



NEXUS GAS TRANSMISSION PROJECT

RESOURCE REPORT 3 ***Fish, Wildlife, and Vegetation***

FERC Docket No. PF15-10-000

Pre-filing Draft
June 2015

NOTICE TO PUBLIC STAKEHOLDER REVIEWERS

This Draft Resource Report for the NEXUS Gas Transmission Project (“Project”) is being filed as part of the Federal Energy Regulatory Commission’s (“FERC’s”) pre-filing process. The pre-filing process allows interested stakeholders, FERC, and regulatory agency staff to engage in early dialogue to identify affected stakeholders, facilitate early issue identification and resolution, provide multiple opportunities for public meetings (e.g., open houses), and support the preparation of high-quality environmental Resource Reports and related documents that describe the Project, assess its potential impacts, identify measures to avoid and mitigate impacts, and analyze alternatives to the Project.

Since the initial filing of Draft Resource Report 1 (Project Description) and 10 (Alternatives) on January 23, 2015, NEXUS hosted eight Open Houses along the proposed pipeline route to inform stakeholders about the proposed Project and to answer questions. FERC staff also hosted six independent Public Scoping Meetings along the proposed route in April and May of 2015, as part of the National Environmental Policy Act (“NEPA”) compliance process. This Draft Resource Report may contain items that are highlighted in grey that will be filed when NEXUS files its NGA 7(c) Certificate Application with the Commission in November 2015.

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RESOURCE REPORT 3—FISH, WILDLIFE, AND VEGETATION	
Filing Requirement	Location in Environmental Report
<input checked="" type="checkbox"/> Describe commercial and recreational warmwater, coldwater, and saltwater fisheries in the affected area and associated significant habitats (§380.12 (e) (1)).	Section 3.2, Tables 3.2-1, 3.2-2, 3.2-3 and Table 2.3-6 of Resource Report 2
<input checked="" type="checkbox"/> Describe terrestrial and wetland wildlife and habitats that might be affected by the Project; describe typical species that have commercial, recreational, or aesthetic value. (§ 380.12 (e) (2)).	Section 3.3, Section 3.4, Table 3.3-1
<input checked="" type="checkbox"/> Describe the major vegetative cover types that would be crossed and provide the acreage of each vegetative cover type that would be affected by construction. (§ 380.12 (e) (3)).	Section 3.3, Table 3.3-1,
<input checked="" type="checkbox"/> Describe the effects of construction, operation, maintenance, clearing, and treatment of the Project area on aquatic and terrestrial species and their habitats. (§ 380.12 (e) (4)).	Section 3.2.7, 3.3.4, and 3.4.2
<input checked="" type="checkbox"/> Evaluate the potential for short-term, long-term, and permanent impact on the wildlife resources and state-listed endangered or threatened species caused by construction and operation of the Project and proposed mitigation measures. (§ 380.12(e) (4)).	Sections 3.4.1, 3.4.2, and 3.5.1
<input checked="" type="checkbox"/> Identify all federally listed or proposed endangered or threatened species that potentially occur in the vicinity of the Project and discussion results of consultations with other agencies regarding those potential species. (§ 380.12 (e) (5)).	Section 3.5
<input checked="" type="checkbox"/> Identify all federally listed essential fish habitat (“EFH”) that potentially occur in the vicinity of the Project; identify the result of abbreviated consultations with the National Maritimes and Fisheries Service (“NMFS”); and identify any resulting EFH assessments (§§ 380.12(e)(4) & (7)).	Section 3.2.5
<input checked="" type="checkbox"/> Describe any significant biological resources that would be affected. Describe any impacts and any associated mitigation proposed to avoid or minimize that impact (§§ 380.12(e)(4) & (7)).	Sections 3.2.3, 3.2.7, 3.3.2, 3.3.4, 3.4.1, 3.4.2, 3.4.3 and 3.5

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ATWS	additional temporary workspace
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
Dawn	Dawn Hub in Ontario, Canada
dbh	diameter at breast height
EFH	essential fish habitat
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC Upland Erosion Control Revegetation and Maintenance Plan
FERC Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
HDD	horizontal directional drill
MDNR	Michigan Department of Natural Resources
MNFI	Michigan Natural Features Inventory
MP	milepost
MWH	Modified Warm Water Habitat
NEXUS	NEXUS Gas Transmission, LLC
NOAA-NMFS	National Oceanic and Atmospheric Administration-National Marine Fisheries Service
ODNR	Ohio Department of Natural Resources
ROW	right-of-way
SPCC Plan	Spill Prevention Control and Countermeasure Plan
T&E	threatened and/or endangered
U.S.	United States
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WWH	Warm Water Habitat

3.0 RESOURCE REPORT 3 – FISH, WILDLIFE, AND VEGETATION

3.1 Introduction

NEXUS Gas Transmission, LLC (“NEXUS”) is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (“FERC”) pursuant to Section 7(c) of the Natural Gas Act (“NGA”) authorizing the construction and operation of the NEXUS Gas Transmission Project (“NEXUS Project” or “Project”). NEXUS is owned by affiliates of Spectra Energy Partners, LP and DTE Energy Company. The NEXUS Project will utilize greenfield pipeline construction and capacity of third party pipelines to provide for the seamless transportation of 1.5 billion cubic feet per day of Appalachian Basin shale gas, including Utica and Marcellus shale gas production, directly to consuming markets in northern Ohio and southeastern Michigan, and to the Dawn Hub in Ontario, Canada (“Dawn”). Through interconnections with existing pipelines, shippers on the NEXUS Project will also be able to reach the Chicago Hub in Illinois and other Midwestern markets. The United States portion of the NEXUS Project will traverse Pennsylvania, West Virginia, Ohio and Michigan, terminating at the U.S./Canada international boundary between Michigan and Ontario. The Canadian portion of the Project will extend from the U.S./Canada international boundary to Dawn. A more detailed description of the Project is set forth in Draft Resource Report 1.

This Draft Resource Report 3 describes the fishery resources associated with the waterbodies crossed by the Project (Section 3.2), the existing vegetation resources in the Project area (Section 3.3), the wildlife habitat in the Project area (Section 3.4), the federally protected and state-protected wildlife species that are known to occur or may potentially occur in the Project area (Section 3.5), and compliance with the provisions of the Migratory Bird Treaty Act (Section 3.6). All sections identify existing resources, potential Project effects on those resources, and measures to avoid, minimize or mitigate potential Project effects. A checklist showing the status of the FERC filing requirements for this Draft Resource Report is included following the table of contents.

Project drawings, maps, alignment sheets, and aerials are provided in Resource Report 1, Appendix 1A.

3.2 Fishery Resources

NEXUS has consulted with the U.S. Fish and Wildlife Service (“USFWS”), National Oceanic and Atmospheric Administration-National Marine Fisheries Service (“NOAA-NMFS”), Ohio Department of Natural Resources (“ODNR”), Michigan Natural Features Inventory (“MNFI”) and the Michigan Department of Natural Resources (“MDNR”) to identify fishery resources in waterbodies crossed by the Project on the proposed route. Agency correspondence is located in Appendix 1C2 of Draft Resource Report 1.

Fishery resources are found in a variety of waterbodies that occur within the Project area and range from larger river systems, to smaller perennial streams, reservoirs and farm ponds. Refer to Draft Resource Report 2, Section 2.3 for detailed descriptions of the waterbodies crossed by the Project. Proposed waterbody crossings and associated construction workspace are shown on the Project alignment sheets and U.S. Geological Survey quadrangle map excerpts provided in Appendix 1A and Volume II-B of Draft Resource Report 1.

Fisheries are typically characterized according to water temperature (warmwater or coldwater), salinity (freshwater, marine, or estuarine), types of fishing uses (commercial or recreational), and utilization by open water marine fishes that require freshwater upstream areas to spawn (anadromous species) or freshwater species that migrate to marine waters for reproduction (catadromous species). All fisheries resources within the Project area are freshwater systems with salinity levels less than 0.5 parts per thousand (Cowardin *et. al.*, 1979), and there are no waterbodies that support anadromous or catadromous species impacted by the Project. Significant fisheries resources are defined by the FERC as waterbodies that either (1) provide important habitat for foraging, rearing, or spawning of fish species; (2) represent

important commercial or recreational fishing areas; or (3) support large populations of commercially or recreationally valuable fish species or species listed for protection at the federal, state, or local level.

3.2.1 Fisheries Habitat Classification

Classification of fisheries habitat includes consideration of both chemical and biological characteristics. Physical and chemical properties that can be used to determine fishery classification include water temperature, salinity, and whether the waterbody is part of a marine, estuarine, or freshwater system. Habitat classification, however, also depends on the presence of certain fish species and associated invertebrate and aquatic vertebrates in the aquatic community that can use the habitat for reproduction. As previously stated, only freshwater systems are found within the Project area.

Freshwater systems have low salinity (less than 0.5 parts per thousand) and contain fisheries that are typically classified as either warmwater, coolwater or coldwater. This designation is dependent upon the dominant species of fish occupying the waterbody based on the regime of water temperatures through the seasons and other physical characteristics. Coldwater fisheries support fish that spawn in water temperatures below 55 degrees Fahrenheit (“°F”) and prefer clear, cold waters; are not tolerant of extreme temperature changes; and cannot survive for long periods with temperatures above 68°F (Piper *et. al.*, 1982). Coolwater fisheries support fish that spawn in water temperatures between 40°F and 60°F and are more tolerant of turbidity and warmer summer water temperatures (Piper *et. al.*, 1982). Coolwater fish species include walleye (*Sander vitreus*), muskellunge (*Esox masquinongy*) and yellow perch (*Perca flavescens*). Warmwater fisheries support fish able to tolerate water temperatures above 80°F. Warmwater fish species include crappies (*Pomoxis spp.*), largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis spp.*), and bullhead (*Ameiurus nebulosus*).

In Ohio, pursuant to Ohio State Water Quality Standards, certain waterbodies are designated as having the ability to support either coldwater or warmwater fishery habitat based primarily on temperature regimes and identified water quality impairments, if applicable (Ohio EPA, 2006). According to Ohio State Water Quality Standards, coldwater fishery habitats are defined as “waters in which the mean of the maximum daily temperature over a seven day period generally does not exceed 68°F (20 degrees Centigrade [“°C”]) and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of coldwater stenothermal aquatic life such as trout (salmonidae).” The abbreviation for the coldwater fisheries designation is CWH (cold water habitat). There are no CWH designated waters crossed by the NEXUS Project. Warmwater fishery habitats are defined by the Ohio State Water Quality Standards as “waters in which the maximum mean monthly temperature generally exceeds 68°F (20°C) during the summer months and are not capable of sustaining a year-round population of coldwater stenothermal aquatic life.” The waterbodies crossed by the NEXUS Project are predominantly classified under the State of Ohio Water Use Quality Designations for Aquatic Life Habitat as WWH (warmwater habitat) or MWH (modified warmwater habitat) and are listed in Table 2.3-2 of Draft Resource Report 2. The following sections describe these state water classifications.

WWH, “Warmwater” waterbodies are defined by the Ohio State Water Quality Standards as those capable of supporting and maintaining a balanced, integrated, adaptive community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the twenty-fifth percentile of the identified reference sites within each of the following ecoregions: the interior plateau ecoregion, the Erie/Ontario lake plains ecoregion, the western Allegheny plateau ecoregion and the eastern corn belt plains ecoregion. For the Huron/Erie Lake plains ecoregion, the comparable species composition, diversity and functional organization are based upon the ninetieth percentile of all sites within the region. For all ecoregions, the attributes of species composition, diversity and functional organization will be measured using the index of biotic integrity, the modified index of well-being and the invertebrate community index as defined in “Biological Criteria for the Protection of Aquatic Life: Volume II, User’s Manual for Biological Field Assessment of Ohio Surface Waters,” as cited in paragraph (B) of rule 3745-1-03 of the Administrative Code. In addition to those water body segments

designated in rules 3745-1-08 to 3745-1-32 of the Administrative Code, all upground storage reservoirs are designated warmwater habitats. Attainment of this use designation (except for storage reservoirs) is based on the criteria in the Administrative Code. A temporary variance to the criteria associated with this use designation may be granted as described in paragraph (F) of rule 3745-1-01 of the Administrative Code.

MWH, "Modified warmwater" as defined by the Ohio State Water Quality Standards are those waters that have been the subject of a use attainability analysis and have been found to be incapable of supporting and maintaining a balanced, integrated, adaptive community of warmwater organisms due to irretrievable modifications of the physical habitat. Such modifications are of a long-lasting duration (*i.e.*, twenty years or longer) and may include the following examples: extensive stream channel modification activities permitted under sections 401 and 404 of the act or Chapter 6131 of the Revised Code, extensive sedimentation resulting from abandoned mine land runoff, and extensive permanent impoundment of free-flowing water bodies. The attributes of species composition, diversity and functional organization are measured using the index of biotic integrity, the modified index of well-being and the invertebrate community index as defined in "Biological Criteria for the Protection of Aquatic Life: Volume II, User's Manual for Biological Field Assessment of Ohio Surface Waters," as cited in paragraph (B) of rule 3745-1-03 of the Administrative Code. The modified warmwater habitat designation can be applied only to those waters that do not attain the warmwater habitat biological criteria because of irretrievable modifications of the physical habitat. A temporary variance to the criteria associated with this use designation may be granted as described in paragraph (F) of rule 3745-1-01 of the Administrative Code.

In Michigan, the Natural Resources and Environmental Protection Act, 1994 PA 451, authorizes the MDNR to provide protection and preservation of fish, game, and birds. Fisheries Order 210.15 under the authority of MDNR, regulates streams where trout are the predominant fish species and lists the streams that are designated trout streams. Trout streams have more stringent fishing regulations to protect the trout population and provide for fishing opportunities. Streams not designated as trout streams and are fish bearing streams are subject to general statewide fishing regulations. There are no streams crossed by the Project that are designated trout streams in Michigan.

3.2.2 Existing Fishery Resources

Fishery resources are broadly defined as fish, aquatic invertebrates including mollusks and aquatic animals. Fisheries resources are supported year-round by perennial waterbodies however depending on their proximity and characteristics, intermittent or ephemeral streams maybe used by fishery resources when water is present. Table 2.3-2 of Draft Resource Report 2 lists the waterbodies crossed by the Project including the state water quality and designated usage classifications. The pipeline crosses 489 waterbodies, consisting of: 179 perennial streams (including rivers); and 186 intermittent and 124 ephemeral stream types. In addition, of the 489 total waterbodies crossed by the pipeline, 17 of the largest waterbodies will not be directly impacted (*see* Table 2.3-3 in Draft Resource Report 2) due to implementation of the Horizontal Directional Drill ("HDD") crossing method and described in detail in Draft Resource Report 2, Section 2.3.

Construction and operation of the proposed NEXUS aboveground facilities will not directly impact waterbody resources and, therefore, will have negligible effects on fishery resources. In addition, fishery resources are only supported by year-round perennial streams, ponds and rivers.

3.2.2.1 Fish Species Present along the NEXUS Pipeline

The proposed Project is located in two major drainage basins: the Ohio River basin and Lake Erie basin. The pipeline from MP 0 at the Kensington Processing Plant to approximately milepost ("MP") 69.7 occurs within the Ohio River basin and from MP 69.7 to the northern terminus of the Project at Willow Run in Michigan occurs within the Lake Erie basin. A total of 180 waterbodies will be crossed within the Ohio River basin and 309 waterbodies will be crossed within the Lake Erie basin. The fisheries resources

present along the pipeline are predominantly warmwater fisheries in Ohio with a few coolwater fisheries in Michigan. Tables 3.2-1 and 3.2-2 list the Representative Fish Species Known to Occur in the Project Area in Ohio and Michigan, respectively.

Ohio

Species of fish found in Ohio include many native species and a number of introduced species in the Ohio River basin and the Lake Erie basin. These drainage basins support a large diversity of fish species with the Ohio River basin typically supporting a wider diversity (Trautman, 1981; Rafferty *et. al.*, 2012). A study by Saunders et al identified a total of 162 species of fish in Ohio; including 143 native species and 19 introduced (Sanders *et. al.* 1999). Fish diversity and population abundance has been impacted in many streams in Ohio by historic and recent human activity including dam construction, removal of the riparian zones and stream channelization by agriculture and urbanization, and water quality degradation by nonpoint source and point source pollutants (Harrington, 1999; Sanders *et. al.* 1999). Improvements in stream conditions and water quality in the last 30 years have increased fish abundance in certain species or have allowed species that were absent in the streams since the 1950s to recolonize many of the heavily impacted streams, while other species still appear to be declining (Sanders *et. al.* 1999).

The majority of the waterbodies crossed by the Project in Ohio are small, unnamed tributaries or moderately-sized streams. Commonly occurring and representative fish species in these streams are summarized in Table 3.2-1. Fish species that are found within the larger rivers of Ohio, such as the Maumee River, Sandusky River and the Huron River, and not found in the smaller stream systems, are walleye, Coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*) and rainbow trout. These species swim upstream from Lake Erie to spawn and support a large recreational fishery during the spawning runs. Although the Project will cross the Maumee, Sandusky, and Huron Rivers, no in-water work is currently proposed in these rivers as NEXUS will be employing the HDD pipeline crossing method to install the pipeline below these water resources.

Michigan

All of the waterbodies crossed by the pipeline in Michigan are a part of the Lake Erie drainage basin and are primarily associated with the drainage network of the River Raisin and Ford Lake/Huron River. Land use within the watersheds of the stream networks in this region of Michigan has the greatest influence on the fish assemblages located in these streams. Agricultural comprises approximately 94 percent of the land use in the watershed of the River Raisin (Dodge 1998). The Huron River watershed has 66.5 percent of its land in agricultural use and another 10 percent in urban use (Hay-Chmielewski, 1995). These uses have resulted in an increase of sediment, nutrients, and chemicals such as pesticides, and increased runoff and peak storm flows in the stream channels, causing changes in habitats and subsequent shifts in fish species and abundance (Dodge, 1998; Hay-Chmielewski 1995).

The fishery resources within the Project area in Michigan are present in moderately sized stream channels. Table 3.2-2 lists the representative fish species known to occur in the waterbodies crossed by the pipeline in Michigan. Most are warmwater fisheries; however, there are waterbodies, such as the River Raisin, that have fish species assemblages typical of coolwater fisheries. The coolwater species found in the larger waterbodies crossed by the Project (*i.e.*, River Raisin and Macon Creek) include yellow perch, grass pickerel (*Esox americana*), northern pike (*Esox lucius*) and rock bass (*Ambloplites rupestris*).

3.2.2.2 Fish Species Present at Aboveground Facilities

Construction and operation of proposed aboveground facilities will not result in any direct effects to waterbodies and, therefore, will not impact fishery resources.

3.2.3 Fisheries of Special Concern

Waterbodies with fisheries of special concern include those that have fisheries with important recreational value, support coldwater fisheries, are included in special state fishery management regulations, or provide habitat for federally or state-listed threatened and/or endangered (“T&E”) species. Waterbodies that have significant economic value because of fish stocking programs, commercial fisheries, essential fish habitat (“EFH”), or tribal harvest are also considered fisheries of special concern (*see* Section 3.2.5 for a discussion of EFH species).

