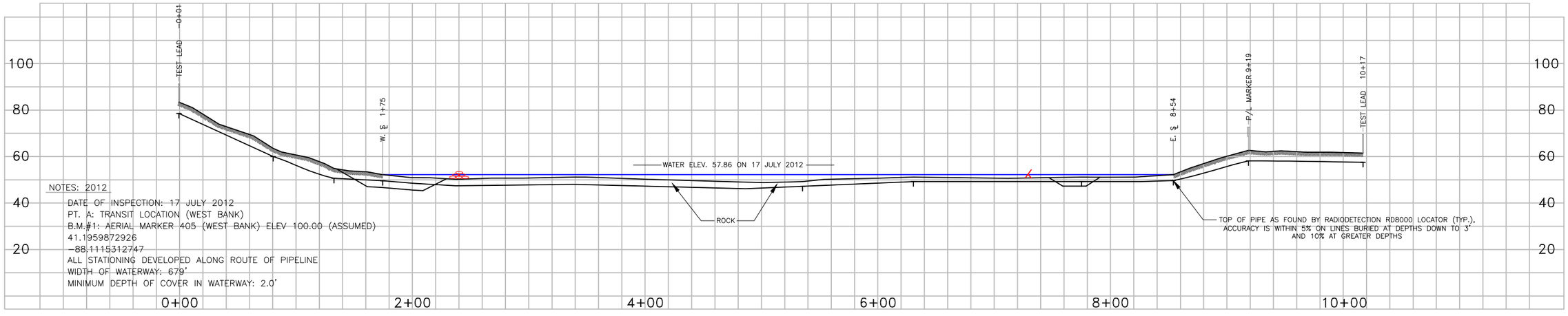


TEMPORARY DAM W/ LINER
NOT TO SCALE



NOTES: 2012

DATE OF INSPECTION: 17 JULY 2012
PT. A: TRANSIT LOCATION (WEST BANK)
B.M.#1: AERIAL MARKER 405 (WEST BANK) ELEV 100.00 (ASSUMED)
41.1959872926
-88.1115312747
ALL STATIONING DEVELOPED ALONG ROUTE OF PIPELINE
WIDTH OF WATERWAY: 679'
MINIMUM DEPTH OF COVER IN WATERWAY: 2.0'

PROFILE 22" PIPELINE
SCALE: 1"=40' HORIZ.
1"=20' VERT.

CENTRAL STATES UNDERWATER CONTRACTING, INC.
P.O. Box 2375 Huffman, TX
281-324-9700
WWW.CSUDIVING.COM

DATE: 1 August 2012	APPROVED BY:
DRAWN BY: A.F.	DRAWING NO: 1 OF 1

BP PIPELINES NA, INC.
KANKAKEE RIVER
WILL COUNTY, IL
22" PIPELINE

APPENDIX C

Appendix C. Grant of Right of Way for East Site (2015-065) and Right of Way Contract for West Site (2015-066).

1483-81A
Corps of Eng. No. 42-3

GRANT OF RIGHT OF WAY

The UNITED STATES OF AMERICA, hereinafter called "GRANTOR", for and in consideration of the sum of ONE DOLLAR ($1.00), and other good and valuable consideration, the receipt of which is hereby acknowledged, and without further or additional rental or charge, hereby grants unto STANOLIND PIPE LINE COMPANY, a Maine corporation, hereinafter called "GRANTEE", the exclusive right to lay, maintain, inspect, operate, repair, replace and remove three (3) pipe lines, and also such additional pipe line or pipe lines as Grantee may from time to time in the future desire, for the transportation of crude petroleum, oil, gas, and the products or by-products of each thereof, and also water, on, over and through the tract or strip of land fifty (50) feet in width, situated in Will County, State of Illinois, and described as follows:

A strip of land fifty (50) feet in width throughout its entire length in said County and State, beginning at the center line of the Kankakee River in Section 22, Township 33 North, Range 9 East, thence east, south of and adjacent to the south line of a Township Road along the north line of said Section 22, extended easterly and westerly, (crossing the Township Road along the East line of said Section 22) to a point in the Northwest Quarter ($NW\frac{1}{4}$) of the Northwest Quarter ($NW\frac{1}{4}$) of Section 23, Township 33 North, Range 9 East; thence northeasterly to a point in the Southwest Quarter ($SW\frac{1}{4}$) of the Southwest Quarter ($SW\frac{1}{4}$) of Section 14, Township 33 North, Range 9 East, in the center line of said 50 ft. right of way, which point is approximately 55 ft. north of the south line of said Section 14; thence east, south of and adjacent to a line 50 feet south of and parallel to the south fence line of the fence to be constructed in connection with the Elwood Ordnance Plant, extended westerly, across Sections 14 and 13, Township 33 North, Range 9 East, and across Sections 18, 17, 16 and 15, Township 33 North, Range 10 East (the center line of said 50 ft. right of way being 75 ft. south of and parallel to said south fence line of the Elwood Ordnance Plant) to the east line of said Section 15; thence continuing this course East to a line 250 feet northwesterly of and parallel to the West right of way line of the Wabash Railroad in the South Half of Section 14, Township 33 North, Range 10 East; (the said 50 ft. right of way being the south 50 feet of a strip of land 100 feet in width, south of and adjacent to the south fence line of the Elwood Ordnance Plant in said Sections 14, 15, 16, 17 and 18 in Township 33 North, Range 10 East) thence in a northeasterly direction along the center line of said 50 ft. right of way parallel to and 275 feet west of the west right of way line of the Wabash Railroad across Sections 14, 13, 12 and 1, Township 33 North, Range 10 East; thence continuing northeasterly along said center line and 275 feet from said West right of way line of the Wabash

Railroad across Section 6, Township 33 North, Range 11 East; thence continuing northeasterly along said center line parallel to said railroad right of way, crossing the right of way of the Sinclair Refining Company pipe lines, to a point in said center line in Section 31, Township 34 North, Range 11 East, which point is 75 feet southeasterly of the southeasterly fence line and 25 feet East of the East fence line, extended south, of said Elwood Ordnance Plant, and 275 feet from the West right of way line of said Wabash Railroad (the northeasterly course of the 50 ft. right of way being the southeasterly 50 feet of a strip of land 100 feet in width southeasterly of and adjacent to the southeasterly fence line to be constructed in connection with the Elwood Ordnance Plant); thence north along said center line 25 feet east of and parallel to the East fence line of said Elwood Ordnance Plant to the north line of Section 31, Township 34 North, Range 11 East, of the third principal meridian, in Will County, Illinois, subject to the crossings of Township roads, Sinclair Refining Company pipe lines, State Highways U. S. 66, Chicago and Alton Railroad right of way and spur railroad tracks;

to continue in full force and effect so long as the said strip of land is used for pipe line purposes, together with the right of ingress and egress on, over and through said land for any and all purposes necessary and incident to the exercise by said Grantee of the rights granted hereunder.

Grantor expressly agrees that it will not cause or authorize the erection of any buildings or obstructions over said pipe lines.

Grantee shall have the right to change, from time to time, the size of its pipe lines, or any of them, if Grantee may desire.

The terms, conditions and provisions of this contract shall extend to and be binding upon the successors and assigns of the parties hereto.

IN WITNESS WHEREOF Grantor has caused this instrument to be signed and executed in its behalf by its Secretary of War thereunto lawfully authorized in the premises, this 24 day of September 1941.

UNITED STATES OF AMERICA

By Henry L Stimson

Secretary of War.

DISTRICT OF COLUMBIA) SS.

I, Edward L. Davis, a Notary Public in and for the aforesaid district, do hereby certify that HENRY L. STIMSON, personally known to me to be the same person whose name as Secretary of War of the United States of America is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he, being duly authorized, signed, sealed and delivered the said instrument as the free and voluntary act of said United States of America and as his own free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal this 24th day of Sept., 1941.

Edward L. Davis
Notary Public, District of Columbia.

My Commission expires My Commission Expires July 14, 1946.

STATE OF ILLINOIS, } ss. 549805
Will County, } No.....

I hereby certify that the within instrument was filed for .... record in the office of the Recorder of Deeds in the County aforesaid, on the 21 day of November A. D., 1941., at 10:47 o'clock a M., and recorded in book 939 page 155
Robert L. Streeter
Recorder of Deeds.

Fee 2.25 Paid.

FORM 70PL—7-40

RIGHT OF WAY CONTRACT

OPTION

FOR AND IN CONSIDERATION OF Twenty-five & NO/100 ($25.00)--------- (Dollars to us in hand paid), receipt of which is hereby acknowledged. and the further consideration of ----$2.50--- per rod, to be paid as hereinafter provided, Mathew M. Readman and Gertrude M. Readman, his wife

do hereby grant to STANOLIND PIPE LINE COMPANY, its successors and assigns, hereinafter called grantee, the right to lay, maintain, inspect, operate, replace, change or remove a pipe line for the transportation of oil, gas, gasoline or other petroleum products, and also the right to erect, install, maintain, inspect, operate and remove telegraph and telephone lines and the equipment and apparatus therefor, to be located along said pipe line, or along fence or property line, together with the right to trim or cut trees as may be necessary in the erection and maintenance of said lines, if grantee desires to do so, to be used in connection with any such pipe line, on, over and through the following described land of which grantors warrant they are the owners in fee simple, situated in Will County, State of Illinois, to-wit:

That part of the W½ of NW¼ of Section 22, Township 33N, Range 9 East of the 3rd P.M., and that part of W½ of SW¼ of Section 15, Township 33N, Range 9 East of the 3rd P.M., west of the Kankakee River

together with the right of ingress and egress to and from said land for any and all purposes necessary and incident to the exercise by said grantee of the rights granted by this contract.

If this option be exercised by the grantee, then the amount paid by grantee for this option shall be credited upon the amount to be paid by grantee for said right of way as above provided.

And for an additional consideration of One ($1.00) Dollar, the receipt of which is hereby acknowledged, said grantors hereby grant unto said grantee the right at any time to lay, maintain, operate, inspect, replace, change or remove an additional pipe line or pipe lines alongside of said first pipe line for the transportation of oil, gas, gasoline or other petroleum products on, over and through said land,

and grantee agrees to pay grantors for each additional pipe line placed on said land by it the sum of

Two and 50/100 Dollars per rod----------

~~Dollars~~ on or before the time grantee commences to construct such pipe line on, over and through said land. Said payment may be made direct to grantor or deposited to credit of the grantors or any one of them in the First National Bank of Wilmington, Illinois.

Grantors reserve the right to use said land for any and all purposes except the purpose hereby granted to said Grantee. Grantee agrees to pay any damages caused by grantee's operations hereunder, to said land, and to the improvements, crops, pasturage, fences and livestock of grantors on said land, on the basis of the status, condition, and use of said land and the improvements thereon, at the date of this contract. In the event the parties hereto cannot agree upon the amount of said damages, then the amount thereof shall be ascertained and determined by three disinterested persons selected as follows: One by said grantors, one by said grantee and the third by the two so selected, and the written award of any two of said three persons so selected shall be final and conclusive on the parties hereto. Within twelve (12) months from the date hereof construction of said pipe line will be commenced, or a survey of said pipe line will be made, establishing the definite location thereof over and across said lands, in either of which events grantee shall pay said sum of $2.50 per rod for the full length of said pipe line constructed, or to be constructed, across said lands as aforesaid; otherwise the rights granted hereunder shall terminate.
Any pipe line laid hereunder shall be buried so it will not interfere with cultivation of the surface of said premises.

It is agreed that the terms, conditions and provisions of this contract shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

And I, or we, hereby release and waive all rights under and by virtue of the homestead exemption laws of this State, insofar as it pertains to this contract.

It is agreed and understood that said pipe line, or pipe lines shall be laid east and west, or approximately so, at or near the dividing line of said above described properties.

IN WITNESS WHEREOF, the grantors above named have hereunto set their hands and seals this 12th day of December, 1940.

Signed, sealed and delivered in the presence of:

A. J. Windom

Mathew M. Readman (Seal)

Gertrude M. Readman (Seal)

(ACKNOWLEDGMENT)

STATE OF Illinois
Will County, } ss.

Before me, a notary public in and for said County and State, on this 12th day of December, 1940, personally appeared Mathew M. Readman and Gertrude M. Readman, to me known to be the identical person s who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

My Commission expires: 5-15-1941

Notary Public.

7 c 3

(ACKNOWLEDGMENT)

STATE OF _____ }
_____ County, } ss.

Before me, _____ in and for said County and State, on this _____ day of _____, 19____, personally appeared _____ and _____, to me known to be the identical person____ who executed the within and foregoing instrument and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed for the uses and purposes therein set forth.

My Commission expires:

_____

_____
Notary Public.

INDEXED
INDEXED
PAGED
PAGED

Sec. 2991 Line No. 1483-7

FROM

Mathew M. Readman

TO

STANOLIND PIPE LINE CO.

Will County, Illinois

Line _____

Length _____ Rods

STATE OF ILLINOIS, } ss. No. 537744
Will County,

I hereby certify that the within instrument was filed for _____ record in the office of the Recorder of Deeds in the County aforesaid, on the 8 day of January A. D., 1941, at 10:37 o'clock A. M., and recorded in book 827 page 45

Fee 1.50 Paid.

Recorder of Deeds.

RETURN TO: RIGHT OF WAY DEPT.
STANOLIND PIPE LINE CO.
BOX 591 TULSA, OKLAHOMA

APPENDIX D

Appendix D. Representative photographs for East Site (2015-065) and West Site (2015-066).

1. Looking west at Site 2015-065 along the east bank of the Kankakee River in Will County, Illinois.

2. Looking east at Site 2015-066 along the west bank of the Kankakee River in Will County, Illinois.

APPENDIX E

Appendix E. Sequence of Storm Water Controls Implemented Relative to Land Disturbing Activities excerpt from the Sites 2015-065 A-E and 2015-066 A-C Construction Storm Water Pollution Prevention Plan

Table 1
Sequence of Storm Water Controls Implemented Relative to Land Disturbing Activities

Construction Activity	Estimated Schedule	Best Management Practice	Responsible Party
Mobilize to site; Hold contractor environmental and safety training and pre-job meeting.	Day 1	BP will hold a pre-job meeting for all project personnel. As a component of this meeting, BP's Construction Superintendent will educate the contractor and project personnel on environmental permit requirements, discuss requirements outlined in the SESC Plan, and discuss locations and proper installation and maintenance of BMPs.	BP's Construction Superintendent
Install stabilized construction entrance and sediment control structures (and timber mats if warranted).	Day 1-2	Install signage in work area as needed and as instructed For construction entrance place gravel on geotextile fabric for easy removal following construction. Contractor shall prepare the right-of-way, including installation of safety fence and silt fence. Sediment barriers shall also be installed on the down slope side of disturbed soil. Timber matting shall be laid as needed for access/staging areas to minimize disturbance to the farmfield field and river bank. Stage equipment within BP's existing right-of-way.	BP's Construction Superintendent
Initiate and install in-stream structural BMPs. Dewater work area downstream Pump bottom 12" of water to an upland area through a dewatering structure constructed in a well-vegetated area.	Day 3-5	Install silt curtains downstream of work area. Install diversion dam and portable dam in river. Relocate federally and state-listed mussels. The work area inside of the river will need to be cleared of any logs to avoid trip hazards while setting up the dam. Relocate logs outside work area in the river. Stage fuel and refuelling equipment within secondary containment at a location at least 50 ft from the river. Relocate any aquatic life remaining within the work area back into the stream with the use of fish nets, taking care not to harm any individuals. Pump any additional ground water seepage from work area into the dewatering structure, to maintain a dry work environment (screen for aquatic life). The dewatering structure shall be of sufficient capacity to handle the expected flow and shall be maintained during construction and shall be equipped to prevent the displacement of aquatic life.	BP's Construction Superintendent

Construction Activity	Estimated Schedule	Best Management Practice	Responsible Party
Mobilize equipment into work area. Strip and segregate topsoil on banks and excavate river substrate as needed.	Days 5-7	Maintain sediment barriers around work areas throughout construction. Ensure there is no co-mixing of topsoil, subsoil and river substrate.	BP's Construction Superintendent
Dewater excavation as needed into river and dewatering structure. Remove existing grout bags over the pipeline. Excavate approximately 2 ft below pipeline (which is currently resting on stream bed). Sandblast pipeline.	Days 7-8	Maintain sediment barriers around work areas. Dewater work area downstream (screen for aquatic life). Pump bottom 12" of water to an upland area through a dewatering structure constructed in a well-vegetated area. Relocate any aquatic life remaining within the work area back into the stream with the use of fish nets, taking care not to harm any individuals. Repair/replace dewatering structure as necessary. Grout bags shall be placed directly into dumpsters. General construction waste shall be collected onsite by Mechanical Contractor and hauled away by BP's Waste Contractor. If necessary, a roll off box should be brought to the job site by BP's Waste Contractor. Contractor will implement the project's Waste Management Plan.	BP's Construction Superintendent
Complete pipeline inspection and repair, if necessary. Dewater excavation as needed into dewatering structure.	Days 8-10	Maintain sediment barriers around work areas and maintain construction entrance. Repair/replace dewatering structure as necessary.	BP's Construction Superintendent
Install new grout bags over the pipeline. Fill excavations and regrade.	Day 10-12	Maintain sediment barriers around work areas.	BP's Construction Superintendent
Remove all equipment from river into upland area. Remove portable dam and diversion dam. Stabilize site; Install permanent erosion controls; remove construction entrance and temporary sediment controls and remove equipment from site.	Day 12-14	Ensure topsoil is replaced and decompacted. Maintain sediment barriers around work areas until work has been completed and permanent erosion control measures are in place. Regrade stream bank to existing contour. Re-seed and mat using high quality coir matting in floodplain areas. Use the following seed mixtures: River Banks: Pizzo Seed Company Wooded Floodplain Seed Mixture; Upland Areas: *Illinois Urban Manual* Low Maintenance Area seed mixture. Restore access route to existing condition, making an effort to de-compact and regrade any areas that have become compacted or rutted.	BP's Construction Superintendent

APPENDIX F

Appendix F. Biological Assessment

BA ATTACHMENTS NOT INCLUDED

AS THEY ARE ALREADY INCLUDED IN

CONSERVATION PLAN

BIOLOGICAL ASSESSMENT

For the East Fort Madison – Manhattan 22" Pipeline Inspections (Rev.2)

Sites 2015-065 A-C and 2015-066 A-C in Kankakee River

Will County, Illinois

Prepared for:

CSU CentralStates Underwater Contracting, Inc
Inland & Offshore Diving Services • Pipeline Construction Services

and

bp

BP USPL

ES Project No.: 8695, IDNR 1610630,
USFWS IPaC Reference EFM-MAN 2015-065A-C

Date: 03/15/2017

Prepared by:

EnviroScience
Excellence In Any Environment

5070 Stow Rd.
Stow, OH 44224
800-940-4025
www.EnviroScienceInc.com

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List of Attachments

Attachment A. SITE 065 AND SITE 066, Threatened and Endangered Species Report for BP USPL Pipeline In-Line Inspection Repairs, Kankakee River Near Wilmington, Illinois

Attachment B. Illinois Department of Natural Resources, Conservation Plan, (Application for an Incidental Take Authorization) Per 520ILCS 10/5.5 and 17 Ill. Adm. Code 1080

List of Appendices

Appendix A. Revised maps from Attachment A and additional figures. (SITE 065 AND SITE 066, Threatened and Endangered Species Report for BP USPL Pipeline In-Line Inspection Repairs, Kankakee River Near Wilmington, Illinois) with updated direct impact areas and excavation areas.

Appendix B. BP Engineering Site Plan for the USDOT compliance inspection and possible repair of two (2) segments of the existing 22" East Fort Madison – Manhattan crude pipeline on the Kankakee riverbed in Will County, IL; sites: 2015-065 and 2016-066

1.0 EXECUTIVE SUMMARY

BP U.S. Pipelines & Logistics (BP USPL) must perform a USDOT compliance inspection and possible repair of two segments of an existing crude pipeline crossing the Kankakee River in Will County, IL. The inspections / repairs will require excavation into the riverbed at the east and west banks of the river along the existing alignment, and will use temporary cofferdams that will be dewatered to access work below the waterline. The project impacts to the riverbed are relatively similar on each bank, with a total Area of Direct Impact (ADI) from temporary dam footprints of 1,842 m^2 (20,365ft^2), which is wetted riverbed and suitable freshwater mussel habitat at normal flow.

Biological and habitat surveys were completed in 2016 for federal and state listed species that could potentially occur within the Action Area and Will County (Appendix A). These included surveys for freshwater mussels, fish (literature search only), mammals (bat and ground squirrel habitat), dragonflies, birds and reptiles. Only the mussel survey found evidence of federally and state endangered species. The federally and state endangered Sheepnose (*Plethobasus cyphyus*) was detected as one live specimen near the west bank ADI and additional fresh dead valves were found on both banks near of the river. Two additional state threatened mussel species, the Purple Wartyback (*Cyclonaias tuberculata*) and Black Sandshell (*Ligumia recta*) were also detected. While the state threatened Spike (*Elliptio dilatata*) was only found as dead material, it potentially could exist in the area.

This biological assessment will focus on the project's anticipated direct and indirect effects (incidental take) to federal species under the Endangered Species Act. A state application for an Incidental Take Authorization (Conservation Plan) was submitted to the state separately to address anticipated impacts to state listed species, including the Sheepnose. BP USPL anticipates that impacts to federally threatened and endangered (T&E) species will occur, but will be limited to temporary impacts to aquatic species as a result of the disturbance to the streambed and associated potential minor indirect effects. An effects determination summary is provided below in Table 1.0.

Table 1.0. Federal Species and Critical Habitat Effect Determinations.

Species	Status	Proposed Determination
Eastern Massasauga rattlesnake	Proposed as Threatened	No Effect
Eastern prairie fringed orchid	Threatened	No Effect
Hine's emerald dragonfly	Endangered	No Effect
Hine's emerald dragonfly	Critical Habitat Designated	No Effect
Lakeside daisy	Threatened	No Effect
Leafy-prairie Clover	Endangered	No Effect
Mead's milkweed	Threatened	No Effect
Northern long-eared bat	Threatened	No Effect
Rattlesnake-master Borer Moth	Candidate	No Effect
Sheepnose mussel	Endangered	May Affect, Likely to Adversely Affect

2.0 INTRODUCTION

2.1. PURPOSE OF THE DOCUMENT

The purpose of this Biological Assessment (BA) is to assess the effects of the proposed actions on federally protected resources under the Endangered Species Act. A state application for an Incidental Take Authorization (Conservation Plan) was submitted to the state separately to address anticipated impacts to state listed species, including shared state / federal resources per 520ILCS 10/5.5 and 17 Ill. Adm. Code 1080 (Appendix B).

BP U.S. Pipelines & Logistics (BP USPL) must perform a USDOT compliance inspection and possible repair of two (2) segments of an existing 22" crude pipeline on the Kankakee riverbed in accordance with USDOT pipeline integrity management regulations. It is their No. 1 System, 22" East Fort Madison – Manhattan pipeline within the Kankakee River in Will County, IL. They are referenced as Sites 2015-065 and 2016-066 ("west" and "east" sites, respectively). These sites have an inspection/repair deadline of October 10, 2016. Collectively, we will refer to the inspections and potential repairs as the "Project".

BP USPL through Central States Underwater Contracting (CSU) contracted EnviroScience, Inc. (ES) to conduct biological surveys including a freshwater mussel survey, fish survey, and terrestrial survey at the stream crossing and access points, since Project construction and access activities could potentially affect protected natural resources known from the vicinity, including any state or federally listed threatened and endangered (T&E) species inhabiting the site. The site "Action Area" was defined as the required construction access along the existing easements, the areas of direct impacts (ADIs) to the Kankakee River riverbed, and potential indirect impact areas upstream and downstream from the repair. A summary of key events and the consultation history to date between BP USPL, CSU, ES, USFWS, IDNR, and IEPA is presented below in Table 2.1.