NEXUS consulted with the USFWS, ODNR, MNFI and NOAA-NMFS to identify waterbodies that may contain federally protected or state-listed threatened, endangered, or candidate species and their habitat, EFH, coldwater fisheries, and other fisheries resources that could be considered fisheries of special concern (*see* Section 3.5 for a discussion of T&E species). There are no areas of EFH in the Project area according to NOAA’s EFH Online Mapper (NMFS, 2014). No coldwater fisheries exist in the Project area.

ODNR identified waterbodies crossed by the Project that are considered Salmonid streams. The identified Salmonid streams are either stocked for a put-and-take sport fishery or are used by Salmonids from Lake Erie to spawn. Fisheries of special concern in the NEXUS Project area are listed in Table 3.2-3. Effects on fisheries resources, including fisheries of special concern, are discussed in Section 3.2.7.

During consultation, agencies noted there are streams that potentially support federally- or state-listed threatened, endangered, or candidate species and their habitat (*see* Appendix 1C2 of Draft Resource Report 1). These species include fish, mussels, damselfly, and a salamander. Table 3.5-1 lists these aquatic species and their regulatory status. ODNR indicated that the Project is within the range (meaning the drainage networks traversed by the Project) of the following Ohio state-endangered fish species: lake sturgeon (*Acipenser fulvescens*), spotted gar (*Lepisosteus oculatus*), pugnose minnow (*Opsopoeodus emiliae*), Iowa darter (*Etheostoma exile*), mountain brook lamprey (*Ichthyomyzon greeleyi*), and western banded killifish (*Fundulus diaphnus menona*).

Lake sturgeon and spotted gar are large fish found only in Lake Erie; however, lake sturgeon utilize the Maumee River and other large tributaries of Lake Erie to spawn (ODNR, 2012). The pugnose minnow is a small stream dwelling fish and historically was found in clear slow moving streams with aquatic vegetation with sandy or organic substrate in northwest Ohio and in the bays of Lake Erie (ODNR, 2012). Iowa darters are small fish found in glacially-formed lakes such as Portage Lakes and slow moving streams or marshes with dense aquatic vegetation (ODNR, 2012). Mountain brook lampreys are small non-parasitic lampreys found in Eagle Creek and the West Branch of the Mahoning River (ODNR, 2012). Western banded killifish are small fish inhabiting slow moving clear streams with sand or organic debris and are found in tributaries with suitable habitat of the Portage River in Wood County (ODNR, 2012).

The Project is also within the range of lake chubsucker (*Erimyzon sucetta*), greater redhorse (*Moxostoma valenciennesi*), channel darter (*Percina copelandi*), and bigmouth shiner (*Notropis dorsalis*), all Ohio-state threatened species. Lake chubsuckers are found in lakes and slow moving streams and deep marshes with dense aquatic vegetation. According to ODNR, lake chubsuckers may occur due to the presence of suitable habitat near the Project in parts of the Portage Lakes (ONDR, 2012). Greater redhorse is a larger fish and often mistaken for common carp. They are only found in the Sandusky, Maumee and Grand Rivers (ONDR, 2012). The channel darter is a small fish and is found along the shores of Lake Erie, in the lower portions of the Scioto River, Muskingum River, Hocking River, Maumee River and the Sandusky River (ODNR, 2012). Bigmouth shiners prefer streams with sandy substrates and in Ohio are found only in the Rocky and Black River drainages of Lake Erie (ONDR, 2012).

3.2.4 Commercial Fisheries

Waterbodies supporting commercial fisheries may be of particular concern because of the need to avoid, minimize and mitigate for any economic impacts that may be caused by construction within the waterbody. MDNR and ODNR were consulted regarding fisheries and neither agency identified any waterbodies within the Project area as supporting commercial fisheries.

3.2.5 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act 16 U.S.C. § 1801 *et seq.*) established a management system for marine fisheries resources in the United States. In particular, Congress charged the NOAA-NMFS and the fishery management councils, along with other federal and state agencies and the fishing community, to identify habitats essential to managed species, which include marine, estuarine, and anadromous finfish, mollusks and crustaceans. The habitat is identified as EFH and defined to include “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” According to data from the NOAA-NMFS EFH Mapper, there are no EFH in the Project Area (NMFS, 2014).

3.2.6 Fisheries Effects and Mitigation

This section describes potential effects and measures that will be implemented to minimize effects to fisheries resources in the Project area. Proposed crossing methods for each waterbody are provided in Table 2.3-3 of Draft Resource Report 2. Proposed crossing methods include wet open cut, dry crossing (including Flume, Dam and Pump, or Dry Open Cut), Conventional Bore, HDD, or Direct Pipe installation described in the following sections. The waterbody crossing method that NEXUS is proposing to employ for each waterbody crossing for the NEXUS Project is listed in Table 2.3-3 in the Tables Section of Draft Resource Report 2. The following sections describe these crossing methods and associated potential effects on fishery resources.

The open-cut crossing method (or wet-ditch method) is proposed for the majority of NEXUS minor waterbody crossings and for the crossing of waterbodies that are dry or have “no perceptible flow” at the time of crossing. Pursuant to the Federal Energy Regulatory Commission’s Wetland and Waterbody Construction and Mitigation Procedures (“FERC Procedures”), minor waterbodies are 10 feet or less in width [at the water’s edge] at the time of crossing. The open-cut crossing method will involve excavation of the pipeline trench across the waterbody, installation of the pipeline, and backfilling of the trench. Excavation and backfilling of the trench will be accomplished using backhoes or other excavation equipment working from the banks of the waterbody. Trench spoil will be stored at least 10 feet from the banks (topographic conditions permitting). A section of pipe long enough to span the entire crossing will be fabricated on one bank and either pulled across the bottom to the opposite bank, floated across the waterbody, or carried into place and submerged into the trench. The trench will then be backfilled and the bottom of the watercourse and banks restored and stabilized. Sediment barriers, such as silt fencing, staked straw bales, or trench plugs will be installed to prevent spoil and sediment-laden water from entering the waterbody from adjacent upland areas.

The FERC Procedures require that in-stream construction activities for open cut crossings of minor waterbodies (including trenching, pipe installation, backfill, and restoration of the streambed contours) be completed within 24 hours [except when blasting and other rock breaking activities are required]. Stream banks and unconsolidated streambeds may require additional restoration after this time period.

NEXUS may choose to use mainline construction procedures across minor waterbodies where the open cut crossing method is proposed. In these instances, a flume pipe will be installed immediately after trenching is completed to ensure continue flow of the waterbody during construction. The flume pipe will remain in place until the pipeline lowering-in process. The flume pipe will be removed just prior to lowering in the pipeline. The 24-hour restoration timeframe starts as soon as the flume is removed.

Larger waterbodies (>10 feet in width) that have greater potential to support fisheries will be crossed using a dry open cut technique unless site specific conditions prohibit use of this installation procedure. Successful implementation of this technique (using the flume method and/or the dam and pump method) will substantially avoid temporary impacts on fisheries resources.

Construction impacts on fishery resources may include direct contact by construction equipment, increased sedimentation and water turbidity immediately downstream of the construction work area, alteration or removal of aquatic habitat cover, introduction of pollutants, impingement or entrainment of fish and other biota associated with the use of water pumps at dam and pump crossings, and downstream scour associated with use of those same pumps. Pump intake hoses will be screened appropriately to prevent the entrainment of fish and minimize the potential for impingement. Fish passage during dam and pump crossings will be temporarily restricted during the installation of the new pipeline which typically takes 24 to 48 hours to complete. Fish passage will only be temporarily interrupted during the dam and pump process, and will be restored immediately after the restoration of the stream bed and banks. The short term and localized interruption of fish passage is not anticipated to dramatically affect the migration of fish within the stream systems.

Removal of trees from the edges of waterbodies at the crossing may reduce shading of the waterbody, diminish escape cover, and potentially result in locally elevated water temperatures. Elevated water temperatures can, in turn, lead to reductions in levels of dissolved oxygen, which can negatively influence habitat quality and the fish populations that occupy these habitats. Impacts resulting from tree clearing will be minimized to the extent practicable by crossing streams and waterbodies perpendicular to the water resource boundaries and clearing only the area that is necessary to construct and operate the pipeline.

Implementing NEXUS' construction, restoration, and mitigation procedures will result in limited, short-term impacts to fishery resources, and the aquatic habitats upon which these fishery resources depend. Invertebrate populations will recolonize the crossing area, and all temporary work areas will revert to their original condition, including re-establishment of riparian cover. Furthermore, operation and routine maintenance of the pipeline right-of-ways ("ROWs") and aboveground facilities, which will be restricted to clearing and mowing vegetation on the permanent ROW, are not expected to have any noticeable impact on fishery resources in the Project area.

Blasting

Based on the surficial geology and bedrock geology along the Project route, NEXUS anticipates that blasting may be required along segments of the proposed pipeline. In the event that unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, care will be taken to prevent damage to underground and aboveground structures, as well as to springs, water wells or other surface water resources. NEXUS will consult with fishery management agencies regarding the need for mitigation measures in locations where blasting may affect fishery resources. If blasting is necessary, pre-blast and post-blast inspections by NEXUS will be performed in accordance with the NEXUS Project Blasting Plan provided as Appendix 1B3 in Draft Resource Report 1.

Hydrostatic Testing

Hydrostatic test water appropriations and discharges will not result in a significant entrainment of fish, loss of habitat, or an adverse effect to water quality. Proposed sources of water for hydrostatic testing of the proposed Project facilities are listed in Table 2.3-10, in Draft Resource Report 2. The withdrawal locations will occur at or near the construction corridor. Discharge locations have not yet been identified, but all discharge locations will be sited within a well vegetated upland area within the same watershed, where practicable. If local water sources are used for hydrostatic testing, withdrawal intake hoses will be fitted with intake screen devices to prevent the entrainment of fingerlings and small fish during water withdrawal. Discharge will comply with regulatory permit conditions and will be controlled to prevent

scour and sedimentation, flooding, or the introduction of foreign or toxic substances into the aquatic system. A detailed description of the hydrostatic test process and mitigation measures is provided in Section 2.3.7.2 of Draft Resource Report 2.

Spill Prevention Control and Countermeasures

Accidental spills of construction-related fluids (*e.g.*, oil, gasoline, or hydraulic fluids) on the landscape or directly into waterbodies could result in water quality effects affecting fish and other organisms. Effects to fisheries would depend on the type and quantity of the spill, and the dispersal and attenuation characteristics of the waterbody. Minimization and mitigation procedures related to water quality are discussed in detail in Draft Resource Report 2. To reduce the potential for surface water contamination, NEXUS will have a Spill Prevention Control and Countermeasure Plan (“SPCC Plan”) in place prior to construction that the contractor(s) will be required to implement. The SPCC Plan is provided in Appendix 1B2 of Draft Resource Report 1.

To minimize spill risk, refueling or other handling of hazardous materials within 100 feet of wetland and waterbody resources will be restricted. If the 100-foot setback cannot be met, these activities will be performed under the supervision of an Environmental Inspector in accordance with the SPCC Plan and following the insurance of a variance for such activities by FERC. The SPCC Plan also specifies that NEXUS will conduct routine inspections of tank and storage areas to help reduce the potential for spills or leaks of hazardous materials.

3.3 Vegetation

This section provides descriptions of the various plant communities found in the Project area, descriptions of unique or protected vegetation and describes how vegetation resources will be affected by the construction and operation of the proposed NEXUS Project. Also included are the methods NEXUS will employ to minimize impacts to vegetation resources.

3.3.1 Existing Vegetation

The types of vegetation cover within the NEXUS Project area are generally common and are typical plant communities found in Ohio and Michigan. Many of the vegetative communities traversed by the proposed Project have been considerably altered by forest conversion and fragmentation and the historic draining of saturated areas primarily for agricultural purposes. Only small areas of undisturbed forest tracts still remain in Ohio (Widmann *et. al.*, 2006).

The NEXUS Project has been designed to minimize impacts to existing to natural vegetation and approximately 93 percent of the route is either collocated with existing utility corridors that undergo regular vegetation maintenance or within active agricultural lands. The natural vegetation communities that do occur within the Project area are generally characterized by small (less than 20 acres in size) upland forests, abandoned agricultural land in various degrees of succession ranging from open fields to shrublands; and emergent, scrub-shrub, and forested wetlands.

The Project spans a large and diverse geographic region. The vegetation communities are best described from a regional perspective using the U.S. Environmental Protection Agency’s (“EPA”) Level III Ecoregion mapping for Ohio and Michigan. Ecoregions are areas of similarity based on patterns in the mosaic of biotic (living) and abiotic (not living) components and aquatic and terrestrial ecosystems, including geology, physiography, vegetation, climate, soils, hydrology, land use, and wildlife, with humans being considered as part of the biota (USEPA, 2013).

The following four (4) USEPA Ecoregions are traversed by the NEXUS Project from east to west:

- Western Allegheny Plateau (MP 0 to MP 7; less than 1 percent of Project)
- Erie/Ontario Drift and Lake Plains; (MP 7 to MP 90; 33 percent of Project)

- Eastern Corn Belt Plains; and (MP 90 to MP 116; 10 percent of Project)
- Huron/Erie Lake Plains; (MP 116 to MP 249; 53 percent of Project)

The majority of the proposed Project (86 percent) is located within the Erie/Ontario Drift and Lake Plains and Huron/Erie Lake Plains Ecoregions. Approximately 10 percent of the proposed Project crosses the Eastern Corn Belt Plains Ecoregion (MP 90 to MP 116) and less than 1 percent of the Project crosses the Western Allegheny Plateau Ecoregion (MP 0 to MP 7) (USEPA, 2013). The vegetation communities found in these Ecoregions and within the Project area are described in the following sections.

Western Allegheny Plateau Ecoregion

The proposed NEXUS pipeline route from MP 0 to MP 7, and the entire 0.9 mile TGP Interconnecting Pipeline are located within the Western Allegheny Plateau Ecoregion. This ecoregion is a dissected plateau with rugged hills underlain by horizontally bedded sedimentary rock. The natural vegetation historically consisted primarily of mixed mesophytic forest and currently contains chestnut oak, red maple, white oak, black oak, beech, yellow-poplar, sugar maple, ash, basswood, buckeye, and hemlock (CEC, 1997). This ecoregion remains primarily forested (USEPA, 2013).

Erie/Ontario Drift Lake Plains Ecoregion

The proposed NEXUS pipeline route from approximate MP 7 to MP 90, traverses the Erie/Ontario Drift Lake Plains Ecoregion comprising approximately 33 percent of the total Project route. This ecoregion is characterized by predominantly level terrain and low lime drift and lacustrine surficial geological deposits. Multiple water resources such as lakes, wetlands, and streams occur where drainage networks converge or where the land has flat relief with clay soils. These clay soils are lower in carbonate and are naturally less fertile than other glaciated ecoregions. Land use is comprised of urban development, industrial activity, and agricultural activities with scattered woodlots. Historically this ecoregion was dominated by beech-maple forests, or mixed oak forests with red oak, white oak, and shagbark hickory, and mixed mesophytic forests with sugar maple, yellow birch, beech and hemlock. In damper lowlands, elm-ash swamp forests were common. This ecoregion contains a significant amount of dairy farms and localized urban areas. Lake Erie influences climate throughout this ecoregion by increasing the growing season, winter cloudiness and snow accumulations (USEPA, 2013).

Eastern Corn Belt Plains Ecoregion

The proposed NEXUS pipeline route from approximate MP 90 to MP 116, traverses the Eastern Corn Belt Plains Ecoregion comprising approximately 10 percent of the total Project route. This ecoregion covers large portions of western Ohio and consists of primarily rolling till plains with local end moraines and glacial deposits (USEPA, 2013). The vegetation of this ecoregion was originally dominated by American beech, sugar maple, and American basswood forests and these forests are found in much smaller expanses or as farm woodlots. This landscape has also been significantly altered to accommodate agricultural activities (USEPA, 2013).

Huron/Erie Lake Plains Ecoregion

The proposed NEXUS pipeline route from approximate MP 116 to MP 249, traverses the Huron/Erie Lake Plains Ecoregion comprising approximately 53 percent of the total Project route. The portions of the Project that lie within this ecoregion include all of the proposed pipeline facilities in Michigan and approximately 87 miles of the pipeline in Ohio [from MP 116 to MP 202.8 at the Ohio/Michigan border. This portion of the pipeline is located on flat lake plains adjacent to Lake Erie (USEPA, 2013). The typically poor drainage of this area originally supported many ecosystems including elm-ash swamps, beech forests, and oak savannas. Today, these areas have been substantially cleared and drained in order to accommodate extensive agriculture, development and industrial growth. Forest cover is generally small woodlots (USEPA, 2013). Drainage in this ecoregion has modified the swamps and marshes that

were once extensive in this ecoregion. Terrain currently consists of broad, nearly flat plains with low gradient perennial streams and rivers (USEPA, 2013).

3.3.1.1 Pipeline Facilities

Proposed pipeline facilities traverse forested and open upland communities, as well as palustrine (*i.e.*, freshwater) forested, scrub-shrub and emergent wetlands. The proposed pipeline facilities also traverse or are adjacent to urban and developed lands; therefore, vegetative communities in the area also reflect previous anthropogenic disturbance.

Upland Forest

Upland forests are found scattered along the pipeline route as generally small woodlots and are all deciduous forests. These forested areas exhibit characteristics of secondary growth meaning they are even aged or uneven aged stands with a defined shrub or sapling strata and prevalent herbaceous layer. The forests that are uneven aged are managed for timber or firewood production. The forest canopies are mainly closed to partially closed.

In Ohio, the upland forest communities found within the Project area include Midwestern White Oak-Red Oak Forests and Beech-Maple/Mesic Hardwood Forests (Faber-Langendoen, 2001). Midwestern White Oak-Red Oak Forests are located in the western portion of Ohio in very well drained sites. These forests are dominated by northern red oak (*Quercus rubra*) and/or white oak (*Quercus alba*) and shagbark hickory (*Carya ovata*) (Faber-Langendoen, 2001). Commonly observed species in these forests during field surveys included red oak, white oak and shagbark hickory. Beech-Maple/Mesic Hardwood Forests are found in central and eastern Ohio where the soils tend to be moderately drained to not very well drained and composed of silt loams and silty clay loams (Faber-Langendoen, 2001). These forests are dominated by American beech (*Fagus grandifolia*) and sugar maple (*Acer saccharum*) (Faber-Langendoen, 2001). The species found in association with this forest type varied along the pipeline route where it is found. Other species observed within these forests during field surveys include red maple (*Acer rubrum*), eastern cottonwood (*Populus deltoids*), shagbark hickory (*Carya ovata*), black cherry (*Prunus serotina*) and American elm (*Ulmus americana*).

Upland forest communities within the Project area in Michigan are described as mesic southern forest (Kost *et al.* 2010). These forests are dominated by American beech and sugar maple. Species also found in these forests include bitternut hickory (*Carya cordiformis*), tulip popular (*Liriodendron tulipifera*), white oak and red oak (Kost *et al.*, 2010). This is the most common forest type in southeast Michigan and is found as small woodlots in the vicinity of the Project that occurs in Michigan.