Table 2.1. Consultation History

Event	Date
Initiated coordination with IDNR regarding access through Des Plaines Conservation Area.	5/11/2016
Initiated agency coordination via e-mail and/or phone: USFWS, IDNR Division of Ecosystems and Environment, IDNR Office of Water, IEPA.	5/17/2016
E-mailed Technical Assistance Letter to USFWS. Phone discussion with USFWS regarding project and Section 7 process and Will County listed species.	5/18/2016
Submitted formal EcoCat Database request for project environmental review through IDNR.	5/18/2016
Submitted on-line request through Chicago District US Army Corps of Engineers Office for Pre-Application meeting.	5/24/2016
Received Land Use Permit from IDNR for Des Plaines Conservation Area	5/31/2016

Event	Date
Pre-Application meeting at Chicago District US Army Corps of Engineers. Included participation by USFWS and IDNR.	6/23/2016
Submitted application for state non-listed mussel collection permit, and state listed mussel species collection permit.	7/2/2016
Submitted mussel survey plan to IDNR.	7/11/2016
Received USFWS authorization to survey for federally listed mussels.	7/11/2016
IDNR approved mussel survey methodology.	7/18/2016
Received environmental review from IDNR from EcoCat submission.	8/3/2016
Received state listed mussel collection permit from IDNR.	8/5/2016
Received collection permit for non-listed mussels from IDNR.	8/8/2016
Overnighted consultation letter to IHPA.	8/15/2016
Follow-up meeting at US Army Corps of Engineers. Delivered Joint Application.	8/24/2016
Mailed Joint Application to IEPA and IDNR.	8/24/2016
Submitted NOI and SWPPP online to IEPA.	8/24/2016
Mailed SESC Plan to Will County SWCD.	8/24/2016
Received collection permit for state-listed fish survey from IDNR.	8/25/2016
E-mailed project location map and request for comment to US Coast Guard MSU Chicago	9/6/2016
Draft BA and ITA Submitted to USFWS and IDNR	10/2016
IDNR provides comments and suggested revisions to the Conservation Plan and BA.	11/04/2016
USFWS provides comments to the USACE and BP regarding the draft Biological Assessment, which were further discussed in a subsequent conference call on 12/12/2016.	12/06/2016
BA and ITA Submitted to USACE, USFWS, & IDNR	2/8/2017
USACE & USFWS provide 4 additional comments and requested revision to the BA	3/2/2017
IDNR provides additional comments and suggested revisions to the Conservation Plan and BA.	3/3/2017

This document will consider whether the planned project will affect any federal threatened, endangered, proposed or candidate species at the project site, and will describe avoidance, minimization, and other conservation measures that BP USPL proposes to take to reduce any impacts during the course of the project.

2.2. PURPOSE OF THE FEDERAL ENDANGERED SPECIES ACT AND ILLINOIS ENDANGERED SPECIES PROTECTION ACT GUIDELINES

The purpose of the Endangered Species Act (ESA) of 1973 is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved (Section 2(B)). Congress further declared that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (Section 2(c)(1)). The term conserve means "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this ACT are no longer necessary" (Section 3(3)). To this end, Section 9 of the ESA sets forth specific prohibitions related to the "take" of a listed species as defined in the statute and regulation. The "take" prohibition applies to all "persons," including federal, state, and local agencies; corporations, businesses, and individuals, regardless of project funding sources or applicable permit requirements. Section 11 provides for civil and criminal penalties for violations of the "take" prohibitions. Section 7, establishes procedures for interagency cooperation to assist federal agencies in meeting the purposes of ESA, while Section 10 allows for certain exceptions to the "take" prohibitions.

State-listed species are protected under the 1972 Illinois Endangered Species Protection Act (ESPA) and in many cases federally listed species is a shared resource, and under both state and federal protections. An Incidental Take Authorization (ITA) application and Conservation Plan for the State of Illinois for potential impacts to state-listed has been submitted to the Illinois DNR Attachment B) to comply with the guidelines of the ESPA.

2.3. DESCRIPTION OF PROPOSED PLAN

The purpose of this document is to assess the effects of the planned inspections on federally listed resources.

The following alternatives were considered by BP:

- The No Action Alternative
- Alternative 1: Pipe Replacement by Horizontal Directional Drilling
- Alternative 2: Pipe Replacement by Open-cut Trenching across the Kankakee River

1. **The No Action Alternative**
   Per PHMSA (DOT) regulations, the pipelines were examined with an inline inspection tool (ILI) which is required on a routine basis to validate the integrity of the systems. Upon analysis of the ILI, the data indicated a change in the conditions of the pipeline indications crossing the Kankakee river. While these changes may be the result of ILI tolerance, BP errs on the side of caution by assuming the change (anomaly) is valid. PHMSA (DOT) requires further assessment within 180 days (October 10, 2016). If unable to assess the pipeline indications within the timeframe, the pipeline indications will be re-categorized by PHMSA as Immediates and BP will be required to apply a pressure de-rate to the crude oil pipeline. The de-rate will remain in effect until BP has examined, and repaired if appropriate, the pipeline indications. The pressure de-rate has the potential to affect BP's ability to keep the BP Whiting refinery fully supplied with crude oil, which then has the potential to affect the price of gas regionally. Additionally, BP is concerned that prolonged timeframes to assess and repair lines (as

needed) could result in more integrity issues that could adversely impact the environment. A No Action Alternative suggests that there would be no further assessment or possible repair to the pipeline, and this would place BP at risk for regulatory noncompliance with PHMSA and its license to operate on this line segment could be adversely impacted.

In summary, the No Action Alternative would not meet the project objectives of inspecting the pipeline indications to meet the PHMSA (DOT) regulatory deadline.

2. **Alternative 1: Pipe Replacement by Horizontal Directional Drilling**
Alternative 1 involves the use of Horizontal Directional Drilling (HDD) method of pipe replacement for the entire Kankakee River crossing. In general, BP prefers to avoid the use of HDD except where there is no alternative option because once the pipe is installed at great depths, it becomes difficult or impossible to inspect and/or repair. For these locations, the only available repair option is to perform another HDD replacement. Pipe replacement by way of HDD are typically long lead, high cost and considerable temporary construction impact to the surrounding areas.

   BP has neither developed a proposed HDD alignment nor completed any soil borings to determine HDD feasibility in the area of the Kankakee River at this stage, but as a preliminary assessment there are some high-level concerns with this approach. The width of the river along the pipeline alignment is approximately 730' and the area has not been evaluated for good candidate locations for HDD entry, HDD exit, or new pipe construction locations. It is possible that after site characterization and HDD design the pipe pullback length may exceed 1,000' which may make construction difficult on the land location between the Kankakee River and Milliken Lake. It is also possible that the presence of shallow bedrock or unsuitable soils may result in a higher than normal risk of frac out (i.e. escape of drilling mud/bentonite clay at some point along the bore path to the river bottom) into the Kankakee river. The construction footprint of an HDD would far surpass the footprint of a pipeline repair.

   With lead time to complete the site characterization, engineering and HDD design necessary to submit environmental permits for a new HDD, and then the additional lead time for permitting, right of way acquisition, job planning, contracting, etc., BP estimates that an HDD would not be completed until late summer of 2017.

   In summary, Alternative 1 would not meet the project objective of inspecting the pipeline indications to meet the DOT deadline.

3. **Alternative 2: Pipe Replacement by Open-Cut Trenching across the Kankakee River**
Alternative 2 involves the use of open-cut trenching across the Kankakee River for the entire Kankakee River crossing. The new river crossing would be in the existing BP right of way, parallel to the existing river crossing but offset by approximately 10'.

   Construction would require the use of a coffer dam dewatering structure to enable the trenching for pipe installation. The coffer dam would need to extend all the way across the river. Depending on the flow of the river and depending on requirements from the Coast Guard, the coffer dam and pipeline installation may need to be executed such that only half of the river is dammed at a time. The construction footprint for an open-cut pipe replacement

would be similar to the HDD in that an 800' pipe string would need to be constructed and hydrotested onsite.

Lead time for open-cut trenching is expected to be similar to that of the proposed repair, except that the Coast Guard may place greater restrictions on the ability to dam across the entire river.

In summary, Alternative 2 would not meet the project objective of inspecting the pipeline indications to meet the DOT regulatory deadline. Alternative 2 would likely also have a greater impact on mussel beds due to the need to trench across the entire river.

2.3.1. Species Considered in this Biological Assessment

The state and federally endangered Sheepnose Mussel (*Plethobasus cyphyus*) will be the primary species considered in this BA. Biological surveys were completed in 2016 for the federal and state species listed and potentially present in Will County (EnviroScience 2016), and only the Sheepnose was detected (Attachment A).

2.4. LOCATION AND DESCRIPTION OF THE PROJECT

BP must perform a physical inspection of two (2) segments of their No. 1 System, 22" East Fort Madison – Manhattan crude pipeline within the Kankakee River in Will County, IL. The project area is located 2.5 miles NW of Wilmington, IL in an unincorporated area in Section 22, Township 33N, R9E. The two segments are referenced as Sites 2015-065 and 2015-066 ("east" and "west" sites, respectively) in this document. Anomalies on the pipeline were identified during a recent routine in-line inspection of the pipeline using a smart tool (pipeline pig). The planned physical inspections of the line are in compliance with United States Department of Transportation (USDOT) Hazardous Liquids Pipeline Integrity Management Regulations. These sites have an inspection/repair deadline of October 10, 2016.

The East Site will be accessed through the Des Plaines State conservation area and the West site will be accessed from South Readman Ln. The location of the Project is presented in the attached biological survey report (Attachment A: Figure 2.0a and Figure 2.0b; Appendix A).

2.5. PROJECT SCHEDULE

BP USPL has an initial inspection/repair deadline of October 10, 2016 for compliance with USDOT Integrity Management regulations. BP USPL delayed the inspection in order to meet federal and state endangered species regulatory requirements. Work will begin immediately upon receipt of, and in accordance with, all agency approvals. We assume based on the mussel field season and issuance of an approved IDNR Conservation Plan, that mussel salvage and relocation work will begin approximately May 15, 2017, with the in-stream repair work beginning immediately after.

An anticipated timeline for completing all tasks causing temporary impacts to the streambed or banks is provided below. Shaded items note the tasks that are to be performed within the stream. An excerpt from the Sites 2015-065 A-E and 2015-066 A-C Construction Storm Water Pollution Prevention Plan is provided below. A detailed schedule of construction activities can be found in the Sites 2015-065 A-E and 2015-066 A-C Construction Storm Water Pollution Prevention Plan.

Table 2.5. Project Conservation and Construction Schedule

Proposed Action*	***Anticipated Action Schedule***	***# Days of In-Stream Work***
Mussel salvage and relocation (Both Banks)	*(18 Days Pre-Construction)*	*Non-construction*
Site Mobilization and Pre-Job Environmental and Safety Training Meeting	*Day 1*	
Begin Project on 1st bank		
Install stabilized construction entrance and sediment control structures	*Days 1-2*	
Initiate and install instream structural BMPs	*Days 3-5*	*1*
Dewater downstream work area, clear fish from temp. dam	*Days 3-5*	*1*
Mobilize equipment into work area and excavate in-stream substrate	*Days 5-7*	*1*
Strip topsoil on banks	*Days 5-7*	
Dewater excavation as needed; excavate below existing pipeline, sandblast pipeline	*Days 7-8*	*1*
Complete pipeline inspection and repair	*Days 8-10*	*1*
Cover pipeline, fill excavations and regrade	*Days 10-12*	*1*
Remove all equipment from river (including dams)	*Days 12-14*	*1*
Install permanent erosion controls, remove construction entrance, and remove temporary erosion controls.	*Days 12-14*	
Additional schedule float for weather, other contingencies		*3*
Total Work Bank 1 (No. Days):	***<14 days***	***6 to 10 days***
Repeat process for Bank 2.	*As-above*	*As-above*
Total In-stream Work Bank 2:	***<14 days***	***6 to 10 days***
TOTAL PROJECT DURATION	***<21 days***	***<20 days***

* Proposed Actions that require in-stream construction work are highlighted in blue.