Open Uplands

Open uplands are areas within the Project area (both Ohio and Michigan) that have experienced relatively recent disturbance or undergo regular maintenance. Open uplands are composed of old fields or abandoned agricultural fields in various stages of succession ranging from all herbaceous species to shrublands. They also include vegetated roadway medians, railroad corridors and utility ROW's. These vegetation communities are not described in the *Plant Communities of the Midwest Ohio Subset* (Faber-Langendoen, 2001) or *Natural Communities of Michigan* (Kost *et al.*, 2010) since they are a result of anthropogenic disturbance and are typically composed of introduced species. Shrub species commonly observed in these areas along the pipeline route include multiflora rose (*Rosa multiflora*), blackberries or brambles (*Rubus spp.*), and Viburnum shrubs (*Viburnum spp.*). Herbaceous plants most commonly associated with open uplands included Pennsylvania sedge (*Carex pennsylvanica*), roundleaf greenbriar (*Smilax rotundifolia*), Canada goldenrod (*Solidago canadensis*), poison ivy (*Toxicodendron radicans*), common cinquefoil (*Potentilla simplex*), grey's sedge (*Carex grayii*), tall fescue (*Festuca arundinacea*), common dandelion (*Taraxacum officinale*), Queen Anne's lace (*Daucus carota*), garlic mustard (*Alliaria petiolata*), smooth broom (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), creeping thistle (*Cirsium arvense*), red fescue (*Festuca rubra*), and common plantain (*Plantago major*).

Forested Wetland

Forested wetlands in the Project area in Ohio consist mostly of Midwestern rich hardwood swamps, which occur primarily in wetland depressions on level or undulating topography or in backwater sloughs away from direct flooding (Faber- Langendoen, 2001). Soils can be deep silt loam, silty clay loam, to clay loam and the water table is at or near the surface for at least a few months of the year, with ponding common (Faber-Langendoen 2001). Typical tree species identified during environmental surveys in Ohio in this community included: red maple, American elm, green ash (*Fraxinus pennsylvanica*), black willow (*Salix nigra*), pin oak (*Quercus paulustrus*), shagbark hickory, silver maple (*Acer saccharinum*), and other oak species (*Quercus spp.*).

Forested wetlands traversed by the Project in Michigan are characterized as southern hardwood swamps (Kost et al 2010). This community is common in southern Michigan and occurs on a variety of sites from depressions to riparian areas adjacent to streams and rivers (Kost *et. al.*, 2010). Typical wetland tree species identified during environmental surveys in this community in Michigan included: red maple, eastern cottonwood, pin oak, American sycamore (*Plantus occidentalis*), and silver maple.

Scrub-shrub Wetland

Scrub-shrub wetlands in the Project area in Ohio consist mostly of Midwestern rich shrub swamps (Faber-Langendoen, 2001). These communities vary widely from occurring on the edges of open water areas to sites with shallow groundwater. They are dominated by tall shrubs between 1 and 3 meters tall, with at least 25 percent cover, and often very dense (greater than 60 percent cover) (Faber-Langendoen, 2001). Typical dominant shrub species identified in Ohio along the pipeline route included: steeple bush (*Spiraea tomentosa*), redosier dogwood (*Cornus sericea*), black raspberry (*Rubus occidentalis*), multiflora rose, and elderberry (*Sambucus nigra*).

Scrub-shrub wetland communities along the pipeline route in Michigan were found as a small component of larger wetland complexes, mainly in association with the understory or edges of southern hardwood swamps. These areas did not contain any of the characteristics of scrub-shrub wetland communities described in Kost et al 2010.

Emergent Wetland

In Ohio, Midwestern Deep Emergent Marsh, Emergent wetlands and depression marshes are shallow with herbaceous vegetation and sandy soils. Typical wetland vegetation identified in emergent wetlands in Ohio included: jewelweed (*Impatiens capensis*), deer tongue grass (*Dichanthelium clandestinum*), tearthumb (*Polygonum sp.*), joe pye weed (*Eupatorium purpureum*), reed canary grass (*Phalaris arundinacea*), rice cut grass (*Leersia oryzoides*), common rush (*Juncus effusus*), fowl mannagrass (*Glyceria striata*), arrowleaf tearthumb (*Persicaria sagittata*), woolgrass (*Scirpus cyperinus*), sensitive fern (*Onoclea sensibilis*), narrowleaf cattail (*Typha angustifolia*), fowl bluegrass (*Poa palustris*), bluejoint grass (*Calamagrostis canadensis*), giant goldenrod (*Solidago gigantea*), Canada goldenrod (*Solidago canadensis*), gray’s sedge, and green bulrush (*Scirpus atrovirens*).

Typical wetland vegetation identified in emergent wetlands in Michigan included gray’s sedge, bluejoint grass, reed canary grass, and common reed (*Phragmites australis*).

3.3.1.2 Aboveground Facilities

The following section describes the existing vegetation at the proposed aboveground facility sites on the NEXUS Project.

Hanoverton Compressor Station, Compressor Station 1 – Hanoverton, Columbiana County, Ohio

The Hanoverton Compressor Station (Compressor Station 1) site is located primarily in the Erie Drift Plain Ecoregion, with the southern extents within the Western Allegheny Plateau Ecoregion. The proposed location for Compressor Station 1 consists of predominantly open land and agricultural land. A

portion of the property also includes upland forest. Impacts to forest have been minimized to the greatest extent practicable; a small area of forest (approximately 1.1 acres) will be cleared at MP 1.3 where the pipeline ties into the compressor station location. Species observed in this location include Kentucky bluegrass (*Poa pratensis*), common dandelion (*Taraxacum officinale*), Queen Anne's lace (*Daucus carota*), and red clover (*Trifolium pratense*). The approximately 100 acre site includes four small wetland areas that will not be impacted by construction or operations of the Project. These wetlands are shown on the Proposed Hanoverton Compressor Station Plot Plan included in Appendix 1A – Volume IV, of Draft Resource Report 1. Species of vegetation common in these degraded wetlands include reed canary grass (*Phalaris arundinacea*) and American black elderberry (*Sambucus nigra ssp. canadensis*).

Wadsworth Compressor Station, Compressor Station 2 – Guilford, Medina County, Ohio

The Wadsworth Compressor Station (Compressor Station 2) is located within the Erie Drift Plain Ecoregion. Current vegetative communities within this proposed compressor station site consists primarily of agricultural land with minimal naturally occurring vegetation. No trees or shrubs were identified in the vicinity of the proposed Wadsworth Compressor Station.

Clyde Compressor Station, Compressor Station 3 – Townsend, Sandusky County, Ohio

The Clyde Compressor Station (Compressor Station 3) is located within the Huron/Erie Lake Plains Ecoregion. Current vegetative communities within the proposed Clyde Compressor Station site consists primarily of agricultural land with minimal naturally occurring vegetation. No forested areas were identified in the vicinity of the proposed Clyde Compressor Station.

Waterville Compressor Station, Compressor Station 4 – Waterville, Lucas County, Ohio

The Waterville Compressor Station (Compressor Station 4) is located within the Huron/Erie Lake Plains Ecoregion. Current vegetative communities within the proposed Waterville Compressor Station site consists primarily of agricultural land with minimal naturally occurring vegetation. The naturally occurring vegetation at the site consists of an open land community. No forested areas were identified in the vicinity of the proposed Waterville Compressor Station.

3.3.2 Unique, Sensitive, or Protected Vegetation

This section summarizes unique, sensitive and protected vegetation identified along the proposed NEXUS Project route. NEXUS consulted federal and state resource agencies to determine if federally- or state-listed threatened or endangered plant species (including federal and state species of special concern) or their designated habitats, occur within the Project area. Agencies contacted by NEXUS include the USFWS, ODNR, MNFI and MDNR. Copies of all agency correspondence, including consultation letters, electronic mail, and response letters from agencies are included in Appendix 1C2 of Draft Resource Report 1. Federal and state listed plant species identified are included in Table 3.5-1. Detailed field surveys will be undertaken in selected areas determined to be potential habitat for protected species along the pipeline and in the vicinity of aboveground facilities in the summer of 2015.

3.3.2.1 Oak Openings Region of Northwestern Ohio

The Oak Openings Region of northwestern Ohio is approximately 22 miles long and approximately 5 miles wide encompassing portions of Lucas, Fulton and Henry Counties in Ohio (Ohio Nature, 2013). The unique ecological communities in this region were glacially influenced to create deep sand deposits and rolling topography (USEPA, 2012). The underlying geology is the main driver of the region supporting a variety of unique ecological communities that include Great Lakes Twig-rush Wet Meadow (Wet Prairie), Great Lakes Swamp White Oak - Pin Oak Flatwoods, Mesic Sand Prairie, Midwest Sand Barrens), Black Oak / Lupine Barrens (Oak Savanna), and Black Oak - White Oak / Blueberry Forest (Oak Woodland) (USEPA, 2012). These communities harbor a third of Ohio's rare, threatened and endangered species in a relatively small area. Furthermore, human influences have reduced the acreage of these communities and converted much of the Region into agricultural production. What remains of

the Oak Opening Communities is approximately a third of Lucas County, and a very small percentage in Henry and Fulton Counties (USEPA, 2012). The NEXUS Project is located on the southwestern extent of the Oak Openings Region in mostly Henry and Fulton Counties. The pipeline mainly traverses agricultural land in this area and the adjacent land use is mainly agricultural. No vegetation communities within or immediately adjacent to the pipeline route have been identified as Oak Opening Communities by field surveys to date. Approximately one half mile of the pipeline will traverse the Maumee State Forest. This portion of the Maumee State Forest contains a dense canopy of mature oak forest and is likely managed by ODNR Division of Forestry for a variety of uses and does not contain any of the unique ecological communities endemic to the Oak Openings Region. NEXUS will perform botanical surveys in the portion of the pipeline that traverses the Oak Openings Region in the summer of 2015 to identify any occurrences of plant species endemic to Oak Opening Communities.

3.3.3 Non-Native Invasive Species

Invasive species are species that display rapid growth and spread, becoming established over large areas. Most commonly they are exotic species that have been introduced from another part of the United States, another region, or another continent, although native species that exhibit rapid growth and spread are sometimes considered invasive. The USFWS defines invasive species as “organisms that are introduced into a non-native ecosystem and which cause, or are likely to cause, harm to the economy, environment or human health” (USFWS, 2012). Invasive plant species can change or degrade natural vegetation communities by reducing diversity, which can reduce the quality of habitat for wildlife and native plant species.

Several plant species considered to be non-native or nuisance plant species in the Great Lakes Region of the United States and have potential to occur along the pipeline facilities and at aboveground facility sites in Ohio and Michigan. These include upland species, such as Canada thistle (*Cirsium arvense*), wild parsnip (*Pastinaca sativa*), and mile-a-minute weed (*Polygonum perfoliatum*), as well as wetland plants like purple loosestrife (*Lythrum salicaria*) and phragmites (*Phragmites australis*). None of these species is listed on the List of Federal Noxious Weeds (USDA, 2010) pursuant to the Federal Noxious Weed Act of 1974. Ohio does not currently have legislation regulating noxious or invasive weeds species. In Michigan, certain invasive plant species are prohibited or restricted to be released or propagated under the Natural Resources and Environmental Protection Act Part 413-Transgenic and Nonnative Organisms. Phragmites and purple loosestrife are restricted species. NEXUS is currently consulting with MDNR, MDEQ, ODNR and the Ohio Department of Agriculture to identify which plant species are considered an invasive species threat along the Project.

While no formally designated noxious weeds occur within the project area, NEXUS is committed to managing the spread of invasive weeds along active ROWs. To minimize impacts from invasive plants, an invasive plant species management plan will be developed in consultation with federal, state, and local agencies.

3.3.4 Vegetation Effects and Mitigation

This section summarizes the NEXUS Project construction and operation effects to the vegetative cover types. Table 3.3-1 provides the approximate acreages of forested land and non-forested land that would be affected during construction and operation of the NEXUS pipeline.

3.3.4.1 Pipeline Facilities

Construction of pipeline facilities will include temporary and permanent impacts to vegetation. The creation of new ROW is required for segments of the pipeline route that cannot be located adjacent or parallel to existing ROWs. In these areas, the nominal construction ROW width will be 100 feet wide, which includes the permanent 50-foot wide easement required for operations. The construction ROW width within wetlands will be reduced to 75 feet wide, which conforms to the FERC *Wetland and Waterbody Construction and Mitigation Procedures*, dated May 2013 (“FERC Procedures”).

The pipeline ROW and temporary workspaces will be cleared of vegetation prior to construction to provide a safe working area. The limits of clearing will be identified and flagged in the field prior to the start of clearing operations. The cleared width within the ROW and temporary construction workspaces will be kept to a minimum. The NEXUS Project will temporarily impact approximately 395.4 acres of forested land (upland forest and forested wetland) during construction and will permanently impact approximately 201.2 acres of forested land (upland forest and forested wetland) to a either scrub-shrub or herbaceous vegetative type during operation of the pipeline. The NEXUS Project has been designed to minimize impacts to existing to natural vegetation and approximately 93 percent of the route is either collocated with existing utility corridors that undergo regular vegetation maintenance or within active agricultural lands.

Access Roads

To the extent feasible, existing public and private road crossings along the proposed pipeline facilities will be used as the primary means of accessing the ROW. NEXUS will also use existing public access roads near proposed compressor and regulator stations.

Construction of new access roads will result in temporary and permanent impacts vegetation. NEXUS is in the process of identifying access roads for construction and operations of the Project and will include vegetation impacts associated with access roads in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Clearing

Vegetative clearing will be required for construction of pipeline facilities that traverse forested habitats. The limits of clearing will be identified and flagged in the field prior to any clearing operations. Initial clearing operations will include the removal of vegetation adjacent to the existing powerline ROWs, within the pipeline ROW, and the temporary construction workspace either by mechanical or hand cutting. Where the ROW will need to be cleared for construction, trees will be cut into manageable lengths, chipped on the ROW, or removed to an appropriate site. In temporary workspaces, tree stumps and rootstock will be left in place wherever possible to facilitate natural revegetation.

In wetlands, trees and brush will either be cut with rubber-tired and/or tracked equipment, or hand-cut. Unless grading is required for safety reasons, wetland vegetation will be cut off at ground level, leaving existing root systems intact, and the aboveground vegetation removed from the wetlands for chipping or disposal.

In uplands, tree stumps and rootstock will be left in the temporary workspace wherever possible to encourage natural revegetation. Stumps will be removed from the ROW to approved disposal locations and sold for lumber or pulp, or chipped on the ROW. Brush and tree limbs will be chipped and removed from the ROW for approved disposal.

The cleared width within the ROW and temporary construction workspaces will be kept to the minimum that will allow for spoil storage, staging, assembly of materials, and all other activities required to safely construct the pipeline.

Following construction, the entire pipeline ROW will be restored and a 50-foot wide permanent ROW will be maintained by NEXUS. The temporary workspace areas used during construction will be seeded and allowed to revegetate with no further maintenance or disturbance associated with the pipeline. In accordance with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* ("FERC Plan"), NEXUS will monitor all disturbed areas to determine the post-construction revegetative success for two growing seasons following construction.

3.3.4.2 Aboveground Facilities

Construction of NEXUS aboveground facilities would result in temporary and permanent impacts to vegetation. Approximately 1.1 acres of forested lands will be cleared for construction of aboveground facilities for the NEXUS Project. Of the total acreage of vegetation temporarily disturbed during construction, approximately 0.3 acres will be allowed to re-vegetate to natural communities following construction.

3.4 Wildlife

NEXUS consulted with the USFWS, NOAA-NMFS, ODNR, MNFI and MDNR regarding wildlife effects and significant habitats in the Project area. Copies of all agency correspondence, including consultation letters, electronic mail and response letters are included in Appendix 1C2 of Draft Resource Report 1.

3.4.1 Existing Resources

The NEXUS Project traverses terrestrial and wetland habitats that support a diversity of wildlife species in a variety of ways. For the purposes of this report, the wildlife species that occur along the pipeline route are representative of the vegetation community structure and composition of the terrestrial and wetland habitats present within the footprint or immediate vicinity of the Project.

The composition, structure and distribution of the plant community in an area are referred to as the vegetative cover. Existing plant communities, as well as aspects of the physical environment (climate, microclimate, hydrology, geology, *etc.*) will influence the wildlife species that are present in a particular habitat. This section describes major wildlife habitat types and wildlife species associated with vegetative cover types present in the NEXUS Project (*see* Section 3.3 for descriptions of plant communities present in the Project area).

Dominant wildlife habitat types have been identified along the proposed pipeline route and at aboveground facility locations based on field surveys and review of available resource materials. These habitat types include upland forest, open uplands (early successional scrub-shrub and herbaceous vegetation cover), forested wetlands, scrub-shrub wetlands, emergent wetlands, urban and open water habitats. Wetland habitat types are further described in Section 2.4.1 of Draft Resource Report 2.

Upland Forest

Upland forests are found throughout the Project area and mostly occur along existing ROWs. Upland forests provide year-round food resources, cover, and nesting habitat for a variety of wildlife species. Mast-producing oaks generate an abundance of seeds and nuts, which are exploited by a diverse group of forest species. Even in relatively developed and urbanized areas, forested patches may be inhabited by a number of wildlife species. Large wildlife species such as the white-tailed deer (*Odocoileus virginianus*) use these forested habitats for food and cover. Small mammals capitalize on the availability of the numerous nest cavities in the form of snags and felled logs. They include such species as the gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*). The abundant small mammal population in upland forests provides prey for owls and hawks.

A variety of songbirds, including species of Neotropical migrants and resident species, use hardwood oak habitat for all or parts of their life cycle. Many Neotropical migrants feed on the numerous insects occurring within the forest canopy. Breeding birds use a range of different nest sites, with some species nesting on the forest floor, some in the understory vegetation, and some in the tree canopy. Characteristic resident bird species in oak forests include red-bellied woodpecker (*Melanerpes carolinus*) and wild turkey (*Meleagris gallopavo*). Typical migratory species might include great crested flycatcher (*Myiarcus crinatus*) and wood thrush (*Hylocichla mustellia*).

Open Uplands

The early successional habitat types in the Project area include successional scrub-shrub areas, fields, and disturbed and/or maintained areas such as existing utility ROWs or other open spaces areas. Early successional and grassland habitats are attractive to many wildlife species. Species such as eastern cottontail (*Sylvilagus floridanus*) frequently prefer shrubby, overgrown open habitats. Other early successional and grassy areas offer habitat for ground-nesting birds such as eastern meadowlark (*Sturnella magna*), killdeer (*Charadrius vociferus*), and song sparrow (*Melospiza melodia*).

Edge habitats adjacent to open space areas can create another type of habitat used by a distinct group of species. Examples of these species include coyote (*Canis latrans*), eastern cottontail, gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), white-tailed deer, and wild turkey (*Meleagris gallopavo*). Eastern box turtles (*Terrapene carolina*) travel between forest, forest edge, and open habitats. Bird species that are forest edge specialists, such as blue-winged warbler (*Vermivora pinus*), field sparrow (*Spizella pusilla*), prairie warbler (*Dendroica discolor*), and rufous-sided towhee (*Pipilo erythrophthalmus*), are often present where the upland fields border forested areas and along utility ROWs. Corridors and edges are also used by hunting raptors, such as American kestrels (*Falco sparverius*), red-tailed hawks (*Buteo jamaicensis*), and sharp-shinned hawks (*Accipiter striatus*), which feed on small mammals and birds.

Forested Wetlands

Forested wetlands have a diverse assemblage of plant species and provide important food, shelter, migratory and overwintering areas, and breeding areas. Typical aquatic and wetland wildlife in forested wetlands include cottonmouth (*Agkistrodon piscivorus*), cotton mouse (*Peromyscus gossypinus*), glossy ibis (*Plegadis falcinellus*), lesser siren (*Siren intermedia*), mud snake (*Farancia abacura*), prothonotary warbler (*Protonotaria citrea*), raccoon, river otter (*Lutra canadensis*), white ibis (*Eudocimus albus*), white-tailed deer, wild turkey, and wood duck (*Aix sponsa*).

Scrub-shrub Wetlands

Scrub-shrub wetland habitats are typically not as structurally diverse as forested wetlands. They contain vegetation that is characteristically low and compact. Under normal conditions the vegetative structure is usually a result of surface water inundation for extended periods of time. Scrub-shrub wetlands can also be maintained by periodic maintenance (such as along existing ROWs) including removal of larger trees. Plant species occurring within scrub-shrub wetlands offer excellent nesting sites for birds. Common species found in these wetlands include Pickerel frog (*Rana palustris*), red-winged blackbird (*Agelaius phoeniceus*), and spring peeper (*Pseudacris crucifer*).

Emergent wetlands

Freshwater emergent wetlands include wet meadows and emergent marshes, which are characterized by a variety of grasses, sedges and rushes. These wetlands are often associated with areas containing standing water for extended periods of time. Common species of birds associated with emergent wetlands include common grackle (*Quiscalus quiscula*), killdeer (*Charadrius vociferus*), and red-winged blackbird. Mammals typically associated with this habitat type include mink, muskrat (*Ondatra zibethicus*), raccoon, and star-nosed mole (*Condylura cristata*). White-tailed deer also frequent these areas and capitalize on the abundance of grasses and forbs. A large variety of amphibians and reptiles are also identified with these areas. These include bullfrogs (*Rana catesbeiana*), common snapping turtle (*Chelydra s. serpentina*), painted turtle (*Chrysemys picta*), and pickerel frog.

Urban

Urban environments are characterized by a low diversity of wildlife species that have become tolerant of human development and activity. The mammal species that are commonly found in urban areas include raccoon, striped skunk (*Mephitis mephitis*), squirrels and rats (*Rattus spp.*). Common bird species in

cities and residential areas include European starlings (*Sturnus vulgaris*), house sparrows (*Passer domesticus*), mourning doves (*Zenaidura macroura*), northern mockingbirds (*Mimus polyglottos*), and rock pigeons (*Columba livia*). The NEXUS pipeline is not located in heavily urbanized areas, but some urban environments do occur within the Project vicinity.

3.4.2 Wildlife Effects and Mitigation

Construction of the NEXUS pipeline will affect a total of approximately 347.9 acres of upland forest and approximately 476.8 acres of open upland habitat (*see* Table 3.3-1). Construction will also temporarily affect a total of 105.9 acres of wetland. Of the total acreage of wetland impacted during construction, 71.4 acres will be allowed to return to the pre-construction cover type. A total of 34.5 acres of forested wetland vegetation that will be permanently affected by routine vegetation maintenance during operation of the pipeline facilities. The majority of the pipeline facilities are located within or adjacent to an existing utility ROW. These existing ROWs are routinely maintained as part of regular facility operations to control vegetative growth, thus establishing shrub and/or open field habitat types. Many species of resident and migratory wildlife in the Project area use these existing utility corridors as preferred habitat.

Temporary wildlife effects are those associated with disturbance to habitats during construction, while permanent effects are those associated with conversion of forested habitats to scrub-shrub and emergent habitats, resulting from periodic maintenance of the permanent ROW. Indirect wildlife effects associated with construction noise and increased activity will be temporary and could include abandoned reproductive efforts, displacement, and avoidance of work areas. Direct mortality to small mammals, reptiles, and amphibians that are less mobile could occur during clearing and grading operations.

Since the NEXUS pipeline route is located primarily along existing ROWs, effects to forested habitat have been minimized. The forested areas adjacent to collocated ROWs that are present along the pipeline route already exist as edge habitat, not interior forested habitat. Consequently, effects on habitat for forest-dwelling wildlife will be minimal, although some conversion of forested vegetation will occur. Conversion of forested habitats creates potential to reduce the area of habitat available for woodland amphibians such as the spotted salamander (*Ambystoma maculatum*) and wood frog (*Lithobates sylvatica*); however, this effect is expected to be minimal, given the relatively small amount of forested vegetation that will be affected over the entire Project.

Construction activities within wetland habitats will temporarily affect wildlife using the area. Disturbances to wetland-dependent wildlife will be similar to those described for terrestrial wildlife species. The alteration and conversion of habitat will displace some species which prefer forested wetlands. Existing nest sites and burrows along stream banks could also be disturbed. Some individuals may relocate to similar forested wetland habitat beyond the limits of work; however, a small overall reduction in carrying capacity for forest dwelling species is expected.

In accordance with the FERC's Plan, vegetative maintenance in upland areas along the ROW will occur no more than once every three years. However, a corridor centered over the pipeline up to 10 feet wide may be mowed annually for maintenance and inspection purposes. To avoid effects to ground nesting birds, maintenance activities will not be scheduled between April 15 and August 1.

In wetlands, vegetation maintenance over the full width of the permanent ROW is prohibited. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline up to 10 feet wide may be maintained annually in an herbaceous state. In addition, trees located within 15 feet on either side of the pipeline that may affect the integrity of the pipeline coating may be selectively cut and removed from the ROW. Trees and shrubs that become reestablished beyond 15 feet on either side of the pipeline will not be disturbed.

Vegetation maintenance practices on the construction ROW adjacent to waterbodies will consist of maintaining a riparian strip within 25 feet of the stream as measured from the mean high water mark. This riparian area will be allowed to permanently revegetate with native woody plant species across the

entire ROW. However, as in wetland areas, a corridor centered on the pipeline up to 10 feet wide may be maintained in an herbaceous state and trees located within 15 feet on either side of the pipeline that may affect the integrity of the pipeline may be selectively cut and removed from the ROW.

Regionally, maintained utility ROWs can provide early successional habitats for several important game species including white-tailed deer and wild turkey. The permanent ROW proposed for the NEXUS pipeline will be 100 feet wide in uplands. ROW corridors may function as travel corridors for some generalist species and provide edge habitat along large forested areas. ROWs revegetated with herbaceous and shrub cover will provide food, cover and breeding habitat for those species that utilize open habitats.

In an effort to minimize permanent effects to wildlife and promote the rapid stabilization and revegetation of the disturbed areas, NEXUS will comply with the FERC's Plan and Procedures thereby minimizing disturbance to vegetation and providing for stabilization of affected areas to mitigate direct and indirect effects to wildlife. Revegetation will be completed in accordance with permit requirements and in consultation with agency and non-agency stakeholders affected by the Project.

Following construction, stabilization, and establishment of vegetative cover, temporarily disturbed areas will be left to revegetate via natural succession. There will be minimal permanent loss of trees that will occur within the ROW, which will be maintained in an early successional stage by mowing and periodic tree removal. Temporary workspaces will be allowed to naturally revegetate via natural succession. This natural revegetation process will gradually develop a stratified vegetative cover between the ROW and adjacent habitats. Overall, construction and operation of the pipeline facilities is not expected to adversely affect the distribution or regional abundance of wildlife species given the amount and distribution of similar habitat types available in the immediate Project area.

3.4.3 Significant or Sensitive Wildlife Habitat

This section identifies and describes the significant or sensitive wildlife habitats within the NEXUS Project area. Significant or sensitive wildlife habitats include wildlife management and refuge areas, or other known wildlife resources not specific to T&E species. T&E wildlife species and their habitats are described in Section 3.5, Table 3.5-1.

Draft Resource Report 8 (Table 8.4-1) provides a detailed discussion of Federal, State, Recreational, and Conservation Lands crossed or located with 0.25 mile of the NEXUS Project.

3.5 Endangered, Threatened and Special Concern Species

The Endangered Species Act ("ESA") of 1973 (16 United States Code A-1535-1543, P.L. 93-205) protects federally listed T&E species. The ESA states that T&E plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the U.S. and that protection of these species and their habitats is required. The ESA protects fish, wildlife, plants, and invertebrates that are federally listed as T&E. A federally-listed endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally-listed threatened species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. The USFWS, which is responsible for terrestrial and freshwater species, and NOAA-NMFS, which is responsible for marine species, jointly administer the ESA.

Protection is also afforded under the ESA to designated "critical habitat," which the USFWS defines as specific areas both within and outside the geographic area occupied by a species on which are found those physical and biological features essential to its conservation. In addition to federal law, Ohio and Michigan have passed laws to protect state T&E species. The state-specific regulations are as follows:

- Ohio law allows the Chief of the Division to adopt rules to restrict taking or possessing native wildlife species that are threatened with statewide extirpation. Additionally, the Chief may develop and periodically update the list of endangered species (Ohio Revised Code

1531.25). The first list of Ohio's endangered wildlife was adopted in 1974 and included 71 species. An extensive examination of this list is conducted every five years (ODNR, 2012).

- Michigan law under the Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994 (Section 324.36501-36507) states that the department shall perform those acts necessary for the conservation, protection, restoration, and propagation of endangered and threatened species of fish, wildlife, and plants in cooperation with the federal government, pursuant to the ESA.

Prior to commencing field studies, NEXUS consulted with the USFWS Columbus Field Office and East Lansing Field Office, ODNR, MNFI, and MDNR to request known federal or state species records within a 1-mile wide corridor of the potential pipeline route (*see* Draft Resource Report 1, Appendix 1C2). The list of protected species that could occur within 1 mile of the Project is provided as Table 3.5-1. Based on the information received from the agencies, NEXUS evaluated the potential occurrence of protected species and their locations relative to the pipeline route. Further evaluation of habitat information collected from field surveys in the fall of 2014 and publically available information was also performed to determine the need for on-site species specific surveys. NEXUS has developed several proposed species survey protocols and is currently consulting with USFWS and ODNR regarding proposed species-specific surveys. Furthermore, NEXUS is also consulting with the resource agencies to update them on the Project route, field survey status, and to obtain any new information on the locations of rare, threatened and endangered species (*see* Draft Resource Report 1, Appendix 1C2). Species-specific field surveys will be conducted in suitable habitats during the proper time of year for the species of interest throughout 2015.

The federally and state-protected wildlife species that potentially occur in the Project area are summarized in Table 3.5.1. Federally protected species are discussed in Section 3.5.1, and state protected species potentially occurring in the Project area are discussed in Section 3.5.2.

3.5.1 Existing Resources, Effects, and Mitigation

3.5.1.1 Federally-listed Species

Eastern Massasauga Rattlesnake (Sistrurus catenatus)

This rattlesnake is currently a federal candidate species. This species exists in disjunctive population segments near both wetland habitats and along forest edges in Michigan and Ohio (MDNR, 2012). The home range for this species varies for each individual population and is dependent on habitat quality. Populations in southern Michigan and Ohio typically use shallow, sedge or grass dominated wetlands, while those in northern Michigan prefer lowland coniferous forests. This species also requires sunny areas with scattered shade to exist with thermoregulation, so it will avoid heavily wooded or closed canopy areas. Therefore, it is typical for the rattlesnake to hibernate from October through April in the hummocked wetland landscapes and move to drier upland areas along fields and old wood edges for hunting purposes in the summer months (NYSDEC, 2015). It is also common in very warm months for the massasauga to become more active in evenings and at night (USFWS, 2014a). NEXUS will be performing a habitat analysis by a qualified herpetologist in June 2015 to determine if any suitable habitat for eastern massasauga rattlesnake will be impacted by the Project. A survey report will be drafted and submitted to USFWS for review and a copy will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Indiana bat (Myotis sodalis)

The Indiana bat occurs in forests and caves from the east coast to Midwestern United States, primarily inhabiting regions in the Midwest. Indiana bats are believed to inhabit all of the proposed Project counties within Ohio and Michigan (USFWS, 2013). During the fall, from August through October, Indiana bats congregate at hibernation sites (*i.e.*, hibernaculum) including caves and abandoned mine

shafts, where bats engage in mating activities. During this time bats also forage the surrounding areas to build fat reserves needed for hibernation (USFWS, 2014b). From October through April, Indiana bats hibernate in these areas, preferring cool, humid caves with stable temperatures under 50°F. There are hibernacula located within Ohio and Michigan, and potential for this species to be located within each of the counties crossed by this Project (USFWS, 2014b). Indiana bats emerge from hibernacula between mid-April and late-May and again forage in areas typically within 10 miles of hibernaculum sites. Small maternity colonies are then formed under exfoliating bark for the duration of the summer months (USFWS, 2014b). Roosting colonies are commonly found in bottomland or riparian areas, but may also include some upland forests and pastures.

Roost trees commonly include mixed mesophytic hardwoods and mixed hardwood-pine stands (USFWS, 2014b). According to the USFWS, potential roosting habitats are those with at least 16 suitable trees per acre. Suitable trees include live shagbark hickory over 9 inches in diameter at breast height (“dbh”); dead, dying, or damaged trees of any species, over 9 inches dbh with at least 10 percent exfoliating bark; den trees, broken trees, or stumps over 9 inches dbh and over 9 feet in height; or live trees of any species over 26 inches dbh (USFWS, 2014b).

Indiana bats often forage in both riparian and upland forests, as well as cropland borders and wooded fencerows. Preferred habitat includes streams and associated floodplain forests, and impounded bodies of water, including ponds and reservoirs. Indiana bats search for flying insects at or near the canopy at night and similar to other bat species, utilize openings in the forest, such as stream corridors and ROWs, to feed (USFWS, 2014b).

The USFWS identified multiple county-specific determinations associated with the Indiana bat for Project areas within Ohio. USFWS recommended that in Carroll, Columbiana, Stark and Summit counties, any unavoidable tree clearing should occur only from October 1 through March 31. Summer surveys were recommended for Wayne, Medina, Lorain, Erie, Sandusky, Wood, Lucas, and Fulton counties and all of the Michigan Counties. No additional surveys were required in areas where there have already been confirmed records of the Indiana bat. No known occurrences of Indiana bat were identified by USFWS in the Michigan portion of the Project however tree clearing between October 1 and March 31 was recommended as well.

NEXUS in response to USFWS’s recommendation to perform surveys to identify any potential hibernacula or summer habitat for Indiana bat drafted a propose survey plan following USFWS and ODNR Guidance. The proposed survey plan is included in Appendix 3A. This survey plan was reviewed and approved by USFWS and ODNR. Mist net surveys were initiated in Michigan on May 15, 2015. Surveys will not begin in Ohio until after June 1 as recommended by USFWS and ODNR. Mist surveys will be completed by August 15, 2015 consistent with all agency guidance. A report summarizing the results of the portal surveys and mist net surveys will be completed and submitted to USFWS by November 2015. A copy of the report will be included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Karner Blue Butterfly (*Lycaeides melissa samuelis*)

The Karner blues have four stages in its life cycle; the egg, larva, pupa, and adult. There are two generations per year, the first appearing in late May to mid-June. The second brood adults, emerging in mid-July to early August, lay their eggs singly in dried lupine seed pods or near the ground on the stems. Eggs of the second brood hatch the following May. Additionally, although the Karner blue adults are nectar-feeders, the larvae are highly specialized and feed exclusively on the wild lupine leaves. Without the lupine, the butterfly populations would not survive (USFWS, 2012).

In Ohio, no impacts to this species is anticipated according to the USFWS (*see* Draft Resource Report 1, Appendix 1C2). In Michigan, the species distribution is limited to pine and scrub oak habitats scattered among open grassy areas, commonly within habitat of wild lupine (*Lupinus perennis*) (USFWS, 2014).

The USFWS identified this species as potentially occurring near the Project areas in Michigan. NEXUS has proposed presence/absence surveys for Karner blue butterflies if wild lupine patches are found during field surveys. A draft of the proposed survey plan submitted to USFWS for review is included in Appendix 3B. To date, no wild lupine has been found in the proposed work areas therefore no presence/absence survey are planned in 2015. If any wild lupine is found during the ongoing field surveys in 2015, presence/absence surveys will be undertaken during the appropriate flight times.

Kirtland's Warbler (Setophaga kirtlandii)

This small blue-gray songbird has a bright yellow colored breast and requires areas with small scrubby jack pines for nesting and breeding. Specifically, the Kirtland's warbler is found in low scrub, thickets, and deciduous woodland (Mayfield, 1992). This warbler migrates through Ohio in the spring and fall, traveling between breeding grounds in north-central North America and wintering grounds in the Bahamas. While migration occurs in a broad front across the entire state, approximately half of all observations in Ohio have occurred within 3 miles of Lake Erie (USFWS, 2012). During migration, individual birds usually forage in shrub/scrub or forested habitats and only stay in the area for a few days.

If suitable habitat cannot be avoided by the proposed pipeline route, the USFWS requested clearing within 3 miles of Lake Erie should not occur from April 22nd to June 1st or from August 15th to October 15th. The current location of the Project is greater than 3 miles from Lake Erie even at its closest location to the lake in Erie County, which is outside of the range for this warbler, therefore, no adverse impacts are anticipated.

Mitchell's Satyr Butterfly (Neonympha mitchelli mitchelli)

Mitchell's satyr butterfly has historic occurrences in Washtenaw County, Michigan, and may have populations within the planned pipeline route. This butterfly has limited distribution, occurring at only 19 sites in southern Michigan and two counties in north Indiana. This butterfly has become endangered as the suitable prairie fen habitat is continually disrupted or lost. Prairie fens are geologically and biologically unique wetland communities that are exclusive to southern Michigan and northern Indiana. Hydrological processes are critical in maintaining the vegetative structure and ultimately the habitat for this species of butterfly. In addition to alteration of the hydrology and elimination of this fen habitat, invasion of woody plant vegetation eliminates the population of suitable host plants for this butterfly and its caterpillars.

The USFWS identified this species as potentially occurring near the Project areas in Michigan. A draft of the proposed survey plan submitted to USFWS for review is included in Appendix 3B. To date, no suitable habitat has been found in the proposed work areas therefore no presence/absence survey are planned in 2015. If any suitable habitat is found during the ongoing field surveys in 2015, presence/absence surveys will be undertaken during the appropriate flight times.

Northern long-eared bat (Myotis septentrionalis)

The northern long-eared bat is a newly federally-listed threatened species. Cumulative impacts of habitat destruction and white-nose syndrome placed this species under review for federal listing as a result of drastic population decline (USFWS, 2015). The northern long-eared bat was historically found statewide in Ohio with a range similar to that of the Indiana bat. Impacts to both of these bat resident species and their habitats have been considered throughout all Project areas.

The northern long-eared bat is similar to the Indiana bat in its use of caves and mines for hibernation. Unique to the northern long-eared bat, however, is the very high humidity associated with selected hibernaculum. After hibernation, these mammals are found in the same types of wooded or semi-wooded habitats for the duration of the summer months. This bat also utilizes crevices and loose bark on trees for roosting, although it is believed to typically be less selective of roost trees than the Indiana bat (USFWS, 2015).