**Because many actions are concurrent and variable, the number of days for each task overestimates the total project duration. Overall, BP is committed to <21 days of construction and <20 days of in-water work. In-stream work will not occur simultaneously on both sides of the river.

2.6. PROJECT CONSTRUCTION

The 22" pipeline is resting on the river bed, therefore only minor excavation below the pipeline will be needed to perform the inspection around the entire circumference of the line. The pipeline will be sandblasted, and non-destructive testing will be performed. If a repair is needed, it will likely be a Clock Spring repair which comprises installing a synthetic wrap around the pipeline; the project does not involve cutting or opening of the pipeline. Work in the river will be timed to take place immediately following receipt of permits, which should be during low flow conditions.

The East Site will be accessed through the Des Plaines State Conservation Area and the West site will be accessed from South Readman Lane. The site description is as follows and is presented in Table 2.6 below, in Attachment A: Figures 2.0a-b, and in Appendices A & B:

- ***East Site (2015-065):***
  - *East temporary Porta-Dam is approximately 44m (143ft) into the river and 22m (72ft) wide, including the liner.*
  - *Area of Direct Impact (ADI) within the Kankakee River including a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 1,394m^2 (15,005ft^2).*
  - *41.333356, -88.184684*
  - *Des Plaines State Conservation Area near N. River Road and S. Boathouse Rd., Will County, IL*
- ***West Site (2015-066):***
  - *West temporary cofferdam (sandbags) is approximately 21m (70ft) into the river by 15m (50ft) wide.*
  - *Area of Direct Impact (ADI) within the Kankakee Riverincluding a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 498m^2 (5,360ft^2) .*
  - *41.33333, -88.186971*
  - *30115 Readman Ln., Wilmington, IL 60481*
- ***Total Impacts (Both Sites Combined):***
  - *Total Area of Direct Impact (ADI) within the Kankakee River is 1,842m^2 (20,365ft^2)*

Table 2.6. Calculation of impact areas for both direct and indirect impact areas and the buffers around the direct impact areas.

Direct and Indirect Impact Area Calculations					
Area Impacted	**Temporary (Direct, No Buffers)**	**Temporary (Porta-Dam Skirt RDB Only)**	**Temporary (Buffers* Only)**	**Salvage Area (Direct and Buffers)**	**Indirect Area**
Direct (LDB)	345m^2	N/A	153m^2	498m^2	N/A
	3,714ft^2	N/A	1,647ft^2	5,360ft^2	N/A
Indirect (LDB)	N/A	N/A	N/A	N/A	5,193m^2
					55,897ft^2
Direct (RDB)	552m^2	518m^2	324m^2	1,394m^2	N/A
	5,942ft^2	5,576ft^2	3,488ft^2	15,005ft^2	N/A
Indirect (RDB)	N/A	N/A	N/A	N/A	25,830m^2
					278,032ft^2
Indirect (Marginal)	N/A	N/A	N/A	N/A	13,013m^2
					140,071ft^2
Direct (Total)	**897m^2**	**518m^2**	**477m^2**	**1,842m^2**	N/A
	9,655ft^2	**5,576ft^2**	**5,134ft^2**	**20,365ft^2**	N/A
Indirect (Total)	N/A	N/A	N/A	N/A	**44,036m^2**
					474,000ft^2

*Salvage buffers are outside of the construction direct impacts (including Porta-Dam Skirt) and are 1m (3ft) upstream and 4m (13ft) downstream and laterally riverward. These buffers were established to account for significant / lethal indirect effects of the construction including scour, sedimentation, and foot traffic disturbance.

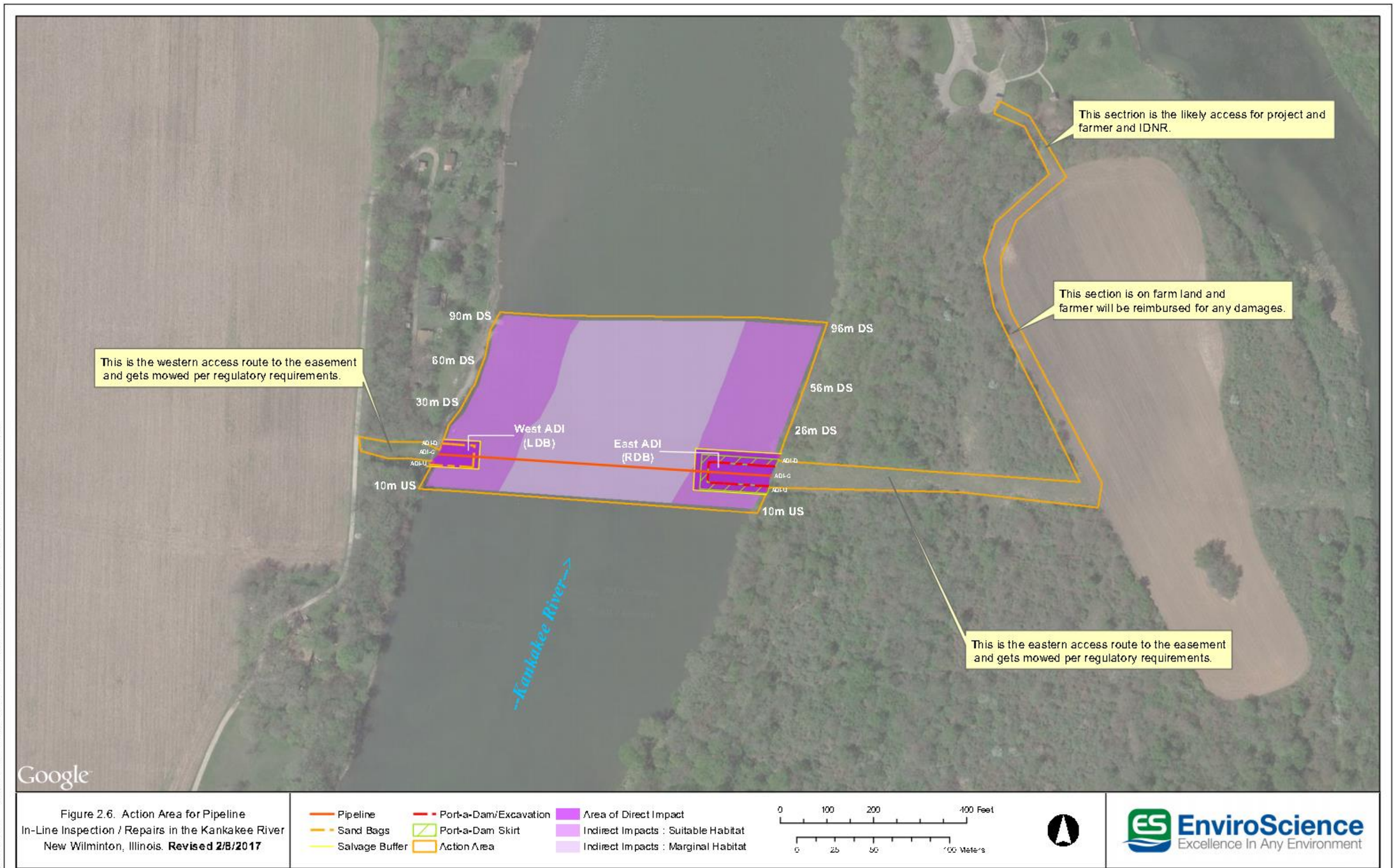

Figure 2.6. Action Area for Pipeline In-Line Inspection / Repairs in the Kankakee River New Wilmington, Illinois. **Revised 2/8/2017**

Pipeline
Sand Bags
Salvage Buffer
Port-a-Dam/Excavation
Port-a-Dam Skirt
Action Area
Area of Direct Impact
Indirect Impacts : Suitable Habitat
Indirect Impacts : Marginal Habitat

0 100 200 400 Feet
0 25 50 100 Meters

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Basemap courtesy of Google

A BP contractor (e.g. CSU) will install a stabilized construction entrance and timber matting will be laid as needed for access/staging areas in order to minimize disturbance to the farm field and river bank. The right-of-way will be prepared, including installation of safety fence and silt fence. Sediment barriers will also be installed on the down slope side of disturbed soil. All equipment will be within BP's existing right of way. Silt curtains will be installed downstream of the work area. After the federally and state-listed mussels are relocated a contractor will install a portable dam.

The proposed work will require installation of a temporary portable dam (i.e. Porta-Dam brand) on the east work area and a sand bag cofferdam on the west bank work area to allow the inspections to be completed under dry conditions. River flows will be maintained at all times, and the in-water duration of each side of the project is estimated to be equal to or less than 10 days (<20 days total). The Porta-Dam to be utilized on the east bank is a 5-ft high steel frame that is constructed of vinyl coated nylon mesh material. On the west bank, the cofferdam will be constructed of hand-stacked sandbags with the entire structure encased in geotextile fabric to prevent toppling and failure. BP will not utilize any practice that will result in a release of sediment into waters of the U.S. Although the need is not anticipated, Porta-Dam will provide a dam overflow contingency plan in the event high flows in the river are encountered. The cofferdam will be constructed from the upland area and no equipment will enter the water at any time.

The work area inside of the river will be cleared of any logs to avoid trip hazards while setting up the dam. The logs will be relocated in the river outside of the work area. The work area downstream will be dewatered and screened for aquatic life. The bottom 0.3m (1ft) of water will be pumped to an upland area through a dewatering structure constructed in a well-vegetated area. Any aquatic life remaining in the work area will be relocated back into the stream with fish nets, taking care not to harm any individuals.

It is expected that an excavation of approximately 0.6m to 0.9m (2ft to 3ft) below the existing river bottom will be needed in the stream following removal of the grout bags over the pipeline. The initial excavation will remove the top layer of cobble / gravel and stored separately so that it can be replaced as the top layer during backfill. This will be done as the top layer of streams generally contain the largest substrates which also are important for aquatic habitat and stability. The remainder of the required substrate below the top layer will then be excavated to the full required depth. The pipeline will be sandblasted and the inspections and repairs, if required, will then be completed. The pipeline and ROW will be returned to existing condition following inspection/maintenance activities. An estimated 118m^3 (154yd^3). of existing substrate will be backfilled in the excavations following the pipeline inspections. The project team will backfill both excavations using existing, native substrate, ensuring the placement of the top substrate layer back on top of the excavation. Grout bags will be placed over the pipeline to the pre-construction elevation profiles to replace those removed to perform the inspection, to maintain the river grade control and as a preventative measure for potential pipeline damage of the exposed line. It has been determined that a Total Area of Direct Impact (ADI) of 1,842m^2 [20,365ft^2(0.46 acres)] below OHWM of the Kankakee River will be affected by temporary impacts only.

All equipment will then be removed from the river into an upland area and the portable dam (east site) or sandbags and geotextile fabric (west site) removed. The stream bank will be regraded to existing contours and re-seeded and matted using high quality coir matting for high impact areas. The access route will then be restored to existing condition, making an effort to de-compact and regrade any areas that have become compacted or rutted.