The USFWS indicated in correspondence with NEXUS (*see* Draft Resource Report 1, Appendix 1C2) that summer surveys are recommended for Wayne, Medina, Lorain, Erie, Sandusky, Wood, Lucas, and Fulton counties and Monroe, Wood, and Washtenaw Counties in Michigan. For areas of confirmed records, which included Carroll, Columbiana, Stark, and Summit counties, it was recommended that mines or caves be avoided and unavoidable tree clearing occur only between October 1 and March 31 to avoid any roosting bats.

NEXUS in response to USFWS's recommendation to perform surveys to identify any potential hibernacula or summer habitat for northern long-eared bat drafted a propose survey plan following USFWS and ODNR Guidance. The proposed survey plan is included in Appendix 3A. This survey plan was reviewed and approved by USFWS and ODNR. Mist net surveys were initiated in Michigan on May 15, 2015. Surveys will not begin in Ohio until after June 1 as recommended by USFWS and ODNR. Mist surveys will be completed by August 15, 2015 consistent with all agency guidance. A report summarizing the results of the portal surveys and mist net surveys will be completed and submitted to USFWS by November 2015. A copy of the report will be included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Rayed Bean (*Villosa fabalis*)

The rayed bean mussel is known to occur in the Huron River and River Raisin, with records higher in the watershed, in Michigan. The rayed bean is a small freshwater mussel about one and one-half inches long as an adult. The shell can be brown, green or yellow-greenish in coloration with wavy, dark-green lines. Sands or gravels of headwater creeks and larger rivers make up the typical substrates this species.

The rayed bean is known to occur in Swan Creek, which flows through Fulton and Lucas Counties, Ohio. The rayed bean is a small freshwater mussel about one and one-half inches long as an adult. The shell can be brown, green or yellow-greenish in coloration with wavy, dark-green lines. Sands or gravels of headwater creeks and larger rivers make up the typical substrates this species (USFWS, 2012).

USFWS recommended HDD or alternative construction method to construct the pipeline under the creek to avoid all impacts to Swan Creek, thereby avoiding any potential impacts to the rayed bean population. The proposed crossing method of the pipeline for Swan Creek is a conventional bore therefore there will be no impacts to the bed or banks resulting in any impacts to rayed bean. Surveys will also be conducted to determine if this species occurs at the crossing location. A proposed survey plan has been drafted and submitted to USFWS for review and approval and is included as Appendix 3C. Surveys are planned to be conducted between June 2015 and September 2015. A copy of the survey report will be submitted to USFWS for review upon completion of the surveys and included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Piping Plover (*Charadrius melodus*)

Piping plovers are small, stocky shorebirds have a sand-colored upper body, a white underside and orange legs. During the breeding season, adults have a black forehead, a black breast band, and an orange bill. They use wide, flat, open, sandy beaches with very little grass or other vegetation to feed on insects, spiders, and crustaceans. Nesting territories often include small creeks or wetlands.

This species became listed as many of the coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments. Through the use of dams or other water control structures, humans are able to raise and lower the water levels of many lakes and rivers of plover inland nest sites (USFWS, 2015).

In Ohio, no impacts to this species are anticipated, and no action is required due to Project size, type and location.

Northern Riffleshell Mussel (*Epioblasma torulosa rangiana*)

The northern riffleshell mussel has a historical record of occurrence in Macon Creek, a tributary of River Raisin, as well as occurrences in the Huron River in Michigan. This species is considered a moderately sized mussel reaching 2 inches. The shell of the riffleshell is ovate to quadrate in shape and becomes thicker towards the anterior. The color of the shell can range from light greenish-yellow to an olive green, with narrow, dark, closed-spaced rays. The riffleshell typically identifies with well-oxygenated and large streams or rivers with sands and coarse gravels. Several known host fish include banded darter, blue breasted darter, banded sculpin and the German brown trout (USFWS, 2012).

The USFWS identified this species as potentially occurring near the Project areas in Michigan, and surveys will be undertaken to determine if this species occurs in streams crossed by the Project. A proposed survey plan has been drafted and submitted to USFWS for review and approval and is included as Appendix 3C. Surveys are planned to be conducted between June 2015 and September 2015. A copy of the survey report will be submitted to USFWS for review upon completion of the surveys and included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Poweshiek skipperling (*Oarisma Poweshiek*)

The Poweshiek skipperling is a species of butterfly that has disappeared across much of its range, resulting in only a few known persisting populations in the Midwest. This butterfly lives in prairie habitats and is typically found in select wet prairies or fen habitats.

The USFWS noted occurrence records for Washtenaw County, Michigan. A draft of the proposed survey plan submitted to USFWS for review is included in Appendix 3C. To date, no suitable habitat has been found in the proposed work areas therefore no presence/absence survey are planned in 2015. If any suitable habitat is found during the ongoing field surveys in 2015, presence/absence surveys will be undertaken during the appropriate flight times.

Snuffbox Mussel (*Epioblasma triquetra*)

In Michigan, snuffbox mussels are known to occur in the Huron River. The snuffbox mussel is a thick-shelled and triangular shaped species that is about 2 inches in length, with males typically larger than females. Coloration is light yellowish with numerous dark-green rays that are broken intermediately. This mussel tends to inhabit small to medium sized rivers but can be found in larger waterbodies. The snuffbox mussel is associated with high velocity waters and the sand, gravel and cobble substrate they bury themselves in. The only known host of this mussel is the log-perch (USFWS, 2012).

The USFWS identified this species as potentially occurring near the Project area. A proposed survey plan has been drafted and submitted to USFWS for review and approval and is included as Appendix 3C. Surveys are planned to be conducted between June 2015 and September 2015. A copy of the survey report will be submitted to USFWS for review upon completion of the surveys and included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

3.5.1.2 State Protected Species - Ohio

Blue-spotted salamander (*Ambystoma laterale*)

The Blue-spotted salamander is currently a state listed endangered species in Ohio. This salamander is believed to historically inhabit two counties within the proposed Project route; Henry and Lucas Counties in Ohio (Lipps, 2005). The blue-spotted salamander can be identified by its unique blue flecks that appear along its bluish-black body. This salamander typically grows between 4 to 6 inches in length and is associated with damp forested habitats with sandy soils. Blue-spotted salamanders will, however, utilize wet prairies and vernal pools for breeding. Nighttime breeding calls for migrations to these vernal

pools can be heard during or after rainfall in the late winter. Courtship, mating, and egg laying all will occur underwater. Eggs are attached singly or in small clusters to leaves and twigs, or are scattered along pond bottoms. The larvae hatch three to four weeks later and feed on aquatic invertebrates until metamorphosis occurs. Throughout its life, this amphibian will feed on worms, snails, slugs, insects, centipedes, spiders, and other invertebrates. Populations of the blue spotted salamanders are known to occur within 1 mile of the Project but have not been documented in the Project area, therefore, no adverse impacts to this species are anticipated.

Eastern hellbender (Cryptobranchus alleganiensis alleganiensis)

The eastern hellbender is currently state listed as endangered and occurs in areas of the Ohio River drainage in the eastern and southern portions of the state. This salamander is black, grayish or olive brown in color and has been documented at lengths up to 27 inches. However, lengths more commonly range between 11.5 and 20 inches (ODNR, 2012a). These amphibians are perfectly adapted to flourish in swift flowing stream environments, given their flat heads and bodies, short legs, small eyes and long rudderlike tails (Lipps, 2005). The hellbender possesses loose flaps of skin that run along the sides of the salamander's body to serve as a respiratory function. This characteristic also correlates to the salamanders need for cool and very clean, dissolved oxygen rich waters (Gottlieb, 1991). In addition to dissolved oxygen rich waters, these amphibians require a system that supports an abundance of crayfish, snails, minnows, insects, and worms. Recent population decline has been attributed to damming, pollution and sedimentation of streams and rivers (Lipps, 2005). Additional causes of population decline have been linked to decreasing numbers of successful reproduction. Populations of the eastern hellbender could exist in the Tuscarawas River. Surveys to determine if this species inhabits the section of the River crossed by the Project will be undertaken in the summer of 2015. Results of the survey will be coordinated with ODNR and a copy of the survey report will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

American bittern (Botaurus lentiginosus)

The American bittern is currently a state listed endangered species. Historically, some sightings of the bittern have been recorded in Lucas, Sandusky, and Summit Counties, Ohio. The bittern is a species of heron best described as a medium-sized, stocky, well-camouflaged, brown and tan colored bird with white stripes. The bittern population has significantly decreased in Ohio in recent years as the natural wetland habitat they require has also significantly declined (ODNR, 2012a). The primary contributor to this decline is the increasing need to clear land for agricultural purposes. This bird grows between 24 and 33 inches in height and has both a thick neck and bill. Nesting activity in Ohio is initiated in May and the eggs can be found from mid-May to mid-June. The bittern likes to keep hidden and often builds nests from dead vegetation over shallow waters. These birds require very large and undisturbed wetlands with thick vegetative cover. The bittern primarily feeds on insects, amphibians, and crayfish, but will also hunt smaller fish and mammals; all of which are abundant in wetland habitats (ODNR, 2012a).

No habitat of this species has been identified within the Project area and no adverse impacts are anticipated.

Barn owl (Tyto alba)

The barn owl is currently listed as a threatened species in the State of Ohio. This owl has low to no occurrences throughout most of the Project counties, but there are some areas of low to medium abundance potentials, according to the ODNR. Southwestern Wayne County holds the highest potential for impact, particularly along wetland edges at Killbuck Marsh Wildlife Area. Documented occurrences have also identified Columbiana County as potential habitat.

Barn owls have ear tufts and long legs. This owl has bright yellow eyes and light tan coloration on its upper sides and a white underside. Adult barn owls can reach 13-14 inches long, typically weight 14-25 ounces, and have a wingspan of 3.5 to 4 feet (ODNR, 2012a).

Due to the extensive farming of Ohio, there is little open grassland habitat available for the owl to hunt over. The decrease in grassland also decreases the number of meadow voles, which is the primary meal for these predators. Barn owls will use old buildings, barns, or chimneys for nesting, when a hollow tree is unavailable (Marti *et. al*, 2005).

Known occurrences of this owl are outside proposed Project areas, therefore, no adverse impacts on this species are anticipated as a result of any Project activities.

Black tern (*Chidonias niger*)

The black tern is resident in Lucas, Erie, and Sandusky counties of Ohio. This species is currently listed as endangered.

The black tern, in breeding season, has a black head, neck, and underparts with generally dark feathers. In the fall, it becomes lighter with gray wings. The tail is small and is only slightly notched, when compared to other terns. The tern's bill is very sharp and slender and is shorter than the bird's head. The black tern has long and pointed wings.

In terms of habitat selection, this species has been most commonly identified with large, undisturbed inland marshes. These marshes must pose fairly thick or dense vegetation with large areas of open water. The tern nests in various kinds of marsh vegetation, but cattail marshes are generally favored (ODNR, 2012a).

No populations of the black tern are in the currently located within the proposed Project area, consequently, no adverse impacts to this species are expected.

Common tern (*Sterna hirundo*)

The common tern is currently an endangered species in Ohio. This bird is a rare summer resident and an uncommon migrant. The tern historically utilized areas all along Lake Erie but is now limited to the western basin of Lake Erie. The common tern is gray on the back with darker wing tips, and has a white head with a black cap. The black-tipped, red-orange bill sets this bird apart from other similar terns. Terns are small, fast-flying water birds with deep V-shaped tails. They do not soar or swim like the gulls, but will dive from the air straight into the water after small fish. For their nesting sites, the common terns prefers natural or man-made islands that are free of mammalian predators and human disturbance. They will also use mainland beaches and dredge disposal areas, but only when islands are unavailable (ODNR, 2012a).

The range for this species is limited to the shores of Lake Erie, and therefore, not within any Project areas. No negative impacts are anticipated.

King rail (*Rallus elegans*)

The king rail is currently a state listed endangered species in Ohio. This bird has been documented in Lucas and Sandusky Counties. The king rail is a large rail species that is between 15 and 19 inches long with a wingspan of 21 to 24 inches length. This bird has a rusty colored head, neck, shoulders, and belly. The flanks are barred with black and white. These rails are found in many freshwater wetland habitat types, but most typically are associated with dense confines of cattails and other thick marsh vegetation. The main reason for population decline is the destruction of these freshwater wetland ecosystems (ODNR, 2012a).

This species was identified by ODNR, however, the documented occurrences are outside the Project areas. Consequently, no negative impacts are anticipated.

Lark sparrow (*Chondestes grammacus*)

The lark sparrow is currently a state listed endangered species. This species occurs within Fulton, Henry and Lucas Counties. This sparrow is a unique bird with bold features that distinguish it from other

sparrows. The lark sparrow has a long tail with white triangles at the corners, an alternating brown, white, and black pattern on the head, and a white breast with a black dot in the center (ODNR, 2012a).

This sparrow nests in grassland habitats with scattered shrub layers, disturbed open areas, as well as patches of bare soil. In the Oak Openings area west of Toledo, lark sparrows occupy open grass and shrubby fields along sandy beach ridges. They typically eat insects and seeds. These summer residents normally migrate out of Ohio shortly after their young fledge or leave the nest.

This species was identified by ODNR, however, the documented occurrences are outside the Project areas. Consequently, no negative impacts are anticipated.

Northern harrier (*Circus cyaneus*)

The northern harrier is currently a state endangered species, with documented occurrences along Lake Erie in Woods County. This hawk has long wings and a long tail. The male is mostly gray with black tipped wings and a white rump. The female is mostly brown and streaked below. Harriers hunt low over grasslands, with wings held in a distinctive dihedral (V-shape). The white rump is also a conspicuous field mark.

This is a common migrant and winter species; nesters are much rarer, although they occasionally breed in large marshes and grasslands. Harriers feed on small mammals and often nest in loose colonies. The female builds a nest out of sticks on the ground, often on top of a mound. Breeding occurs from April through July.

This species was identified by ODNR, however, the documented occurrences are outside the Project areas. Consequently, no negative impacts are anticipated.

Sandhill crane (*Grus canadensis*)

The sandhill crane is a state listed endangered species in Ohio. The majority of the Project area has no documented occurrences, however, there are a few regions where low to moderate potential for the crane to inhabit the area exists. Sandhill cranes are wading herons that can be characterized by their long legs, necks, and bills. The crane ranges between 34 and 38 inches in height and has a six-to seven-foot wingspan. The plumage of the adult sandhill crane is gray with a bald red skin patch on its forehead. Their eyes are yellow and their bill, legs, and feet are blackish. Immature sandhill cranes have a gray body with a brownish head and they lack the red skin patch. Sandhill cranes are monogamous breeders, meaning a male and female partner together to rear the young. Peak breeding activity occurs in April and May.

Sandhill cranes are primarily a wetland-dependent species. On their wintering grounds, they will utilize agricultural fields; however, they roost in shallow, standing water or moist bottomlands. On breeding grounds they require a rather large tract of wet meadow, shallow marsh, or bog for nesting (ONDR, 2012).

This species was identified by ODNR as potentially occurring within 1 mile of the Project area. No impacts are anticipated to sandhill crane as large high quality wetlands these species depend upon have been avoided.

Trumpeter swan (*Cygnus buccinator*)

The trumpeter swan is currently a state threatened species and has most recent occurrences documented along Lake Erie in Sandusky County. Adult trumpeter swans have white plumage with a black bill and feet. The bill of a trumpeter swan may also have a red border on the lower jaw and has a seven foot wingspan. The long neck of the trumpeter swan is an adaptation that allows the bird to access food inaccessible to other species of waterfowl. The trumpeter can uproot plants in 4 feet of water (ODNR, 2012a).

Trumpeter swans are year-round residents and prefer large marshes and lakes ranging in size from 40 to 150 acres. This swan also frequents areas with shallow wetlands with a diverse mix of plenty of emergent and submergent vegetation. The bulk of their diet consists of arrowhead, sage pondweed, wild celery tubers, and the stems and leaves of various plants. This bird will also occasionally feed on freshwater invertebrates, snails, worms, seeds, and grain.

This species was identified by ODNR as potentially occurring within 1 mile of the Project area, however, considering its documented occurrences in close proximity to Lake Erie, no negative impacts are anticipated.

Upland sandpiper (Bartramia longicauda)

The upland sandpiper is currently listed as endangered. This species has been documented in Erie, Lorain, Sandusky and Wood Counties. The upland sandpiper has a long, slender neck and small head, is brown in color with a scaly-looking pattern on its upper feathers and barred appearance on its underside. The legs are long and yellowish. This bird breeds in grasslands, pastures, and unkempt agricultural land with a mosaic of old fields and crop lands, and sometimes the grassy expanses of airports (Audubon, 2015). The sandpiper feeds on a wide variety of insects, including many grasshoppers, crickets, beetles and their larvae, moth caterpillars, and many others; also spiders, centipedes, earthworms, snails; and some seeds of grasses and weeds, and waste grain in fields. Nest site is on ground among dense grass, typically well hidden, with grass arched above it (ODNR, 2012a).

This species was identified by ODNR as potentially occurring within 1 mile of the Project area. No impacts are anticipated to upland sandpiper as the Project will not traverse grasslands 50 acre or more in size that this species depends upon.

Bigmouth shiner (Notropis dorsalis)

The bigmouth shiners is currently listed as a threatened species in Ohio, primarily occurring within the Rocky and Black river drainages of Lake Erie in Medina and Lorain Counties. The bigmouth shiner belongs to the minnow and carp family (*Cyprinidae*) and they typically range from 2 to 3 inches. Bigmouth shiners have a large, horizontal mouth with the upper jaw extending farther than the lower one. The underside of the head appears flat and while the side of its head angles inward. This fish has a silver body that is darker on the back and lighter on the sides.

Bigmouth shiners are found in pools where they swim in schools just above the sandy substrate. These fish prefer to eat various aquatic invertebrates, and terrestrial insects that fall in the water.

Since this species has been identified as occurring within areas in close proximity to Lake Erie, no adverse impacts area anticipated as a result of Project activities.

Channel darter (Percina copelandi)

The channel darter is a state threatened species in Ohio with occurrences in Columbiana, Erie, and Lorain Counties. The Channel darter is a bottom-dwelling species of fish originally found in the Ohio River and throughout Lake Erie. Impounding of the river and the introduction of non-native species in Lake Erie have led to a significant decline of known fish populations throughout Ohio (ODNR, 2012a). The darter is best described as a small, slender fish with yellowish-olive colored scales with a brown outline. In addition to the unique brown outline of its scales, this fish typically ranges from 1 to 3 inches in length and has 10 to 15 dark blotches along its sides. These blotches allow for proper identification from other darters (ODNR, 2015). The channel darter has solid dashes on its sides, as opposed to the “w” or “x” shaped marks on other species (NatureServe, 2007).

Suitable habitat for the channel darter has been documented as large, coarse sand or fine gravel bars in large rivers or along lake shores. It is believed this fish migrate to waters of at least 3 feet in depth during

the day and move back to shallow waters at night (ODNR, 2012a). Adult darters can be seen spawning in these shallow areas during the spring and summer months (NatureServe, 2007).

No populations of the channel darter are within the proposed Project area, rather were identified by ODNR as historically occurring within a 1 mile of the Project. No adverse impacts or impacts to waterbodies known to support this species are anticipated.

Greater redhorse (*Moxostoma valenciennesi*)

The greater redhorse is listed as a threatened species in Ohio and occurs within Lucas and Sandusky Counties. The greater redhorse is the rarest of the seven species of redhorse suckers found in Ohio. This fish is a large bottom-feeder that is often mistaken for carp. However, unlike carp, these fish are indicators of a healthy river system and are native to the Ohio River (ODNR, 2012a).

The greater redhorse has a relatively large rounded head, small eyes, and a bright red tail. Adults typically grow between 18-24 inches in length, but can reach 30 inches. They usually weigh 2-5 pounds, but can reach 10 pounds. The greater redhorse is found in medium to large rivers in the Lake Erie drainage system of Ohio. They are typically found in pools with a clean sand or gravel substrate. They are very intolerant of pollution and turbid (murky) water and are an indicator of good water quality. Their diet is made up of larval insects, snails, small mollusks, and other aquatic invertebrates (ODNR, 2012a).

No populations of the channel darter are within the proposed Project area, rather were identified by ODNR as historically occurring within a 1 mile radius of the Project. No adverse impacts or impacts to waterbodies known to support this species are anticipated.

Iowa darter (*Etheostoma exile*)

The Iowa darter is listed as endangered in the State of Ohio and has documented occurrences in Stark County. This darter has a long, slender body shape and a very short, blunt snout. This fish is typically one and a half to three inches in length. They can also be identified by the 9-12 dark, square blotches along their sides. These spots are blue on breeding males and often less distinct or absent on females. Iowa darters have a light brown back and a white or cream colored belly and throat (ODNR, 2012a).

Iowa darters are found in natural lakes and very sluggish streams or marshes with dense aquatic vegetation and clear waters. In Ohio they are primarily found in glacially formed natural lakes, often referred to as pothole or kettle lakes with very clear water and an abundance of aquatic vegetation. They feed on insect larvae, crustaceans, and other aquatic invertebrates (ODNR, 2012a).

No populations of the channel darter are within the proposed Project area, rather were identified by ODNR as historically occurring within a 1 mile of the Project. No adverse impacts or impacts to waterbodies known to support this species are anticipated.

Lake chubsucker (*Erimyzon sucetta*)

The lake chubsucker is currently listed as a threatened species in Ohio. This fish has documented occurrences in Wayne County. The chubsucker is a small species of sucker fish, typically 6-10 inches long, with a dark, golden bronze colored back and upper sides with a light cream colored or white belly. The edges of their scales have dark margins giving them a cross hatched appearance over much of their body. Young chubsuckers have a distinct black stripe down their side and are often mistaken as small minnows (ODNR, 2012a). These chubsuckers are found in natural lakes and very sluggish streams or marshes with dense aquatic vegetation and clear waters. In Ohio they are primarily found in glacially formed natural lakes that have very clear water and an abundance of aquatic vegetation. They feed on various aquatic invertebrates (ODNR, 2012a).

No populations of the channel darter are within the proposed Project area, rather were identified by ODNR as historically occurring within a 1 mile radius of the Project. No adverse impacts or impacts to waterbodies known to support this species are anticipated.

Lake sturgeon (*Acipenser fluvescens*)

The lake sturgeon is an endangered species in Ohio and has documented occurrences in Erie, Lorain and Lucas Counties. This sturgeon has numerous body plates on its back, sides, and belly. This fish has no scales and the skin is very coarse. The mouth is located on the underside of the snout and is an extendible tube-like structure. It usually measures 4-6 feet in length (sometimes up to 8 feet), and it typically weighs 50-100 pounds (can reach over 300 pounds). These fish will stir up mud and silt on the river and lake bottom when searching for mussels and snails to eat. The sturgeon will also eat a wide variety of invertebrates, some fish, and some plant material (ODNR, 2012a).

The lake sturgeon requires large bodies of water with connections to much smaller streams for spawning. They were historically very abundant in both the Ohio River and Lake Erie and would make spawning runs far up tributaries of both of these. Today there are still small numbers of them present in Lake Erie but none have been found in the Ohio River since 1971 (ODNR, 2012a). Much of their decline is likely due to the numerous dams that prevent them from reaching their spawning grounds.

Pugnose minnow (*Opsopoeodus emiliae*)

The pugnose minnow is considered extirpated in Ohio. Pugnose shiners is a rather small minnow, reaching around 2 inches in length. The tip of the lower jaw has black pigment, once occurred in western Lake Erie in bays and marshes with extremely clear waters and profuse amounts of submerged aquatic vegetation. They were last caught in Ohio waters in 1931 in East Harbor. This species is highly intolerant of turbid (murky) waters and loss of aquatic vegetation (ODNR, 2012a).

Spotted gar (*Lepisosteus oculatus*)

Spotted gar are only found in Lake Erie in Ohio and is a state listed endangered species. This gar has very strong, diamond shaped scales with many spots on its body and fins. These spots often makes this gar seem darker colored than other gar species. The mouth is filled with sharp needle-like teeth, which allows it to prey on smaller fish species. They are typically 20-30 inches long and two to four pounds (ODNR, 2012a).

Spotted gar are found in clear waters with profuse amounts of aquatic vegetation in natural lakes, backwaters of larger rivers, and large permanent swamps or marshes. In Ohio this species has only ever been found in Lake Erie where it was once relatively common in marshes and bays. Today it has become a very rare species there and very few individuals have been found in recent years (ONDR, 2012).

Project facilities will not be in close proximity to Lake Erie, and therefore, no adverse impacts are anticipated.

Western banded killfish (*Fundulus diapharus menona*)

This species is currently limited to the western portion of the state and is listed as endangered in Ohio. The native Western banded killfish is one and a half to two and a half inches in length and has 12-15 vertical bands along its side. These bands are a silvery blue color on breeding males, and are dark vertical lines on females and non-breeding males (ODNR, 2012a). Western banded killfish are found in areas with an abundance of rooted aquatic vegetation, clear waters, and with substrates of clean sand or organic debris free of silt. This fish mostly eats insect larvae such as mosquito and midge fly, zooplankton, and other invertebrates. They were historically found in natural glacial lakes and slow moving streams in the northern part of the state and in the bays and marshes along the Lake Erie shoreline. They are also found in some tributaries of the Portage River system in Wood County and in Miller bluehole of Sandusky County (ODNR, 2012a). No populations of the channel darter are within the proposed Project area, but

were identified by ODNR as historically occurring within a 1 mile radius of the Project. No adverse impacts or impacts to waterbodies known to support this species are anticipated.

Canada darner (*Aeshna canadensis*)

This species of dragonfly is currently state listed as threatened and has documented occurrences in Lucas County in high quality wetlands. The Canada darner is a blue and brown colored dragonfly, with the males typically brighter in color than the females. The darner reaches approximately one and a half centimeters in length. This species inhabits both terrestrial and freshwater environments, including bogs, beaver ponds, lakes and other freshwater areas with an abundance of forest vegetation types. Generally, these dragonflies aggregate around wet areas that are shallow with floating vegetation. They will utilize these areas for both feeding and breeding (Yoon, 2012). Potential habitat for this species has been avoided therefore no impacts are anticipated.

Chalk-fronted corporal (*Ladona julia*)

The chalk-fronted corporal is a state threatened dragonfly with known occurrences in Summit County. This dragonfly is medium in size, with a length of just over 1 inch. The wings are clear except for a patch of brown at their bases. Both mature males and females have a powdery-appearing coating on the thorax and the first part of the abdomen. In males this coating is bluish white and on the females it is grayish. The rest of the abdomen is blackish brown, possibly fading to orange brown along each side (Needman and Westfall, 1955). The habitat which supports this species is near the nutrient poor lakes, ponds and marshes. This species also prefers acidic waters, which is uncharacteristic of most dragon flies (Corbet, 1999). Potential habitat for this species has been avoided therefore no impacts are anticipated.

Elfin skimmer (*Nannothemis bella*)

Elfin skimmer dragonflies are considered endangered in Ohio with three occurrences, one of these which is the Singer Lake Bog Preserve in Summit County. This dragonfly is one of the smallest, averaging only three-quarters of an inch long. These dragonflies are so small that they sometimes become trapped in sundew. The elfin skimmer is black and yellow with males being covered in a powdery coat of frosty blue while the females are mainly yellow. This dragonfly has a white face and a very slender abdomen. One other distinguishable trait are their clear wings (ODNR, 2012a). Habitat for this dragonfly is primarily stagnant pools in marshy places, such as bogs. Skimmers are weak flyers and therefore never fly over open water. Elfin skimmers diet consists only of insects (ODNR, 2012a). Potential habitat for this species has been avoided therefore no impacts are anticipated.

Frosted elfin (*Incisalis irue*)

The frosted elfin is currently listed as endangered in the State of Ohio and only currently exists in Lucas County. The frosted elfin is best identified by its coloration; a frosted or gray ventral hindwing and a brown streaked upper side. This butterfly has a short tail on the hindwing and a dark spot above the tail, at the base of the hindwing. The frosted elfin wing span is typically 1 inch in length. The flight season for this species is May and June. The frosted elfin inhabits oak savannas with blue lupine, as the lupine is what this butterfly feeds. Similar to other endangered butterflies, conservation efforts have increased stands of its larval host. Any populations of this butterfly would not be impacted by Project activities as they are currently within conservation lands, and outside of any proposed Project area.

Marsh bluet (*Enallagma eribium*)

The marsh bluet is a threatened damselfly in the State of Ohio, with occurrences in Summit County. This small damselfly is just about 1 inch in length. The males are predominately blue on the sides of the thorax and the upper side of the abdomen while females are typically a greenish-yellow to brown with a black abdomen. This damselfly occurs at lowland lakes, ponds, and marshes, and has a definite preference for alkaline waters (Corbet, 1999). Potential habitat for this species has been avoided therefore no impacts are anticipated.

Persius dusky wing (Erynnis persius)

The Persius dusky wing is currently state listed as endangered in Ohio. This species has two populations documented, both occurrences are in Lucas County. The Persius dusky wing feeds on blue lupine, similar to many other butterflies currently protected in Ohio. It seems to be doing better with increased stands of its larval host, due to Karner blue conservation efforts. The best identifying characteristic is the straight row of white spots on the tip of the dorsal forewings. The wing span of this butterfly average one and a half centimeters in length (ODNR, 2012a). The Persius dusky wing inhabits oak savannas and blue lupine. Adults rest on low vegetation with their wings held outstretched. This dusky wing flies in May and June. The populations of this dusky wing would not be impacted as they are currently within conservation lands, and outside of the areas impacted by this Project.

Plains clubtail (Gomphus externus)

The plains clubtail is a state endangered dragonfly with occurrences in Erie County. This dragonfly is medium to large in size, at just over 2 inches in length. A brownish black is the primary body color but the head is yellow, as are the stripes that run down each side of the thorax. The abdomen is also black with a line of yellow dashes along the top. This species has a large range across the central United States. Habitat supportive of this dragonfly throughout all areas of its range are typically large, slow flowing and muddy streams and rivers (Corbet, 1999). Adverse impacts to this species as a result of Project activities are not anticipated as impacts to known habitat have been avoided.

Purplish copper (Lycaena helloides)

The ODNR Division of Wildlife lists this species as endangered and based on documented occurrences, only occur in Lucas County. The upper side of a male purplish copper is orange-brown with a purplish sheen. The females tend to be more orange. The hindwing of both sexes has a broad orange band at the margin, and the wingspan is typically 1.5 inches in length (ODNR, 2012a). This species inhabits a variety of disturbed moist areas, such as fallow fields with poor drainage, sedge meadows, wet prairies, wet ditches and low, damp areas in cultivated fields. The purplish copper can be found scattered throughout the western half of the state, but it is most often encountered in northwestern Ohio (ODNR, 2012a). No adverse impacts to this species are anticipated as a result of Project activities as impacts to known habitat have been avoided.

Racket-tailed emerald (Dorocordulia libera)

The racket-tailed emerald is listed as an endangered species by ODNR. Documented occurrences for this species occur at Singer Lake Bog, in Summit County. This dragonfly is a small, hairy species with a distinctive swollen club-like feature at the end of its abdomen. The racket-tailed emerald reaches about 1.5 inches in length and has a primarily brown colored body. This species is fairly confined to boggy pond and lake edges. The continuous draining of wetlands had led to habitat destruction and a decline in the population numbers for this dragonfly (Corbet, 1999). No adverse impacts to this species are anticipated as a result of Project activities as impacts to known habitat have been avoided.

Black bear (Ursus americana)

Despite the black bear being the most common bear in North America, this mammal is state listed as endangered in Ohio. This is applicable to all counties throughout the state. The black bear has an extensive list of ecosystem types it can successfully inhabit. Black bears have been located in swamps and wetlands to dry upland coniferous or deciduous landscapes. Primarily, this species thrives in heavily wooded forests, although these habitats vary greatly in the other types of vegetative and wildlife species present (ODNR, 2012a). Black bear are nomadic mammals with a home range of up to 120 square miles. This species is most active early mornings and late evenings when feeding occurs. A variety of foods are suitable for this omnivorous species and often includes fruits and grasses, insects and meats. The bear's omnivorous diet allows them to grow in sizes up to 3 feet tall (at the shoulder when on all fours) and up to

700 pounds, although 300 pounds is a more average weight. Despite this large mammal's adaptable nature, suitable habitat has been significantly depleted in Ohio. Much of the eastern forested regions of the state have been cleared for agricultural purposes. In addition to eliminating the habitat, overhunting of this species has contributed to population decline. As a result, the black bear has been state listed as an endangered species (ODNR, 2012a). Black bear have been identified as potentially occurring in the Project area. They are a highly mobile species and are expected to avoid the Project area during construction. This will be a short-term effect. In the long-term, black bears are anticipated to utilize the ROW during operation for foraging and as a travel corridor.

Eastern pondmussel (*Ligumia nausta*)

Eastern pondmussel is a state listed endangered species in Ohio with occurrences in Erie, Lorain, Lucas, and Sandusky Counties. The pondmussel has an elongate shape and reaches up to ten centimeters in length. This species has a distinct posterior ridge. The coloration of this species is typically tan to dark green, occasionally with fine green rays. Older mussels tend to be more of a brown or black color. This mussel primarily inhabits Lake Erie and the Lake Erie tributaries, and slow moving streams, lakes and ponds with sandy bottoms (Watters et al, 2009). Survey for these mussels were recommended by the ODNR. A proposed survey plan has been drafted and submitted to ODNR for review and approval (*see* Appendix 3C). Surveys are planned to be conducted between June 2015 and September 2015. A copy of the survey report will be submitted to ODNR for review and included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Threehorn wartyback (*Obliquaria reflexa*)

State threatened mussel in Ohio with occurrences in Erie, Lorain, Lucas, and Sandusky Counties. This mussel is around 3 inches in length and a yellow, green or brown color. The inner shell is a pearly white color. The shell is moderately thick and rounded with three, sometimes four, horn-like bumps along the center of the shell. This species is typically found in large rivers in sand or gravel; may be locally abundant in impoundments (NPS, 2015). Survey for these mussels were recommended by the ODNR and will be undertaken. A proposed survey plan has been drafted and submitted to ODNR for review and approval (*see* Appendix 3C). Surveys are planned to be conducted between June 2015 and September 2015. A copy of the survey report will be submitted to ODNR for review and included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Blanding's turtle (*Emydoidea blandingii*)

In Ohio, Blanding's turtle is limited primarily to the northern counties along Lake Erie. This turtle is currently listed as threatened in Ohio and has documented occurrences in Erie, Fulton, Henry and Lorain Counties. Blanding's turtle is a medium to large turtle with adult shell ranging from 6 to 11 inches in length. This turtle has a bright yellow chin and throat, and a very long neck. The upper part of the shell (carapace) is usually black and has yellow spots and streaks. The turtles head is also a darker shade with brown or yellow spots along it (Harding, 1997).

This turtle inhabits clean, shallow waters that contain an abundance of aquatic vegetation. This species habitats are also associated with areas of soft muddy substrates. Therefore, this species is typically found in ponds, marshes, swamps, bogs, wet prairies, and river backwaters. The Blanding's turtle can also occur in slow-moving rivers, protected coves, lake shallows, and inlets. These turtles can inhabit upland ecosystems in the spring and summer during nesting and mating seasons (ODNR, 2012a).

Surveys to determine if habitat exists for this species within the Project corridor will be undertaken in the summer of 2015. Results of the survey will be coordinated with ODNR and a copy of the survey report provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Spotted turtle (*Clemmys guttata*)

The spotted turtle is currently a threatened species in the State of Ohio. This turtle has also been documented as occurring within Erie, Fulton, Lorain and Summit Counties. The spotted turtle is a small turtle with lengths ranging from 3.5 to 5.5 inches. This turtle can be easily identified by the round yellow spots on its broad, smooth, black or brownish black carapace. Spots may fade in older individuals, and some individuals are spotless. This species inhabits clean, shallow, slow moving bodies of water with muddy or mucky bottoms and some aquatic and emergent vegetation (Ernst et al., 1994). Spotted turtles utilize a variety of shallow wetlands including shallow ponds, wet meadows, tamarack swamps, bogs, fens, sedge meadows, wet prairies, shallow cattail marshes, sphagnum seepages, small woodland streams and roadside ditches (ODNR, 2012a). Surveys to determine if habitat exists for this species within the Project corridor will be undertaken in the summer of 2015. Results of the survey will be coordinated with ODNR and a copy of the survey report provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

3.5.1.3 State Protected Species - Michigan

Blanchard's cricket frog (*Acris creptians blanchardi*)

The Blanchard's cricket frog is a state threatened species which has been known to occur in the vicinity of the proposed Project. This frog inhabits less than 10 sites throughout four counties in Michigan, among those four counties are Lenawee and Washtenaw Counties which are crossed by the NEXUS Project.

This frog inhabits ecosystems along edges of permanent ponds, bogs, lakes, and slow-moving streams or rivers. This species can also be seen on aquatic vegetation such as floating algae mats and water lily leaves, or along muddy or sandy shorelines. Cricket frogs prefer warmer temperatures and breed from mid to late May through July (Harding, 1997). This species feeds on a large variety of small terrestrial and aquatic insects and other invertebrates. The frog will feed on shore, at the water's surface, or while submerged.

Records from MNFI indicate that this species is found near the Huron River and Ford Lakes crossing of the Project. The HDD crossing method is planned in this area thereby avoiding any impacts to its known habitat.

Grasshopper sparrow (*Ammodramus savannarum*)

The grasshopper sparrow is currently a species of special concern for the State of Michigan. This bird inhabits areas within Lenawee, Monroe, and Washtenaw Counties in Michigan. Grasshopper sparrows were historically considered rare and local in Michigan. As forests were cleared, the species increased in abundance, especially in the southern Lower Peninsula (Beaver, 1991). Grasshopper sparrows may be found in a wide variety of grassland habitats, cultivated fields, hayfields and old fields. More specifically this species selects dry sites as long as the vegetation is grassy, dense and relatively tall (MNFI, 2015). They also tend to be found in areas with moderately deep litter and a low percentage of woody vegetation. Breeding season begins in May and usually lasts through July, and males typically are seen at these sites five to ten days before females arrive. Impacts to this species as a result of Project activities are not anticipated as habitat suitable for this species is not present in the Project corridor.