1. *Description of Proposed Activities*
    a. *Mobilization to Site*
    b. *Relocate federally and state-listed mussels (EnviroScience)*
    c. *Equipment will be staged within BP's existing right-of-way on top the west and east banks. (Refer to Action Area map depicting site access routes).*
    d. *Install portable dam in river from east bank*
    e. *Dewater work area (screen for aquatic life)*
    f. *Pump ground water seepage into work area through a geotextile sediment bag in an upland area*
    g. *Remove existing grout bags from over the pipeline*
    h. *Excavate approximately 2 ft. below pipeline (which is resting on the stream bed)*
    i. *Perform pipeline inspections and repairs*
    j. *Backfill excavation*
    k. *Install new grout bags over the pipeline*
    l. *Remove portable dam*
    m. *Repeat above steps for Site 2015-065 except in place of Port-A-Dam, use hand-placed sand bags with the entire structure wrapped in geotextile material to prevent failure, accessing the river from the west.*
2. *Permitting Activities*
    a. *U.S. Army Corps of Engineers (Chicago District) Clean Water Act Section 404 Regional Permit Program*
    b. *U.S. Fish and Wildlife Service, Section 7 ESA coordination Biological Assessment*
    c. *U.S. Coast Guard, coordination for work in a Section 10 river*
    d. *Illinois EPA, Section 401 Water Quality Certification*
    e. *Illinois EPA NPDES Construction Stormwater General Permit authorization*
    f. *IDNR, Office of Water Resources Floodway Permit*
    g. *IDNR, Office of Realty and Environmental Planning, work in an Illinois Public Water, Conservation Plan, Incidental Take Authorization, Endangered Species Review, and Des Plaines Conservation Area, access agreement*
    h. *Will County soil and Water Conservation District, erosion and sedimentation control*
    i. *Will County Land Use Department, sign-off for work in a floodplain.*

2.7. CONSERVATION MEASURES

Conservation Measures are those actions taken to benefit or promote the recovery of the species. These actions will be taken by the applicant and serve to minimize or compensate for project effects on the species under review and are included as an integral portion of the proposed action.

1. A Conservation Plan (Application for Incidental Take Authorization) was submitted to the IDNR on October 7th, 2016 and revised March 15th, 2017 (Attachment B) to address impacts to the state endangered Sheepnose as well as additional state listed mussel and fish species. Because the Sheepnose is a federal and state shared resource, the conservation and mitigation commitments presented in the Conservation Plan largely apply as conservation measures for this BA. Relevant conservation measures within the

plan include mussel salvage and monitoring, habitat monitoring, mussel propagation research, and fish monitoring.

2. Mussels will be relocated from the direct impact area (ADI) which is defined as the areas within the footprint of the temporary dams and a small salvage buffer to account for immediate effects (Figure 2.6). Because the project will occur at low flow, we do not anticipate it will be necessary to relocate mussels from the immediate indirect impacts (e.g. scour or sedimentation) surrounding the dams beyond the designated salvage buffers. Also, it should be noted that mussels underneath the dam footprint and membrane will likely not experience 100% mortality as the dam structures sit on the substrate surface and there is some seepage of fresh water through the interstitial spaces in the sediment. Since the dams are relatively low in height, the pressure exerted by the dams on the substrate is also minimal and not enough to crush most mussel species. BP USPL has developed and will implement a plan for salvaging mussels from the ADIs to appropriate relocation sites with comparable habitat and mussel communities. Permission to access and use the proposed sites from the adjacent landowners has been obtained by BP USPL (see Figure 5).
    a. The preferred Site A/Site B upstream extent (41.347069°, -88.189084°) is located approximately 1,600m (5,250ft) downstream of the project centerline. The downstream extent (41.350973°, -88.196035°) is 2,350m (7,710ft) downstream of the project centerline. The total relocation area is 750m in length along both banks of the river. Site A represents the right descending half of the river and Site B represents the left descending bank of the same river reach. A subdivision within Site B, the landowner has indicated that Site B-Preferred be used first, if possible). The overall Site A/Site B area has been selected as a suitable relocation site based on historical and recent mussel data provided to ES by INHS; this area is known to host an extensive, diverse population of mussels. Site C (near 41.334826°, -88.186280°) is located 160m downstream of the project centerline and will be primarily used as an overflow site to relocate non-listed Mucket so the primary relocation site is not overcrowded. Mussel populations within Site C are known to be very similar to those within the project area based on the BP USPL 2016 mussel survey results.
    b. Immediately prior to the relocation, a qualified mussel surveyor will assess the micro-habitat within the primary and secondary relocation areas, and a subset of these areas will be selected and a re-population grid established based on microhabitat conditions.
3. The salvage plan will follow the outline below and include: a protocol for maximizing the probability of finding the endangered mussels; a protocol for removing mussels from the substrate (searching substrate to a depth of at least 10cm); protocols for handling and holding mussels to minimize stress and mortality; and a delineation and grid of the area to which mussels will be relocated. The plan will include details of ensuring the location of the salvage accurately covers the direct impact area.
    a. Prior to the mussel salvage effort, the in-stream action area will be clearly marked. Temporary bank and in-stream reference marking shall be done in such a manner as to assist the salvage team.
    b. The salvage areas will be divided into a grid and searched using adaptive sampling. In this way, the most effort is allocated to the areas with the highest

mussel density. This method has been used in other mussel relocations with >90% salvage efficiency (e.g. Hunter Station [EnviroScience, Inc. 2016]).

i. We anticipate each grid cell being approximately 5m^2 (54ft^2) and being surveyed for 15-minutes for the first search pass.
ii. Any cells with at least one mussel in the first pass will receive a 2nd pass.
iii. Cells with 2nd passes where the mussel search total exceeds 10% of the first pass will be subject to a 3rd pass.
iv. Additional passes will be completed until the re-survey condition is not met or until no T&E species are found.

c. Collection and relocation will be done at normal or low flow and only when the water temperature is above 50 degrees Fahrenheit and water clarity is good (at least 0.5m at depth of survey).
d. Surveys and relocations of mussels will be performed by approved, qualified personnel who are thoroughly briefed on the techniques to be used. These personnel shall survey the action area via diving, wading, and/or snorkeling, as appropriate. All mussels located shall be collected by hand and removed.
e. All mussels will be identified to species, counted, and if possible, sexed, processing all T&E species immediately upon discovery. All live specimens of T&E species will be measured. At least 300 individuals, including federal and state T&E species will be affixed with a Passive Integrated Transponder (PIT) tag to allow for future monitoring efforts.
f. While awaiting identification and relocation T&E species will be held temporarily using a Service-approved protocol that will maximize survival and minimize stress (e.g., held in bags / containers in-stream to ensure appropriate and consistent water temperature and oxygen levels). During boat (or other vehicle) transfer to the relocation site, T&E species will be held out of the water no more than 5 minutes or held in containers of fresh water.
g. T&E species collected during the mussel salvage will be relocated to suitable habitat downstream from the Project known to have a similar mussel community and with adjacent landowner permissions (Figure 5), since no suitable habitat was observed upstream during field surveys. Suitable habitat will include an area: 1) with stable sand/gravel or sand/gravel/cobble substrate below the ordinary low water elevation; 2) with similar mussel species diversity, 3) not currently subject to mixing zones associated with point-source discharges, immediately downstream of tributaries, or subject to evident sources of non-point source pollution. Non-endangered mussels will be translocated in such a manner as to increase their chances for survival.
h. T&E species will be hand-placed securely in the substrate by a professional malacologist or another qualified individual. The siphons of T&E species shall be exposed at the substrate/water interface. This will avoid dislodging of the mussels during high flow events. Non-listed mussels may be "broadcast" in areas of suitable, non-compacted substrate but these areas must be re-checked by a diver within 24hrs to ensure all mussels have re-buried in the life position. Any non-listed mussels found not to be buried will be hand-placed in the substrate in the life position.
i. Any T&E species accidentally killed, or that are moribund or fresh dead and contain soft tissues, will be preserved according to standard museum practices, properly

identified, or indexed (date of collection, complete scientific and common name, latitude and longitude of collection site, description of collection site), and submitted to a recognized museum or scientific repository such as The Illinois Natural History Survey (INHS). Disposition of these specimens will be coordinated with the INHS prior to mussel salvage. The appropriate curator (i.e., Dr. Kevin Cummings) will be contacted regarding proper specimen preservation and shipping procedures. In addition, the USFWS and Illinois DNR will be notified within 24 hours of this take.

j. Notification will be made to the following Service offices at least two days prior to beginning in-stream translocation activities:
    i. Chicago Field Office, 230 South Dearborn St., Suite 2938, Chicago, Illinois 60604, Phone: 312-216-4720, FAX: 312-216-1788, Attn: Shawn Cirton

k. A report documenting the translocation effort will be prepared and submitted to the Service's Chicago Field Office and the IDNR within three months of completion of the translocation. A preliminary electronic draft summary (email) including number of T&E species encountered will be submitted within 5 working days following the completion of fieldwork. The final report will include an introduction, GIS mapping, methods section, results section, conclusion and/or summary, and any relevant supplementary information (e.g. names and qualification of surveyors). The methods section will detail the protocols used for surveying, holding, handling, and translocating mussels; and establishment and location of the relocation site. The results section will include; the total number of individuals of each mussel species collected and relocated; date collected; water and air temperatures; river stat; total number of live and dead T&E species collected; condition, size, and approximate age of live T&E species; data regarding non-endangered mussels; and GIS maps or figures showing 1) project features and action area; and 2) the relocation site. Electronic files including GIS data (shapefiles or database with XY coordinates) of species locations will be provided to the Service via FTP or CD-ROM.

4. Post-project monitoring will be performed at the project site and on relocated mussels. Monitoring events are proposed every other year for 10 years post construction. The first will be after two years from completion of the relocation then at years four, six, eight, and 10. Three of the five monitoring events (years 2, 6, and 8) will include non-intrusive monitoring (limited excavation). Years 4 and 10 will have full excavations to record growth and confirm survivorship. A schedule for reporting of monitoring activities is provided in Section 5.B.i of the Conservation Plan (Attachment B).
    a. Site Post-Construction Monitoring**:** The monitoring protocol for the site will be in general accordance with the approach used for the initial mussel survey but only quantitative and qualitative methods (no transect searches). Stream habitat monitoring and fish surveys to meet the mitigation requirements of the state endangered and threatened species Conservation Plan will also be performed.
    b. Relocated Mussels: Monitoring of relocated mussels will search for PIT-tagged individuals from the initial relocation effort at the new site. At least 50% of PIT tagged individuals will be excavated, recovered, checked for mortality, measured, and replaced into the substrate. Results of % recovery and mortality will be reported within 45 days of each monitoring event.

3.0 SPECIES / ESSENTIAL HABITAT CONSIDERED

3.1. TERRESTRIAL AND AQUATIC SPECIES

During the summer of 2016, ES conducted surveys for terrestrial threatened and endangered species at the pipeline crossing of the Kankakee River in Will Co., IL. Species considered (listed federal species known from Will County) included reptiles, plants, mammals, and insects, and any critical habitat designated (Table 4.1 below). The surveys were performed from August 13 to August 15, 2016 (ES, 2016a; ES, 2016b). None of the federal listed terrestrial / semi-aquatic species were observed during the survey (ES, 2016a), and no suitable habitat was identified. As a result, these species have been excluded from further analysis. Based on the report findings, only the federally and state endangered Sheepnose was found to be present within the Kankakee River portion of the Action Area (Attachment A; Appendix A).

Table 4.1: Federal T&E Species of Concern and Site Findings

Species	Status	Details	Proposed Determination
Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests and woods.	Presence uncertain. No roost trees or habitat will be affected by construction. No Effect.
Hine's emerald dragonfly *Somatochlora hineana*	Endangered	Spring fed wetlands, wet meadows and marshes	None observed, habitat lacking. No Effect.
Hine's emerald dragonfly *Somatochlora hineana*	Critical Habitat Designated	Map and written description of the areas designated as Critical Habitat (PDF)	None observed, outside of designated critical habitat. No Effect.
Eastern Massasauga rattlesnake *Sistrurus c. catenatus*	Proposed as Threatened	Graminoid dominated plant communities (fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands)	None observed, habitat marginal. No Effect.
Sheepnose mussel *Plethobasus cyphyus*	Endangered	Shallow areas in larger rivers and streams	**Present,** likely found throughout the survey area in low numbers ($0.06/m^2$). May affect, likely to adversely affect.
Rattlesnake-master Borer Moth	Candidate	Undisturbed prairie and woodland openings that contain their only food plant, rattlesnake-master (*Eryngium yuccifolium*).	None observed, no forage food found on site. No Effect.
Eastern prairie fringed orchid *Platanthera leucophaea*	Threatened	Emergent wetland, wet meadow, sedge meadow, fen, wet to mesic prairie, or marsh edges.	None observed. Non-habitat. No Effect.
Lakeside daisy *Hymenopsis herbacea*	Threatened	Open, sunny grassland areas with a limestone substrate.	None observed. Non-habitat. No Effect.
Leafy-prairie Clover *Dalea foliosa*	Endangered	Prairie remnants along the Des Plains River.	None observed. Non-habitat. No Effect.
Mead's milkweed *Asclepias meadii*	Threatened	Perennial plant of tallgrass prairies.	None observed. No Effect.