Orange throated darter (*Etheostoma spectabile*)

The orange throated darter is a species of concern in Michigan with occurrences in Monroe and Washtenaw Counties. The orangethroat darter is a slender fish averaging 3 inches in length, with a large head of a blunt triangular shape and large eyes. There are two separated dorsal fins and a single anal fin, all translucent and of a general fan shape. This species has very unique coloration, with yellow to pale olive-colored body and six to ten dark green dorsal saddles. In adult males, the vertical bars are separated by bright orange, yellow or red pigmentation, dorsal fins are orange and blue banded, anal fin pale blue to green, and the throat is often bright orange. As the name suggests, these fish move with a rapid darting

motion (MNFI, 2015). This darter occurs in small creeks to medium-sized streams with substrates of sand or gravel and slow to moderately swift currents, where it is most often found among riffles (Hubbs and Lagler, 2004).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Laura's snaketail (*Stylurus laurae*)

Laura's snaketail is species of concern in the State of Michigan. The snaketail has been documented in Washtenaw County in Michigan. This species is approximately 2.5 inches in length, with a greenish-yellow head. The snaketail has a distinct black cross stripe on the face. The thorax is yellowish green with a dark middle section. This species typically inhabits well established sandy-bottomed streams and adults generally appear in the river/stream or riparian/floodplain corridor of an ecosystem. More specifically, this species is drawn to shallow, well shaded, rivers and streams with cobble, sand or mud substrate (MNFI, 2015).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Pipevine swallowtail (*Battus philenor*)

This species is currently listed within Michigan as a species of concern. The pipevine swallowtail has been historically documented in Lenawee and Washtenaw Counties in Michigan. The pipevine swallowtail can be best identified by its wingspan (3.75 to 4.5 inches) and coloration. The tailed hindwings. The coloration of this species is black with blue-green iridescence on the upper side of the hindwings (MNFI, 2015). Additionally, there are small, white sub marginal spots on both wings and the undersides are an iridescent blue, with a sub marginal row of large round orange spots ringed with black. This species can be found in open fields and railroad embankments near oak-hickory woods or in open areas near deciduous woodlands. The eggs are laid in small clusters on Virginia snakeroot (*Aristolochia serpentaria*), wild ginger (*Asarum sp.*), or Dutchman's pipe (*Aristolochia macrophylla*) (MNFI, 2015).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Regal fritillary (*Speyeria idalia*)

This species is currently listed as state endangered butterfly in Michigan. Historical documentation lists this species as potentially occurring in Lenawee and Washtenaw Counties in Michigan. This butterfly species is best described by its wingspan 3.0-4.0 inches. The upper surface of the forewing is reddish orange with black and white spots. The hindwing is black with white spots in females and reddish sub marginal spots in males. The undersurface of the hindwing is blackish gray with white spots (not metallic silver). The caterpillar is velvety black with yellowish orange blotches and is covered with orange-based silver spines tipped in black (MNFI, 2015). Prairie or open environments frequently in sandy regions. Meadows, old fields, and floodplain forest openings and edges. Adults have been observed on alfalfa, common milkweed, blazing-star, and butterfly weed (MNFI, 2015).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Swamp metalmark (*Calephelis mutica*)

The swamp metalmark is a species of concern in Michigan and has been recorded from a total of 17 counties in the southern half of the Lower Peninsula, occurring locally within its preferred habitats (MNFI 2012). Currently, Lenawee is the only Michigan county with recent documentation of this butterfly. The swamp metalmark has a wingspan of approximately 1 inch in length, and wings of a red-brown color. The wings also have small black and metallic spots along the edges and fine black lines toward the center

of the wing (Shull, 1987). This insect occurs in prairie fens and southern wet meadows that support its main host plant, swamp thistle (*Cirsium muticum*). The swamp metalmark has a single brood in Michigan, with flight beginning in July, and two broods in the southern portion of its range, where it flies in May and late August (MNFI, 2015).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Wild indigo dustwing (*Eynnis baptisiae*)

The wild indigo dustwing is a species of concern in the State of Michigan. This species has occurrences documented in Monroe and Washtenaw Counties in Michigan. The duskywing has a wingspan just over 1 inch and is chocolate brown in color, typically with three or four small white spots on the forewing (Glassberg, 1999). The undersurface of the hindwing is brown with two irregular rows of dull yellowish spots. This butterfly species commonly occurs in open oak barrens, shrubby fields, prairies and roadsides. Its main food plant, wild indigo (*Baptisia tinctoria*), generally occurs in sandy soils in dry or in southern forests and dry sand prairies (Reznicek *et al.*, 2011). Naturally uncommonly in Michigan, the range of the dustwing is assumed to be successfully expanding due to the recent adoption of a new larval host plant, the widespread, non-native crown vetch (*Securigera varia*).

No adverse impacts to this species or its habitat are anticipated as a result of Project activities as it occurs outside of the Project area.

Evening bat (*Nycticeius humeralis*)

The evening bat is currently a threatened species in Michigan. The only documented occurrence of evening bat is within Lenawee County, which is one of the counties potentially impacted by this Project. The evening bat is a dark brown fur covered mammal that reaches an average length of 3.5 inches, with both forearm and tail measuring about 1.5 inch. The wings, tail, muzzle and ears are thick with a leathery texture and black coloration. This bat is distinguished from other similar species by its rounded, forward curving tragus (skin flap at front of ear) and number of upper incisors. The evening bat forages above water and in forest clearings and edges for insects both high and low to the ground. Its flight pattern is slow and steady. This species can be found roosting in old and mature forests, frequently moving between large snags located near one another, and in spacious cavities during the maternity period (MNFI, 2015). Where such conditions are not available, evening bats will roost in wooden structures, such as attics and barns. Mist net surveys will be conducted between May 15 and August 15, 2015 to determine if evening bat is utilizing forests within the Project area (*see* Appendix 3A for a copy of the proposed survey plan). The results of the survey will be coordinated with MDNR and a copy of the survey report will be included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Least shrew (*Cryptotis parva*)

The least shrew is currently a state threatened species with occurrences documented in Washtenaw County, Michigan. This mammal is one of the smallest shrews inhabiting Michigan, with a body length averaging 3 inches and a short tail just under 1 inch long. Like many shrews, it has an elongated head, pointed nose, tiny eyes, and short grayish brown fur. The least shrew is found in dry upland meadows with dense coverage of grasses and forbs. However, this species can also be found in marshy areas, fencerows, and woodland edges. Nests are often found tucked under rocks, logs, discarded lumber, metal sheeting, and hay bales left in fields over winter (MNFI, 2015). No adverse impacts to this species or its habitats are anticipated as a result of Project activities as it occurs outside of the Project area.

Appalachian elktoe (*Alasmidonta marginata*)

The Appalachian elktoe is a species of concern listed for Michigan. There are occurrences documented in Lenawee County. The elktoe is widespread in North America although patchy in distribution. It can

occur in northern drainages of the Great Lakes to southern drainages of the Tennessee, with species abundant in the center of its range (NatureServe, 2007). The elktoe is a small, thin shelled mussel, which can reach up to 4 inches in length. The shell of this mussel is elongate, with a rounded anterior end and an angled, square posterior end. It has a prominent posterior ridge, and the posterior slope is ribbed (MNFI, 2015). The elktoe is found in small to large sized streams and small to medium rivers. It is a riffle species, preferring swifter currents over packed sand and gravel substrates. The elktoe is typically only found in very clean and clear waters (Cummings and Mayer, 1992). Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Back sandshell (*Ligumia recta*)

The black sandshell is currently a state listed endangered species in Michigan. Within the scope of this Project, all three counties, Lenawee, Monroe, and Washtenaw have historical occurrences of this mussel documented. The black sandshell is a large mussel with an elongate shell. This mussel ranges in coloration from dark green to brown or black. This species has a low, broad beak, pointed posterior and rounded anterior ends. The nacre is whitish-pink to purple (MNFI, 2015). This species can be found on host fish, and in open water conditions, most commonly occupies rivers with strong currents and lakes with a firm substrate of gravel or sand (Watters et al., 2009). Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015. Results of the surveys will be coordinated with MDNR and a copy of the survey report will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Paper pondshell (*Utterbackia imbecillis*)

The paper pondshell is currently listed in Michigan as a species of concern. Only Washtenaw County in Michigan has documented occurrences. Pondshell is a medium-sized, elongate, inflated, and very thin-shelled mussel that averages 4 inches in length. This species can be identified based on the oval shape of its shell, the wide and flattened beak, and two posterior ridges often descending into a low dorsal wing. The shell varies in color from yellow to light green, and has dim green rays. The paper pondshell is most often observed in lakes, ponds and impoundments with soft mud or sand substrates (Watters et al., 2009). NEXUS will conduct surveys to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Purple lilliput (*Toxolasma parvus*)

This species of mussel is currently listed as endangered in Michigan. Macon Creek and the Raisin River in Monroe County commonly reveals spent shells of this species. The purple lilliput is a small mussel, growing to a little over 1 inch in length. The shell is inflated and relatively heavy. The anterior end is rounded, while the posterior end is pointed to rounded in males, and truncated in females (Clarke, 1981). The shell of the lilliput is smooth, except for growth lines, and light to dark green or brown, becoming darker with age (MNFI, 2015). The purple lilliput occurs in small to medium sized streams, less often in large rivers and lakes. It is most often found in well packed sand or gravel. Little is known about the biology of the purple Lilliput, but it is believed that breeding occurs on a host fish, and like all freshwater mussels, the lilliput is a filter feeder, gathering nutrition by filtering out particles, such as algae, zooplankton and debris, from the water (MNFI, 2015). Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report will be provided in the

updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Purple wartyback (*Cyclonaias tuberculata*)

The purple wartyback is a threatened mussel species in Michigan and occurs in all three Project counties, Lenawee, Monroe, and Washtenaw. This species range is limited to eastern North America, and within Michigan, is generally found along Lake Erie tributaries. The wartyback has a rough circular outline with numerous bumps along the majority of the outside of its shell (NatureServe, 2007). These mussels are yellow-brown or green-brown in young individuals and change to a dark brown as they age. Nacre color ranges from white with a hint purple to deep purple. The shell is overall very thick and heavy (MNFI, 2015).

The purple wartyback is found in medium to large rivers with gravel or mixed sand and gravel substrates (Cummings and Mayer, 1992). Suitable habitat for fish host species must be present for purple wartyback reproduction to be successful. Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report will be provided in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Rainbow shell (*Villosa iris*)

The rainbow shell mussel is currently a species of concern in Michigan. This species occurs in Lenawee, Monroe, and Washtenaw Counties in Michigan. The outside of the shell is smooth, without bumps or ridges, and is yellow to dark tan in color. There are green rays along the shell, becoming wider and more pronounced toward the posterior end of the shell. The maximum length of the rainbow shell is approximately 3 inches (MNFI, 2015). The rainbow shell is found in small to medium sized streams with sand and gravel substrates. Similar to many other mussel species, suitable habitat for fish host species must be present for rainbow reproduction to be successful. Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Round hickorynut (*Obovaria subrotunda*)

The round hickorynut is a state endangered mussel species in Michigan. This mussel has been documented within Lenawee and Monroe Counties and in Lake St. Clair and Lake Erie drainages. The hickorynut is described as a near perfectly circular shell, which is moderately thick and inflated. The average size has been documented as around 1 inch long, although individuals have been found up to 2 inches in length. Similar mussel species in Michigan, such as the hickorynut (*Obovaria olivaria*) and the Ohio pigtoe (*Pleurobema cordatum*), are not as round in shape or as smooth as the round hickorynut (MNFI, 2015). This mussel is found in medium to large rivers along the shore and along lake shores. The round hickorynut generally is found in sand and gravel substrates in areas with moderate flow. Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (see Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Slippershell (*Alasmidonta viridis*)

The slippershell is a state threatened mussel species. This mussel has been found in two of the three Michigan counties traversed by the Project; Lenawee and Washtenaw. The slippershell mussel has been referred to commonly as the brook wedge mussel and has been found in the Lake Michigan, Lake Huron, Lake St. Clair and Lake Erie drainages (MNFI, 2015). The slippershell is a small mussel averaging

around 1.5 inches long. The posterior end of the shell is square while the anterior end is rounded. The shell is generally smooth, except for growth lines. The exterior coloration of the shell is yellowish-brown and is marked with fine green rays. In Michigan, this mussel could be confused with the elktoe, however, the elktoe has ribs on its posterior ridge. Similar to the other mussel species listed, the slippershell mussel is found in creeks and headwaters of rivers, but has also been reported in larger rivers and in lakes. Typically, this mussel usually occurs in sand or gravel substrate, but occasionally has been found in mud (Clarke, 1981). Suitable habitat for fish host species must be present in order for slippershell mussel reproduction to be successful (MNFI, 2015). Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (*see* Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

Wavyrayed lampmussell (*Lampsyllis fasciola*)

The wavyrayed lampmussell is listed as threatened in the state and occurs all along Lake Erie in southeastern Michigan. Counties traversed by this Project where occurrences are documented include Lenawee, Monroe, and Washtenaw. The wavy-rayed lampmussel has a rounded to ovate, moderately thick shell and is usually under 3.5 inches in length. The shell is compressed to inflated (females) in shape. Shell color ranges from yellow to yellowish green with numerous thin wavy green rays (Watters *et. al.*, 2009). This mussel occurs in small to medium sized shallow streams, in and near riffles, with good current. The substrate preference is sand and/or gravel. Surveys will be conducted to determine if this species is found in streams crossed by the Project in the summer of 2015 (*see* Appendix 3C). Results of the surveys will be coordinated with MDNR and a copy of the survey report included in the updated Resource Report 3 to be filed with the NEXUS NGA 7(c) Certificate Application with the Commission in November 2015.

3.6 Migratory Bird Treaty Act

Migratory birds are defined as species which nest in the United States and Canada during summer months, and migrate south to the tropical regions of Mexico, Central or South America, and the Caribbean for the non-breeding season. These migratory birds are protected under the Migratory Bird Treaty Act (16 U.S. Code 703-711). Additionally, bald eagles and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S. Code 668-668d). Executive Order 13186 ([“EO”] 13186) (66 Federal Register 3853) directs federal agencies to identify areas where unintentional take is likely to have a measurable negative effect on migratory bird populations. This EO also promotes conservation of migratory birds through enhanced collaboration with the USFWS. EO 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors. Particular focus should be given to addressing population-level impacts.

On March 30, 2011, the USFWS and the Commission entered into a Memorandum of Understanding that focuses on the avoidance or minimization of adverse effects on migratory birds and the strengthening of conservation through enhanced collaboration between the two agencies. This voluntary Memorandum of Understanding does not waive any legal requirements under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, ESA, Federal Power Act, Natural Gas Act, or any other statutes, and does not authorize the take of any migratory birds. NEXUS is currently consulting with the USFWS regarding potential impacts to eagles and migratory birds (*see* Draft Resource Report 1, Appendix 1C2).

NEXUS has designed the Project in a manner so as to minimize potential impacts to migratory birds and will take other measures during Project construction and operation to limit migratory bird impacts. These measures include:

- routing Project facilities to avoid natural vegetation and sensitive resources where possible;
- maximizing the use of existing pipeline ROWs;

- limiting the construction and operation ROW widths to the minimum necessary;
- conducting mitigation for impacts to sensitive resources (e.g., wetlands) through agency permit conditions;
- adherence to the measures outlined in the NEXUS E&SC Plan during construction of the Project facilities; and
- limiting routine ROW maintenance clearing and prohibiting clearing during the migratory bird nesting season (April 15 to August 1).

Given the limited amount of disturbance and the predominance of open areas associated with construction of the proposed Project facilities, it is unlikely that construction would have an adverse impact on migratory birds.

3.6.1 Migratory and Breeding Birds - Ohio

The Birds of Conservation Concern (“BCC”) list of 2008 identified an array of potentially impacted species throughout the three regions traversed by the Project in Ohio. These Bird Conservation Regions (“BCRs”) are within USFWS Region 5 and more specifically, the Lower Great Lakes/St. Lawrence Plain (BCR 13), the Eastern Tallgrass Prairie (BCR 22) and the Appalachian Mountains (BCR 28) (USFWS, 2012).

Within the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region there were 27 bird species identified. The majority of birds listed have only been confirmed along Lake Erie, which is well outside any Project areas. Additionally, ten of these species are listed as non-breeding within the BCR. Four species were found to have potential of occurrence within the Project areas, these include the bald eagle (*Haliaeetus leucocephalus*), wood thrush (*Hylocichia mustelina*), blue-winged warbler (*Vermivora pinus*), and red-headed woodpecker (*Melanerpes erythrocephalus*). All of these species prefer well-developed deciduous forest habitats, with the warbler preferring the edges of woodlands and clearings (Cornell Lab, 2009).

The Eastern Tallgrass Prairie Region encompassed 39 species of bird, with 12 listed as non-breeding within the BCR and eight no longer identified by the Ohio Breeding Bird Atlas (Cornell Lab, 2009). Four of these species had confirmed occurrences within the state, but none within close proximity to any Project areas. The northern flicker (*Colaptes auratus*), field sparrow (*Spizella pusilla*) and the red-headed woodpecker all have confirmed occurrences with high potential to be in or near the Project. Both the northern flicker and the red-headed woodpecker inhabit forested areas with large trees and venture to more open areas to forage. The field sparrow is commonly found in early successional habitats, and frequent abandoned fields (Cornell Lab, 2009).

The Appalachian Mountains Region has 25 bird species associated with its listing, 16 of which are not within any areas in close proximity to the proposed Project route. There were nine species identified with the BCC listing that appear to potentially occur within the Project areas. These species include the forest dwelling bald eagle, black-capped chickadee (*Poecile atricapillus*), Cerulean warbler (*Dendroica cerulea*), Louisiana waterthrush (*Parkesia motacilla*), peregrine falcon (*Falco peregrinus*), red-headed woodpecker, and the wood thrush. The blue-winged warbler (*Vermivora pinus*) was only species with potential occurrence within the Project areas that inhabits shrubby fields or early successional ecosystems, and the sedge wren (*Cistothorus platensis*) was the only marsh or wetland resident identified. The sedge wren is also listed as not breeding within this BCR.

For a more expansive list of bird species included in the BCC list for these regions refer to Table 3.6-1.

3.6.2 Migratory and Breeding Birds – Michigan

The BCC list of 2008 identified an array of potentially impacted species throughout the two regions traversed by the Project in Michigan. These BCRs are the Eastern Tallgrass Prairie (BCR 22) and the Prairie Hardwood Transition (BCR 23) (USFWS, 2012).

Within the Eastern Tallgrass Prairie Region of Michigan, 39 species of bird were identified. Similar to this BCR in Ohio, 12 species were listed as non-breeding and multiple species were no longer identified by the Michigan Breeding Bird Atlas (MBBA II, 2012). The red-headed woodpecker and bald eagle were the only two species listed with occurrences in Project counties, but none within the specific Project areas. Both the woodpecker and the eagle inhabit forested areas with large trees. The woodpecker will venture to more open to forage, and the eagle will head to large open waters to hunt (MBBA II, 2012).