3.2. T&E MUSSEL SPECIES DISTRIBUTION AND STATUS

Freshwater mussels are found on all continents except Antarctica and have reached, by far, their greatest species richness in North America, particularly in drainages of the southeastern and Midwestern United States. Turgeon et al. (1998) recognized 297 unionid species (includes a number of subspecies) (Margaritiferidae = 5 species' Unionidae = 292 species) within drainages of the U.S. and Canada (from the Rio Grande basin and northward). Over 70% are considered endangered, threatened, or of special concern, including 21 species presumed to be extinct (Williams et al., 1993). The Kankakee River watershed is known to support an exceptionally diverse river system in terms of mussel resources relative to the region. Recent mussel surveys within the watershed have documented 27 extant species of an estimated 40 historically extant species (Price et al, 2012).

3.2.1. Biology and Ecology

Mussel Biology and Ecology

Adult freshwater mussels are relatively sedentary and feed on microscopic material (e.g., algae, diatoms, bacteria, and dissolved organic matter) that they siphon and filter out of the water column. Juvenile mussels are <1mm in length are believed to use ciliary action and sweeping movements of their foot to collect food (pedal feeding; Gatenby et al., 1997; Yeager et al., 1994). Mussels are capable of moving laterally (several meters per day) and vertically (burying) using their strong, tongue-like foot. Amyot and Downing (1998) reported that most lateral movement occurs during reproduction. Mussels are also known to bury in winter (Balfour and Smock, 1995; Amyot and Downing, 1997), as well as in response to environmental stress (Sparks and Strayer, 1998).

Most mussels probably start reproducing between three and five years of age. Reproduction is initiated when male mussels release sperm in to the water column. If the sperm happens to be siphoned from the passing water by a female, then fertilization of the eggs (held in female's gills) will occur. The embryos develop within the gills until they are ready for release as glochidia (larval stage). This brooding time varies among species. Tachytictic brooders, or "short-term" brooders, hold their glochidia for several weeks to several months, with development starting in the spring/summer and glochidial release occurring in the summer/fall. Bradytictic brooders, or "long-term" brooders hold their glochidia for development over winter, with development generally starting in the summer and release occurring the following summer. However, glochidial release timing and frequency (more than once per year) appears to be a function of water temperature (Watters, 2000).

The glochidia are unique in that they require attachment to the gills or fins of a host, typically a fish, to complete metamorphosis from the larvae stage to a juvenile mussel. Often only one or several fish species act as successful hosts for each unionid species. Glochidial transformation on the fish host occurs within one week to many months (Cummings and Mayer, 1992), depending on the mussel species (see Table 4.2.1). Newly transformed juveniles are then sloughed off by the fish host and settle in the substrate; unfortunately, little is known about juvenile habitat requirements.

Table 4.2.1. T&E Mussel Species Life History

Scientific Name	Common Name	Federal Status	State Status	Habitat	Known or likely fish hosts
Plethobasus cyphyus	Sheepnose	Listed Endangered	Listed Endangered	Large streams in sandy mud or gravel shoals with moderate to swift current.	Central Stoneroller, Sauger
Cyclonaias tuburculata	Purple Wartyback	Not Listed	Listed Threatened	Coarse sand or gravel in a swift current. Most common in large creeks.	Black Bullhead, Yellow Bullhead, Channel Catfish, and Flathead Catfish
Elliptio dilatata	Spike	Not Listed	Listed Threatened	Small to large streams and lakes, in sand and gravel in swift current.	Gizzard Shad, Flathead Catfish, White Crappie, Black Crappie, and Yellow Perch
Ligumia recta	Black Sandshell	Not Listed	Listed Threatened	Coarse sand or gravel bottoms in strong or moderate current.	Rock Bass, American Eel, Central Stoneroller, Convict Cichlid, Common Carp, Banded Killifish, Redbreast Sunfish, Pumpkinseed, Green Sunfish, Orangespotted Sunfish, Bluegill, Longear Sunfish, Largemouth Bass, White Perch, Rosyface Shiner, Yellow Perch, White Crappie, Black Crappie, Roach, Sauger, Walleye, Southern Platyfish

In general, most unionid species prefer waters with moderate flow conditions and a heterogeneous mixture of substrate composed of larger particles (e.g., cobble and large gravel) for substrate stability and smaller particles (e.g., small gravels, sand, and small amounts of silt or clay) that allow for burrowing into the substrate. The distribution of mussels in streams is generally patchy (Downing and Downing, 1992), and is a culmination of such factors as host fish distribution, larval settlement conditions, and a complex combination of hydraulic variables (e.g., shear stress) at varying levels of flow (discharge) conditions (Layzer and Madison, 1995). In most lotic systems, mussel distribution across the stream channel is often concentrated in a longitudinal (upstream to

downstream) "band" between the bank and main channel. Habitat near the bank is typically limited by slow flow, sedimentation, temperature extremes, and possible emersion (during low flow); whereas habitat in the stream channel's deepest area (thalweg) is limited by erosive velocities, scour, and relatively impervious substrate.

3.2.2. T&E Species Description

T&E Species Descriptions

Sheepnose – Federal and State Endangered

The Sheepnose is a larger-stream species occurring primarily in shallow shoal habitats with moderate to swift currents over coarse sand and gravel (Oesch, 1984), although considerable populations have been identified in deeper glide habitats in medium-sized streams with gravel / cobble bottoms (e.g. EnviroScience 2010). Habitats with Sheepnose may also have mud, cobble, and boulders. Sheepnose in larger rivers may occur in deep runs (Parmalee and Bogan 1998). Strayer (1999a) demonstrated in field trials that mussels in streams occur chiefly in flow refuges, or relatively stable areas that displayed little movement of particles during flood events. Flow refuges conceivably allow relatively immobile mussels to remain in the same general location throughout their entire lives (Butler 2002).

Sheepnose glochidia are released in the form of conglutinates, which mimic fish food items. Conglutinates resemble small pink worms, which infect fish gills when the fish attempt to eat them (Butler 2002). Glochidia must come into contact with a specific fish host(s) in order to survive. If they do not, they will perish. Little is known regarding Sheepnose host fishes (Roberts and Bruenderman 2000). The Sauger (*Stizostedion canadense*) and Central Stoneroller (*Campostoma anomalum*) are the only known natural hosts (Surber 1913, Wilson 1914; Waters et al. 2009, p 221). In many mussel species, a few weeks are spent parasitizing the fishes' gill tissue, after which time they drop off from the fish and begin a free-living existence on the stream bottom. Unless they drop off in a suitable habitat, they will die. Thus there are several weak links in the life cycle that may prevent successful reproduction and recruitment of juveniles into existing populations (Butler 2002).

3.3. CURRENT T&E POPULATIONS AND HABITAT CONDITIONS WITHIN THE PROJECT AREA

In 2016, EnviroScience was contracted by Central States Underwater (CSU) to conduct a biological survey for federal and state species potentially present within the Action Area. A detailed description of the survey methods and results is provided in EnviroScience 2016a (Appendix A). Of the potential federally listed species known from Will County (see Table 4.1), only the federally and state endangered Sheepnose was detected. The following is a summary of the 2016 mussel survey results.

The survey was performed from August 13 to August 15, 2016 following agency-approved methods and survey limits that encompassed both ADIs (Appendix A, Figure 2.0b). The survey area was found to contain extensive and significant freshwater mussel resources including

federally and state listed species. The federally and state endangered Sheepnose, was found at 25m (82ft) from the west bank waterline near the downstream corner of the west bank ADI. The location of this specimen is provided in Appendix A, Figures 3.1.a through 3.1.c. Additionally, two (2) fresh dead Sheepnose were found on the west bank in the river and four (4) were found on the east bank along the shore in a shell midden. The state threatened Purple wartyback (*Cyclonaias tuberculata*) and Black Sandshell (*Ligumia recta*) were commonly detected in both right and left bank survey areas. Overall, A total of 1,220 living mussels and 22 species were detected alive or as fresh dead shells within the survey area. Only one additional species (state threatened Spike [*Elliptio dilatata*]) was represented by weathered dead shells, although the species could potentially exist within the project area. Table 4.3 provides a summary of the freshwater mussel community in the vicinity of the proposed project.

The presence of this high-quality mussel community is probably due in part or enhanced by the presence of the existing pipelines at this location. The effects of the pipeline on river flow can be observed as far back as 1988 on aerial photography. The pipeline armoring effect of placed grout bags have raised and stabilized the stream bed slightly and created a grade control and stable riffle/flow refuge downstream from the alignment. Immediately upstream from the pipeline the river has a slow, lake-like pool habitat and expanses of bedrock that is often poor habitat for sensitive mussel species, and again 200m downstream the river begins to slow down and increase in depth. As a result, the area at the pipeline and for a few hundred meters downstream may represent the best mussel habitat within at least a kilometer or more upstream and downstream.

Table 4.3. Status, Numbers, and Relative Abundance of Freshwater Mussels, from Kankakee River Mussel Survey (All Methods).

					LDB Best Condition[2]		RDB[3] Best Condition[2]		TOTAL Best Condition[2]			
Species	Common Name	Code	Federal Status[1]	IL Status[1]	Live	Relative frequency (% total)	Live	Relative frequency (% total)	Live	FD	D	Relative frequency (% total)
Actinonaias ligametina	Mucket	ACLI			975	79.9%	198	54.0%	1173			73.9%
Alasmidonta marginata	Elktoe	ALMA			6	0.5%	1	0.3%	7			0.4%
Amblema plicata	Threeridge	AMPL			33	2.7%	23	6.3%	56			3.5%
Cyclonaias tuberculata	**Purple Wartyback**	**CYTU**		**T**	**93**	**7.6%**	**11**	**3.0%**	**104**			**6.6%**
Elliptio dilatata	**Spike**	**ELDI**		**T**	**0**	**0.0%**	**0**	**0.0%**	**0**		**x**	**0.0%**
Fusconaia flava	Wabash Pigtoe	FUFL			4	0.3%	0	0.0%	4			0.3%
Lampsilis cardium	Plain Pocketbook	LACA			11	0.9%	5	1.4%	16			1.0%
Lampsilis siliquoidea	Fat Mucket	LASI			1	0.1%	0	0.0%	1			0.1%
Leptodea fragilis	Fragile Papershell	LEFR			4	0.3%	4	1.1%	8			0.5%
Ligumia recta	**Black Sandshell**	**LIRE**		**T**	**11**	**0.9%**	**6**	**1.6%**	**17**			**1.1%**
Lasmigona complanata	White Heelsplitter	LSCO			1	0.1%	0	0.0%	1			0.1%
Lasmigona costata	Flutedshell	LSCS			11	0.9%	2	0.5%	13			0.8%
Megalonaias nervosa	Washboard	MENE			5	0.4%	0	0.0%	5			0.3%
Obliquaria reflexa	Threehorn Wartyback	OBRX			3	0.2%	6	1.6%	9			0.6%
Pleurobema sintoxia	Round Pigtoe	PLSI			3	0.2%	2	0.5%	5			0.3%
Potamilus alatus	Pink Heelsplitter	POAL			10	0.8%	69	18.8%	79			5.0%
Plethobasus cyphyus	**Sheepnose**	**PLCY**	**E**	**E**	**1 (2)**	**0.1%**	**(4)**	**0.0%**	**1**	**(6)**		**0.1%**
Quadrula metanevra	Monkeyface	QUME			4	0.3%	4	1.1%	8			0.5%
Quadrula pustulosa	Pimpleback	QUPU			34	2.8%	24	6.5%	58			3.7%
Toxolasma parvum	Lilliput	TXPA			FD	0.0%				x		
Tritogonia verrucosa	Pistolgrip	TRVE			1	0.1%	0	0.0%	1			0.1%
Truncilla donaciformis	Fawnsfoot	TRDO			2	0.2%	4	1.1%	6			0.4%
Truncilla truncata	Deertow	TRTR			6	0.5%	6	1.6%	12			0.8%
Utterbackia imbecillis	Paper Pondshell	UTIM			FD	0.0%				x		0.0%
Venustaconcha ellipsiformis	Ellipse	VEEL			1	0.1%	2	0.5%	3			0.2%
Total:					**1220**	**100.0%**	**367**	**100.0%**	**1587**			**100.0%**
No. of Species (Total Live + Fresh / Weathered Dead):	**25**				22		16		22	2	1	

[1] E = Endangered; SC = Special Concern; T = Threatened

[2] (2) or FD=fresh dead shell, D=includes weathered dead and subfossil shells

[3]. No transect searches were performed at the RDB site due to time / weather constraints, so comparison of number of mussels and species between banks is somewhat skewed since more effort was expended at the LDB.

4.0 EFFECTS ANALYSIS

4.1. CONSTRUCTION EFFECTS

4.1.1. Anticipated Effects of the Pipeline Inspections and Repairs

The inspection and possible repair of two points on the 22-inch pipeline where it crosses the Kankakee River will result in a number of temporary impacts to the streambed, which in turn could result in an adverse impact to resident aquatic and threatened or endangered species. Those living in the direct impact area could be crushed, smothered, dislodged, or die from exposure. Temporary disturbance of the streambed and riverbanks could result in local scouring and downstream sediment deposition, which are putative sources of unionid impairment and decline (Fuller, 1974; Aldridge et al., 1987; Bogan, 1993; Williams, 1993). Additionally, mussel host fish activity may be altered by minor changes in habitat and turbidity, which could lead to disruption of unionids' life cycles. The project construction methods were designed to minimize the above-listed effects.

If not relocated, all stages of mussels and fish trapped within the portable would likely be buried, crushed or killed, or exposed to air by inspection activities. The adult fish species could be displaced from habitat or become entrapped in the temporary cofferdams installed in the work area during construction. Larval and egg stages of fish could be killed by pumps or sedimentation of spawned eggs. Mussel and fish species in the immediate area of the construction could have less efficient reproduction as the mussel / host fish interaction is disrupted. Also, mussels and fish living in the vicinity of the project could have interrupted feeding and respiration. Mussels and fish that are salvaged and relocated will have some short term adverse effects including minor mortality but these effects will be minimized by mussel and fish relocation, and post-construction monitoring.

Adult fish and adult mussels will be the life stages primarily directly affected due to the short duration of the project. It is anticipated that minimization measures for listed and non-listed fish species such as exclusion and netting / relocation will also protect the juvenile stages of freshwater mussels.

The number of listed species anticipated to be affected is relatively comparable to previously authorized projects with similar conservation commitments, and because the effects of this project will be short in duration and temporary, it does not represent a threat to the continuation of the affected species within Illinois. The ultimate purpose of the project is to maintain the integrity of the existing pipeline and scour protection to prevent additional impacts to the mussel resources from scour or an unintentional release from the pipeline that could potentially affect many more fish and mussels compared to the impacts from the proposed repair.

4.1.2. Hydraulic Modification by the Project

The presence of temporary dams within the river to support construction activities could potentially result in local hydrologic modifications to the river bottom, if flows exceed normal flows. These modifications could include scouring and destabilizing of the river bottom which would directly impact mussels and mussel habitat. The project duration has been limited to less than twenty (20) days during expected low flows on a regulated river, and since the river is relatively wide and flat with large substrate, we considered these modifications unlikely to occur. In the event rising flows are believed to be in danger of causing scour or compromising the work area during the

temporary dam work, adaptive management will be used and a diversion dike may be installed upstream from the temporary dam(s) to prevent scour and maintain the integrity of the dam(s). BP USPL understands that if a diversion dam is required, consultation will need to be reinitiated with the Service. Again, we consider the necessity of installing diversion dam highly unlikely, and as a result we did not include the potential impacts of a diversion dam in our take analysis for the Sheepnose. If a diversion dam is required, a post-project analysis may be required to determine if the incidental take estimate for the Sheepnose was exceeded.

4.1.3. Effects to T&E Species Habitat

Direct and indirect impacts to the threatened / endangered species habitats are shown in Appendix A, Figures 3.1a – 3.1e. with the distribution of mussels following suitable habitat. The majority of the direct and indirect impact areas should be considered suitable habitat for the Sheepnose Mussel. Temporary, direct effects to Sheepnose habitat will occur in the ADI during the excavations for the pipeline inspections within the excavation footprints where the substrate will be completely excavated and disturbed. Grout bags will be used to armor the pipeline where necessary, and as a result the water pH will likely be raised within the excavation area during the installation of grout bags. Discharge water from the work area is to be discharged on an upland site where it will infiltrate into the ground and neutralized, and not be sent directly into the stream.

Following the inspections / repairs, the substrate will be replaced using stockpiled substrate materials and built to the pre-existing elevation profile. In addition, any scour protection will be installed. During construction, a biologist will be on-site to confirm conservation commitments and post-construction a site inspection will be conducted to confirm habitat was replaced in a way to support the re-colonization of the Sheepnose and other resident aquatic life.

Additional direct effects to habitat will be within the temporary dam footprints, but we anticipate those affects to be less destructive than the effects of the excavation to the Sheepnose since: 1) the substrate will not be directly disturbed or underneath heavy equipment as the dams will just be set up on the substrate surface with a plastic membrane, 2) while mussels will be disturbed, we anticipate >50% of any mussels remaining underneath the portable dam footprint post-relocation effort will survive as there will be some flow and the pressures exerted by the temporary dam on the substrate are minimal.

A salvage effort of all mussel species including the Sheepnose will be completed within the direct impact area following an agency-approved mussel salvage and monitoring plan. We anticipate the salvage efficiency to be >70%. All T&E and non-listed mussels will be translocated to suitable habitat approximately 100 meters downstream (no suitable habitat known from upstream) from the project area during the acceptable sampling period for mussels, typically between May 1st and October 1st.

4.1.4. Other Environmental Impacts

No other significant environmental impacts are anticipated as a result of this project. Temporary impacts to the riparian zone are expected to be minimal as this will be primarily equipment access and lay-down areas within the existing, maintained right of way. Any disturbed areas including the riverbank will be re-seeded and replanted with native vegetation using an agency approved seed mix for the 100-year floodplain and upland areas (Appendix B).

4.1.5. Anticipated Response of T&E Species to the Proposed Action

Based on the proposed action, we determined, with the exception of the Sheepnose, that the project would likely have no effect on T&E species. It is expected that the project would likely have a relatively small short-term and no long term, negative effect on the Sheepnose. We did not anticipate extensive indirect (downstream or upstream) effects based on the best available information, nor did we anticipate substantial impacts to the riparian zone. The total direct impacts to T&E species habitat were estimated to be 1,842m^2 (20,365ft^2) and all impacts were considered to be temporary as the purpose of the project was to inspect the pipe then replace habitat to the preexisting condition. Using the species density estimates based on 2016 quadrat data, we determined the estimated level of take in the direct and indirect impact areas for each respective T&E species. All results were rounded up; the results of that analysis are provided in Section 5.1.8 (Calculation of Take Estimates).

BP USPL is committed to restore the repair elevations to the preexisting condition, and will record the pre-existing stream profiles at the repair to be used to ensure the final Project as constructed has the same elevation profile. This will prevent any indirect changes to river flow and habitat as a result of the placement of the pipeline and replacement of the fill. While a substantial change in habitat from the construction was considered unlikely, it is a risk. Therefore, mussel and habitat monitoring (e.g. repeating 2016 quantitative and spot search mussel survey methods and depth profiles) of the project area post-construction will be completed to confirm the completed ADIs are restored and functioning similar to the preexisting conditions at the site. Long term monitoring of relocated threatened and endangered and non-listed mussels will also be completed over at least one event every other year over 10 years post-construction (years 2, 4, 6, 8, and 10). Three of the five monitoring events (years 2, 6, and 8) will include non-intrusive monitoring (limited excavation). Years 4 and 10 will have full excavations to record growth and confirm survivorship. The results will then validate the take estimates, or, be used, if necessary, to revise the incidental take estimate. If take appears to be exceeded, reinitiation of formal consultation with the Service may be required.

Most mussels (>70%)within the ADIs will be salvaged and relocated to suitable habitat and monitored for long-term survivorship. The salvage efficiency estimate of 70% was based within the ranges of relevant mussel detection rates (<50% to >90%) obtained from of past mussel relocations and mussel survey projects completed by EnviroScience, Inc. (e.g. EnviroScience, Inc. 2016 [<50% efficiency; T&E Mussel Survey Appendix A], and 2017 [>90% efficiency; Hunter Station Bridge relocation]), the proposed endangered mussel services contractor for the mussel relocation. Initial survivorship of mussels is estimated to be 70%; the 30% mortality rate is caused by the relocation of the individuals. This estimate of 70% survivorship is based on a range of reported relocation success including INHS (Tiemann et al 2016; >90%) and Pennsylvania Fish and Boat Commission (Allison, 2015, 50% to 90%). The <30% of Sheepnose within the ADI that are missed by the salvage effort will be either temporarily adversely affected if underneath the temporary dams, or relocated to nearby suitable habitat and monitored over 5 years for survival.

4.1.6. Direct Impacts

The total direct impacts to T&E species habitat (suitable wetted substrate at normal flow) were estimated to be 1,842m^2 (20,365ft^2) and all impacts were considered to be temporary since this in an inspection / repair and replacement to the pre-existing condition. We have included a buffer around the direct impact area after re-reviewing the construction plans; this buffer will be 4m (13ft) downstream and laterally riverward and 1m (3ft) upstream. The direct impacts are as follows and

are presented in Figure 2.0b in the attached biological survey report (Attachment A; Appendices A & B):

- ***East Site (2015-065):***
  - *East temporary Porta-Dam is approximately 44m (143ft) into the river and 22m (72ft) wide, including the liner.*
  - *Area of Direct Impact (ADI) within the Kankakee River including a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 1,394m^2 (15,005ft^2).*
  - *41.333356, -88.184684*
  - *Des Plaines State Conservation Area near N. River Road and S. Boathouse Rd., Will County, IL*
- ***West Site (2015-066):***
  - *West temporary cofferdam (sandbags) is approximately 21m (70ft) into the river by 15m (50ft) wide.*
  - *Area of Direct Impact (ADI) within the Kankakee Riverincluding a 1m (3ft) buffer upstream and a 4m (13ft) lateral (riverward) and downstream buffer will be 498m^2 (5,360ft^2) .*
  - *41.33333, -88.186971*
  - *30115 Readman Ln., Wilmington, IL 60481*
- ***Total Impacts (Both Sites Combined):***
  - *Total Area of Direct Impact (ADI) within the Kankakee River is 1,842m^2 (20,365ft^2)*

4.1.7. Indirect Impacts

Indirect impacts were estimated to occur across the entire reach of the river, extending from 10m (33ft) upstream and 90m (295ft) downstream from the ADI as a result of siltation, temporary hydrology alteration, scouring and ponding, and fish host and reproductive disruption (Figure 4). These limits were based on the agency-requested mussel survey limits, and are likely over-estimated since we anticipate siltation and scour effects from the Project are expected to be minimal. Also, a large portion of the central section of the river was considered marginal habitat for most mussel species. The total area of indirect effects was calculated as Sheepnose Mussel suitable habitat within the Action Area along the west bank of the river [5,193m^2 [55,897ft^2)] and the east bank of the river [25,830m^2 (278,032ft^2)], with an additional marginal habitat of 13,013m^2 (140,071ft^2), but not including the areas of direct impact [ADI = 1,842m^2 (20,865 ft^2)], which equals a total indirect impact area of 44,036m^2 [474,000 ft^2(11 acres)].

4.1.8. Calculation of Take Estimates

The 2016 quantitative (quadrat) mussel survey data was used to calculate the estimated take of T&E species. While the single Sheepnose individual was only detected in transect surveys, none were detected in quadrat sampling, which presented somewhat of a challenge to calculate a density estimate for the species. We proposed density estimates in Table 5.1.8a simply based on the species' observed relative abundance would be comparable to other rare species picked up in quadrat sampling (e.g. Pistolgrip) with and estimated overall site density of 0.06/m^2. While not ideal, we considered this the best method, since the Sheepnose was known to exist at the west bank and likely existed at the east bank based on the presence of numerous (4) fresh dead valves and deeper water with slower flow comparable to other sites where the Sheepnose has been found in relatively high numbers (e.g. EnviroScience 2010). The estimated density of the Sheepnose using this method was therefore considered 0.06/m^2 at all locations (Table 5.1.8a and 5.1.8b).

Table 5.1.8a. Mussel Quantitative (Quadrat) – Based Estimated Density Results for West (Left Descending) and East (Right Descending) Banks.*

					West (LDB) Density			East (RDB) Density			Total Average Density		
Species	Common Name	Code	Federal Status[1]	IL Status[1]	Live	No/m^2	Relative frequency (% total)	Live	No/m^2	Relative frequency (% total)	Live	No/m^2	Relative frequency (% total)
Actinonaias ligametina	Mucket	ACLI			57	11.40	78.1%	81	7.71	63.8%	138	8.903	69.0%
Alasmidonta marginata	Elktoe	ALMA			3	0.60	4.1%			0.0%	3	0.194	1.5%
Amblema plicata	Threeridge	AMPL			1	0.20	1.4%	9	0.86	7.1%	10	0.645	5.0%
Cyclonaias tuberculata	**Purple Wartyback**	**CYTU**		**T**	**3**	**0.60**	**4.1%**	**3**	**0.29**	**2.4%**	**6**	**0.387**	**3.0%**
Elliptio dilatata	**Spike**	**ELDI**		**T**			**0.0%**			**0.0%**			**0.0%**
Fusconaia flava	Wabash Pigtoe	FUFL			1	0.20	1.4%			0.0%	1	0.065	0.5%
Lampsilis cardium	Plain Pocketbook	LACA			1	0.20	1.4%	2	0.19	1.6%	3	0.194	1.5%
Lampsilis siliquoidea	Fatmucket	LASI					0.0%			0.0%			0.0%
Leptodea fragilis	Fragile Papershell	LEFR					0.0%	1	0.10	0.8%	1	0.065	0.5%
Ligumia recta	**Black Sandshell**	**LIRE**		**T**	**1**	**0.20**	**1.4%**	**2**	**0.19**	**1.6%**	**3**	**0.194**	**1.5%**
Lasmigona complanata	White Heelsplitter	LSCO					0.0%			0.0%			0.0%
Lasmigona costata	Flutedshell	LSCS			1	0.20	1.4%	1	0.10	0.8%	2	0.129	1.0%
Megalonaias nervosa	Washboard	MENE					0.0%			0.0%			0.0%
Obliquaria reflexa	Threehorn Wartyback	OBRX					0.0%	2	0.19	1.6%	2	0.129	1.0%
Pleurobema sintoxia	Round Pigtoe	PLSI					0.0%	1	0.10	0.8%	1	0.065	0.5%
Potamilus alatus	Pink Heelsplitter	POAL					0.0%	19	1.81	15.0%	19	1.226	9.5%
Plethobasus cyphyus	**Sheepnose**	**PLCY**	**E**	**E**	**0**	**0.06**	**0.0%**	**0**	**0.06**	**0.0%**	**0**	**0.06**	**0.0%**
Quadrula metanevra	Monkeyface	QUME					0.0%	1	0.10	0.8%	1	0.065	0.5%
Quadrula pustulosa	Pimpleback	QUPU			3	0.60	4.1%	4	0.38	3.1%	7	0.452	3.5%
Tritogonia verrucosa	Pistolgrip	TRVE			1	0.20	1.4%			0.0%	1	0.065	0.5%
Truncilla donaciformis	Fawnsfoot	TRDO					0.0%			0.0%			0.0%
Truncilla truncata	Deertoe	TRTR			1	0.20	1.4%	1	0.10	0.8%	2	0.129	1.0%
Venustaconcha ellipsiformis	Ellipse	VEEL					0.0%			0.0%			0.0%
Total:					**73**	**14.66**	**100.0%**	**127**	**12.16**	**100.0%**	**200**	**12.96**	**100.0%**
No. of Species (Total Live + Dead):					11			13			16		
No. Samples (Quadrats)					20			42			62		

[1] E = Endangered; SC = Special Concern; T = Threatened

[2] FD=fresh dead shell, D=includes weathered dead and subfossil shells

Because a Sheepnose was not detected in quadrat sampling, a density estimate is presented based on the species' observed relative abundance, comparable to the density of other rare species that were detected in quadrat sampling.

Alternately, because the single Sheepnose was detected in a semi-quantitative transect search the density of the species could have been assessed using the number of transect segments surveyed. A total of eleven (50m) transects were surveyed on the west bank only, for a total of 550m^2 of habitat surveyed. Transect searches typically are not 100% efficient at mussel detection, so a commonly cited efficiency rate of 50% could be applied, resulting in 1 Sheepnose detected in 225m^2 of habitat, or a density of 0.0004/m^2. We dismissed this method as greatly underestimating the Sheepnose population. A comparison of quadrat sampling results to the semi-quantitative sampling results indicated transect search efficiency may have been as low as 10%. A total of 800 mussels were collected during transect survey of 550m^2 but based on the more precise excavated quadrat-calculated density in the area, there should have been approximately 8,035 mussels in the transect searches at 100% efficiency. Low search efficiency is common in high density mussel concentrations where the efforts required to detect all mussels present greatly exceeds the allocated survey time (G. Zimmerman, pers. obs.). We believe the low efficiency observed on the transect searched here was a combination of high mussel density, and the partial use of commercial divers with limited mussel survey experience. Again, for this reason we proposed basing the density estimate of the Sheepnose on the lowest observed density found within the quantitative quadrat sampling.

The west (left descending) bank ADI was estimated to be approximately 239m^2 of mussel habitat and the east (right descending) bank ADI was estimated to be approximately 524m^2 of mussel habitat based on the mussel survey results and final construction drawings and GPS locations provided by BP USPL, and ES field measurements. Applying the density estimates to this area indicates that approximately 24,143 mussels, including 114 Sheepnose, 704 Purple Wartyback, 365 Black Sandshell, and 23,018 additional non-listed species inhabit the direct impact areas of the project (Table 5.1.8b). Following a >70% mussel salvage and successful (~70% survival) relocation effort, the number of mussels experiencing mortality or significant direct effects (e.g. missed in relocation and still survive within the temporary dam footprints) is limited to 12,313 mussels, including 58 Sheepnose, 359 Purple Wartyback, 186 Black Sandshell, 10 Spike[1], and 11,739additional non-listed species. Therefore, assuming a 70% detection rate during the mussel salvage and a 70% survival rate of salvaged mussels, an estimated 11,830 mussels (all species) will survive relocation including 56 Sheepnose, 345 Purple Wartyback, 179 Black Sandshell, 5 Spike, and 11,279 non-listed species.

[1] The 10 Spike assumed to exist within the ADI based on professional judgement were not included in the take calculation totals sine that number was not based on actual data.

Table 5.1.8b. Estimated No. of T&E and Non-listed mussels Take after 70% Salvage and Relocation (70% Survivorship) within the Areas of Direct Impact.

Species	West Bank (LDB) 498m²		East Bank (RDB) 1,394m²		Total Mussels Both Sites 1,892m²	Mussels Salvaged	Take from Direct Impacts	Take from Relocation Effects	Viable Mussels Relocated	Total Take (Lethal or Significant*)
	Density Est. (No./m²)	Total Mussels	Density Est. (No./m²)	Total Mussels		Total Mussels Salvaged (70% efficiency)	Total Salvage Loss (30% Missed)	Relocation Effects (30% Mortality from moving)	Total Mussel Reloc. Sucess	
Sheepnose (FE, SE)	**0.06**	**30**	**0.06**	**84**	**114**	**80**	**34**	**24**	**56**	**58**
Purple Wartyback (T)	0.60	300	0.29	404	704	493	211	148	345	359
Black Sandshell (T)	0.20	100	0.19	265	365	256	110	77	1799	186
Spike (T)	-	0	-	0	10**	7**	3**	2**	5**	5**
Non-listed	13.75	6,848	11.6	16,170	23,018	16,113	6,905	4,834	11,279	11,739
Total (All Species)	**14.61**	**7,276**	**12.1**	**16,867**	**24,143**	**16,900**	**7,243**	**5,070**	**11,830**	**12,313**

FE = Federally endangered; SE = State endangered; T = Threatened.
Note: columns will not total exactly due to rounding effects and results shown in whole mussels, and the Spike was not included in the totals due to that species numbers being based on professional judgement and not field data.
*We defined a "significant" but non-lethal take as an impact that would substantially and negatively affect an animal, but not necessarily kill. For example, T&E mussels that are missed during the mussel salvage could likely survive within many portions of the ADI during construction, but their life processes would be interrupted and their health condition likely degraded.
**The Spike (T) was not detected during the survey, however we proposed a total of 10 individuals could exist within the ADI based on professional judgement considering the site habitat and nearby records, and to avoid a construction delay if a Spike was detected, as it would require a revision of the state conservation plan. The population and take estimates for the Spike were not added to the overall site totals since it was not actually found alive.

4.2. CUMULATIVE EFFECTS ANALYSIS

No other negative effects from other (federal or non-federal) actions within the action area were identified within this BA that could affect T&E species in the near future. It should be noted that the existing pipeline is a main transporter of crude oil in this region, reducing the need for other, environmentally riskier transportation modes such as trucking, rail or barge.

5.0 CONCLUSION AND DETERMINATION OF EFFECTS

The proposed construction project has several relatively small but potential and likely impacts to the federally and state endangered Sheepnose, and similar effects to three state listed mussels as described in the attached Illinois Application for Incidental Take Authorization – Conservation Plan (Appendix B). Overall, the project may affect and is likely to adversely affect the Sheepnose, and is not likely to affect the other species considered in Table 6.0. No federally designated critical habitat was identified within the Action Area.

Table 6.0. Federal Species and Critical Habitat Effect Determinations.

Species	Status	Proposed Determination
Eastern Massasauga rattlesnake	Proposed as Threatened	No effect
Eastern prairie fringed orchid	Threatened	No effect
Hine's emerald dragonfly	Endangered	No effect
Hine's emerald dragonfly	Critical Habitat Designated	No effect
Lakeside daisy	Threatened	No effect
Leafy-prairie Clover	Endangered	No effect
Mead's milkweed	Threatened	No effect
Northern long-eared bat	Threatened	No effect
Rattlesnake-master Borer Moth	Candidate	No effect
Sheepnose mussel	Endangered	May affect, likely to adversely affect

In summary, the following effects from this project to the Sheepnose were considered for this conclusion:

- Alteration of flow produced by the project is expected to be minimal, however it may affect and is likely to adversely affect T&E species and/or their habitat.
- There is a low potential for significant lethal effects from sedimentation above a typical high flow event, however these aspects of the project may affect and are likely to adversely affect T&E species and/or their habitat, temporarily.
- Pipeline inspections including temporary dams, excavations and fill intersects Sheepnose Mussels and essential habitat, and it may affect and is likely to adversely affect endangered species or their habitat through its footprint.

Since likely adverse effects have been noted, we concluded that a Formal Consultation should be initiated for this project.

6.0 LIST OF CONTACTS AND PREPARERS

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Personal Observations:

Gregory F. Zimmerman, Malacologist., EnviroScience, Inc. 5070 Stow Rd., Stow, OH 44224 (GZimmerman@EnviroScienceInc.com), Various direct observations from freshwater mussel field surveys in PA, IN, WV, FL and OH, 1997 – 2016.

Attachment A

2016 Biological Survey Report

(EnviroScience 2016a)

BA ATTACHMENTS NOT INCLUDED

AS THEY ARE ALREADY INCLUDED IN

CONSERVATION PLAN