The Prairie Hardwood Transition Bird Conservation Region provided for a listing of 30 species to be evaluated for impact potential and their proximity to the Project. Of these species, 11 are non-breeding within the BCR, eight were not listed in the Michigan database and eight were not reported or confirmed as occurring near any Project areas. The majority of species located would not be impacted by the Project, as they only had confirmed occurrences along shores of, or in close proximity to, Lake Erie. The willow flycatcher (*Empidonax traillii*), brown thrasher (*Toxostoma rufum*), and bobolink (*Dolichonyx oryzivorus*) were all found to be potentially occurring within Project areas. The brown thrasher specifically was documented near the Project in Monroe County and typically is found in shrubby fields or shrubby forest edges. The bobolink inhabits grasslands and pastures and had confirmed occurrences in both Lenawee and Washtenaw Counties near the Project area. The flycatcher can thrive in multiple ecosystem types, but are typically associated with nesting in thickets of shrubby vegetation.

For a more expansive list of bird species included in the BCC list for these regions refer to Table 3.6-1.

3.6.3 Bald Eagle (*Haliaeetus leucocephalus*)

Since its de-listing in 2007, the bald eagle has become more common in the Northeastern United States. Specifically in Ohio and Michigan, the bald eagle's stronghold is within the marsh region of western Lake Erie. For the bald eagle, the ideal site is one where water with ample food (fish) is located within 2 miles of the nesting site. Eagles also shows a preference for a somewhat secluded homesite (ODNR, 2012a). Bald eagles utilize habitats consisting of mature forest less than 0.5 miles away from large bodies of water.

In the spring of 2015, NEXUS performed aerial surveys along the proposed pipeline route searching for nests within suitable habitat. Appendix 3D contains a copy of the survey protocols used to conduct the nest search. No nests were located within the 660 foot buffer of the Project area, as recommended by eagle guidance. There were seven nest areas located as a result of these surveys. All of these were outside of the buffer. One nest near MP 88.9 is at a distance of 750 feet from the edge of the construction workspace. The pipeline route traverses an active agricultural field in most of this area. There is a small amount of trees bordering a waterbody that will be avoided by using the HDD crossing method and therefore no forested habitat will be impacted. NEXUS will consult with USFWS for recommendations on how to proceed to minimize potential disturbance to the eagles.

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TABLES

TABLE 3.2-1

Representative Fish Species Known to Occur in the NEXUS Project Area in Ohio

Common Name	Binomial Nomenclature
Common Carp	<i>Cyprinus carpio</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Spotfin Shiner	<i>Notropis spilopterus</i>
Striped Shiner	<i>Notropis chrysocephelus</i>
Bluntnose Minnow	<i>Pimphales notarus</i>
Central Stoneroller	<i>Campostoma anomalum</i>
Mottled Sculpin	<i>Cottus bairdi</i>
Northern Hog Sucker	<i>Hypentelium nigricans</i>
Common White Sucker	<i>Catostomus commersoni</i>
Stonecat Madtom	<i>Noturus flavus</i>
White Crappie	<i>Poxomis annularis</i>
Black Crappie	<i>Poxomis nigromaculatus</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Bluegill	<i>Lepomis macrochirus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Rockbass	<i>Ambloplites rupestris</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Yellow Perch	<i>Perca flavescens</i>
Logperch Darter	<i>Percina caprodes</i>
Johnny Darter	<i>Etheostoma nigrum</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Black bullhead	<i>Ameiurus melas</i>

Reference: Trautman, 1981 and Sanders et. al. 1999

TABLE 3.2-2

Representative Fish Species Known to Occur in the NEXUS Project Area in Michigan

Common Name	Binomial Nomenclature
Bluntnose Minnow	<i>Pimphales notarus</i>
Common Shiner	<i>Luxilus cornutus</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Spotfin Shiner	<i>Cyprinella spiloptera</i>
White Sucker	<i>Catostomus commersoni</i>
Bluegill	<i>Lepomis macrochirus</i>
Blacknose Shiner	<i>Notropis heterolepis</i>
Blacknose Dace	<i>Rhinichthys atratulus</i>
Stonecat Madtom	<i>Noturus flavus</i>
Rock Bass	<i>Ambloplites rupestris</i>
Hornyhead Chub	<i>Nocomis biguttatus</i>
Grass pickerel	<i>Esox americanus</i>
Yellow Perch	<i>Perca flavescens</i>
Emerald Shiner	<i>Notropis atherinoides</i>
White Crappie	<i>Poxomis annularis</i>
Black Crappie	<i>Poxomis nigromaculatus</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>

Bailey et. al. 2004, Hay-Chmielewski 1995, and Dodge 1998

TABLE 3.2-3

Fisheries of Special Concern Occurring in the Project Vicinity

STATE	COUNTY	MP	Waterbody ID	Stream Name	Concern
OH	Stark	26.0	A14-99-S1	Middle Branch Nimishillen Creek	Potential Occurrence for Protected Species
OH	Stark	26.4	A14-97-S1	Swartz Ditch	Potential Occurrence for Protected Species
OH	Summit	45.9	AS-SU-37	Tuscarawas River	Potential Occurrence for Protected Species
OH	Wayne	53.01	AS-WE-17	Mill Creek	Salmonid Stream
OH	Medina	54.9	A14-43-S1	Styx River	Potential Occurrence for Protected Species
OH	Medina	67.6	AS-ME-46	The Inlet	Potential Occurrence for Protected Species
OH	Medina	73.7	AS-ME-73	Mallet Creek	Potential Occurrence for Protected Species
OH	Lorain	83.0	A14-50-S1	East Branch Black River	Potential Occurrence for Protected Species
OH	Lorain	88.0	AS-LO-19	Wellington Creek	Potential Occurrence for Protected Species
OH	Lorain	88.6	AS-LO-20	West Branch Black River	Potential Occurrence for Protected Species
OH	Lorain	88.7	AS-LO-22	Tributary to West Branch Black River	Potential Occurrence for Protected Species
OH	Lorain	97.7	A14-148-S1	East Fork Vermillion River	Potential Occurrence for Protected Species
OH	ERIE	99.9	AS-ER-100-S1	Vermillion River	Potential Occurrence for Protected Species/Salmonid Stream
OH	Erie	108.9	A14-187-S1	Old Woman Creek	Potential Occurrence for Protected Species
OH	Erie	112.6	A14-186-S1	Huron River	Potential Occurrence for Protected Species
OH	Erie	121.4	E14-95-S1	Pipe Creek	Potential Occurrence for Protected Species
OH	Erie	124.7	E14-94-S1	Mills Creek	Potential Occurrence for Protected Species
OH	Sandusky	131.5	D14-6-S1	Fuller Creek	Potential Occurrence for Protected Species
OH	Sandusky	133.4	E14-105-S1	Pickereel Creek	Potential Occurrence for Protected Species
OH	Sandusky	135.3	D14-8-S1	Raccoon Creek	Potential Occurrence for Protected Species
OH	Sandusky	135.9	E14-103-S1	South Creek	Potential Occurrence for Protected Species
OH	SANDUSKY	137.0	AS-SA-78	Green Creek	Potential Occurrence for Protected Species
OH	Sandusky	139.1	D14-40-S1	Bark Creek	Potential Occurrence for Protected Species
OH	Sandusky	141.1	E14-31-S1	Sandusky River	Potential Occurrence for Protected Species
OH	Sandusky	141.3	E14-31-S1	Sandusky River	Potential Occurrence for Protected Species/Percid Stream
OH	SANDUSKY	144.4	AS-SA-82	Little Muddy Creek	Potential Occurrence for Protected Species
OH	Sandusky	148.2	E14-43-S1	Muddy Creek	Potential Occurrence for Protected Species
OH	Sandusky	153.4	D14-25-S1	Sugar Creek	Potential Occurrence for Protected Species
OH	SANDUSKY	157.1	AS-SA-75	Portage creek	Potential Occurrence for Protected Species/Percid Stream
OH	Sandusky	157.42	AS-SA-75	Portage River	Percid Stream
OH	Wood	161.9	E14-175-S1	Toussaint Creek	Potential Occurrence for Protected Species/Percid Stream
OH	Wood	165.7	E14-40-S1	Packer Creek	Potential Occurrence for Protected Species
OH	Wood	171.7	AS-WO-8	Tributary to Maumee River	Potential Occurrence for Protected Species
OH	WOOD	174.2	AS-WO-18	Tributary to Maumee River	Potential Occurrence for Protected Species
OH	Wood	175.8	AS-LU-1	Maumee River	Protected Occurrence for Protected Species/Percid Stream
OH	Lucas	176.0	AS-LU-1A	Maumee River	Potential Occurrence for Protected Species/Percid Stream
OH	LUCAS	183.1	AS-FU-55	Blue Creek	Potential Occurrence for Protected Species
OH	FULTON	188.2	AS-FU-61	Fewless Creek	Potential Occurrence for Protected Species

TABLE 3.2-3

Fisheries of Special Concern Occurring in the Project Vicinity

STATE	COUNTY	MP	Waterbody ID	Stream Name	Concern
OH	FULTON	188.5	AS-FU-63	Swan Creek	Potential Occurrence for Protected Species
OH	Fulton	192.9	E14-4-S1	Ai Creek	Potential Occurrence for Protected Species
OH	Fulton	199.9	D14-45-S1	Tenmile Creek	Potential Occurrence for Protected Species
MI	Lenawee	207.3	E14-140-S1	River Raisin	Potential Occurrence for Protected Species
MI	Lenawee	214.5	E14-76-S1	Swamp Raisin Creek	Potential Occurrence for Protected Species
MI	Lenawee	218.4	E14-127-S1	South Branch Macon Creek	Potential Occurrence for Protected Species
MI	Lenawee	218.6	E14-126-S1	Unnamed Tributary	Potential Occurrence for Protected Species
MI	Lenawee	218.8	E14-74-S1	Schreeder Brook	Potential Occurrence for Protected Species
MI	Lenawee	219.0	E14-75-S1	Unnamed Tributary	Potential Occurrence for Protected Species
MI	Lenawee	221.5	E14-87-S1	Unnamed Tributary	Potential Occurrence for Protected Species
MI	Monroe	227.8	AS-MO-4	North Branch Macon Creek	Potential Occurrence for Protected Species
MI	Washtenaw	229.4	E14-157-S1	Saline River	Potential Occurrence for Protected Species
MI	Washtenaw	238.0	E14-164-S1	Paint Creek	Potential Occurrence for Protected Species
MI	Washtenaw	245.0	D15-21-S4	Huron River	Confirmed Occurrence of Protected Species

TABLE 3.3-1

Acres of Vegetation Affected by the NEXUS Project

State, Facility	Forested Land ^{a/}				Open Land ^{b/}						Agricultural ^{c/}		Other ^{d/}		Total	
	Upland Forest		Wetland Forest		Upland Open Land		Emergent Wetlands		Scrub-Shrub Wetlands		Construction	Operation	Construction	Operation	Construction	Operation
	Construction ^{e/}	Operation ^{f/}	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation						
Ohio																
<i>Pipeline Right-of-Way</i>																
<u>Mainline</u>	280.1	151.1	44.6	30.6	243.3	120.5	37.6	23.4	6.4	4.3	1699.2	859.7	61.6	35.8	2372.8	1225.4
<u>TGP Interconnect</u>	3.0	1.5	0.0	0.0	1.7	0.9	0.0	0.0	0.0	0.0	4.2	3.0	0.1	0.1	9.0	5.5
<i>Additional Temporary Workspace</i>	24.3	0.0	2.1	0.0	59.6	0.0	5.5	0.0	0.7	0.0	647.5	0.0	10.9	0.0	750.6	0.0
<i>Contractor Yards</i>																
<u>Yard 1-1</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	0.0	0.4	0.0	39.2	0.0
<u>Yard 2-1</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.6	0.0	0.0	0.0	56.6	0.0
<u>Yard 3-1</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.4	0.0	1.3	0.0	78.7	0.0
<u>Yard 3-2</u>	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	69.2	0.0	0.4	0.0	70.3	0.0
<i>Access Roads</i>	2.4	0.0	0.0	0.0	17.9	0.3	0.1	0.0	0.0	0.0	31.9	1.2	7.9	0.2	60.2	1.7
<i>Compressor Stations</i>																
<u>Hanoverton Compressor Station (CS-1)</u>	1.1	0.8	0.0	0.0	36.3	5.4	0.0	0.0	0.0	0.0	62.3	22.4	0.0	0.0	99.7	28.6
<u>Wadsworth Compressor Station (CS-2)</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.2	19.9	3.4	0.0	63.6	19.9
<u>Clyde Compressor Station (CS-3)</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.3	48.6	0.5	0.1	60.8	48.7
<u>Waterville Compressor Station (CS-4)</u>	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	37.2	34.9	0.1	0.0	37.4	34.9
<i>Meter Stations</i>																
<u>MR01 (TGP)</u>	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	8.9	2.1	0.1	0.0	9.1	2.1
<u>MR02 and MR03 (Kensington and Open)</u>	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	4.5	0.1	0.0	11.3	4.5

TABLE 3.3-1

Acres of Vegetation Affected by the NEXUS Project

State, Facility	Forested Land a/				Open Land b/						Agricultural c/		Other d/		Total	
	Upland Forest		Wetland Forest		Upland Open Land		Emergent Wetlands		Scrub-Shrub Wetlands		Construction	Operation	Construction	Operation	Construction	Operation
	Construction e/	Operation f/	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation						
Ohio Subtotal	311.4	153.4	46.7	30.6	359.7	127.1	43.2	23.4	7.1	4.3	2864.4	996.3	86.8	36.2	3719.3	1371.3
Michigan																
<i>Pipeline Right-of-Way</i>																
<u>Mainline</u>	26.7	14.1	5.9	3.9	70.7	36.2	3.0	1.8	0.0	0.0	430.6	215.9	14.6	8.3	551.5	280.2
<i>Additional Temporary Workspace</i>	8.7	0.0	0.0	0.0	29.8	0.0	0.0	0.0	0.0	0.0	149.3	0.0	2.6	0.0	190.4	0.0
<i>Contractor Yards</i>																
<u>Yard 4-1</u>	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	40.9	0.0	1.8	0.0	44.4	0.0
<u>Yard 4-2</u>	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	7.3	0.0
<u>Yard 4-3</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.0	0.0	0.0	16.1	0.0
<i>Access Roads</i>	0.3	0.0	0.0	0.0	6.3	0.1	0.0	0.0	0.0	0.0	5.9	0.0	1.6	0.2	14.1	0.3
<i>Meter Stations</i>																
<u>MR04 (DTE / WillowRun)</u>	0.8	0.8	0.0	0.0	1.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	2.6	2.1
Michigan Subtotal	36.5	14.9	5.9	3.9	117.1	37.4	3.0	1.8	0.0	0.0	642.8	215.9	21.1	8.7	826.4	282.6
PROJECT TOTAL	347.9	168.3	52.6	34.5	476.8	164.5	46.2	25.2	7.1	4.3	3507.2	1212.2	107.9	44.9	4545.7	1653.9

Note: Minor discrepancies due to rounding.

a/ Upland and wetland forest.

b/ Active hayfields, cultivated land, and specialty crops.

c/ Utility right-of-ways ("ROWS"), open fields, pasture, vacant land, herbaceous and scrub-shrub uplands, non-forested lands, emergent wetland, scrub-shrub wetland, golf courses, and open land portions of municipal, county, state, and federal lands.

TABLE 3.3-1

Acres of Vegetation Affected by the NEXUS Project

State, Facility	Forested Land ^{a/}				Open Land ^{b/}						Agricultural ^{c/}		Other ^{d/}		Total	
	Upland Forest		Wetland Forest		Upland Open Land		Emergent Wetlands		Scrub-Shrub Wetlands		Construction	Operation	Construction	Operation	Construction	Operation
	Construction ^{e/}	Operation ^{f/}	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation						
<p>^{d/} Existing developed residential areas and planned residential developments. This may include large developments, low, medium, and high density residential neighborhoods, urban/suburban residential, multi-family residences, and residentially zoned areas that have been developed or short segments of the route at road crossings with homes near the route alignment.</p> <p>^{e/} Manufacturing or industrial plants, paved areas, auto salvage and scrap yards, quarries, electric power or natural gas utility facilities, developed areas such as airport runways, roads, railroads and railroad yards, and commercial or retail facilities.</p> <p>^{f/} Water crossings greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width.</p>																

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species								
	Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Amphibians	Blanchard's cricket frog	<i>Acris creptians blanchardii</i>	Not listed	Michigan - Threatened	Lenawee, Washtenaw	Open edges of permanent ponds, lakes, floodings, bogs, seeps and slow-moving streams and rivers. They prefer open or partially vegetated mud flats, muddy or sandy shorelines, and mats of emergent aquatic vegetation in shallow water.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
	Blue-spotted salamander	<i>Ambystoma laterale</i>	Not listed	Ohio - Endangered	Henry and Lucas	Occurs in damp forested areas with sandy soils. Typically found burrowing under rotting logs.	Not likely	No survey required
	Eastern hellbender	<i>Cryptobranchus alleganiensis</i>	Not listed	Ohio - Endangered	N/A	Habitat is limited to cool and very clean, dissolved oxygen rich waters with gravel and bedrock substrate. Often occurrences are associated with Ohio River drainages.	Not likely	Surveys will be conducted
Avian	American bittern	<i>Botaurus lentiginosus</i>	Not listed	Ohio - Endangered	Lucas, Sandusky and Summit	Occur in large and undisturbed wetlands with thick vegetative cover and areas with small sections of open water.	Not likely	No survey proposed. Avoidance of impacts to known habitat.
	Barn owl	<i>Tyto alba</i>	Not listed	Ohio - Threatened	Columbiana and Wayne	Utilizes hollow trees or man-made shed, etc for nesting but are found in areas of large open grasslands.	Not likely	No survey proposed. Avoidance of impacts to known habitat.
	Black tern	<i>Chilodnius niger</i>	Not listed	Ohio - Endangered	Lucas, Erie, and Sandusky	The black tern prefers large, undisturbed inland marshes with fairly dense vegetation and pockets of open water. They nest in various kinds of marsh vegetation, but cattail marshes are generally favored.	Not likely	No survey proposed. Avoidance of impacts to known habitat.
	Common Tern	<i>Sterna hirundo</i>	Not listed	Ohio - Endangered	Erie, Lorain and Lucas	Limited to the shores or islands of Lake Erie.	Not likely	No survey proposed. Avoidance of impacts to known habitat.

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species									
Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements		
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Not listed	Michigan - Species of Concern	Lenawee, Monroe and Washtenaw	Habitats include grasslands, cultivated fields, hayfields and old fields.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
King Rail	<i>Rallus elegans</i>	Not listed	Ohio - Endangered	Lucas and Sandusky	Occurs in freshwater wetland habitats with dense confines of cattails and other marsh vegetation.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Lark sparrow	<i>Chondestes grammacus</i>	Not listed	Ohio - Endangered	Fulton, Henry, and Lucas	Occupy open grass and shrubby fields along sandy beach ridges.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Northern Harrier	<i>Circus cyaneus</i>	Not listed	Ohio - Endangered	Wood	Inhabits large marshes and grasslands.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Sandhill crane	<i>Grus canadensis</i>	Not listed	Ohio - Endangered	Lorain	Dependent on wetland habitats.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Trumpeter swan	<i>Cygnus buccinator</i>	Not listed	Ohio - Threatened	Sandusky	Occur in large marshes and lakes (typically 40 to 150 acres). Utilize shallow wetlands with a diverse mix of plenty of emergent and submergent vegetation and open water.	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Upland sandpiper	<i>Bartramia longicauda</i>	Not listed	Ohio - Endangered	Erie, Fulton, Lorain, Sandusky, Summit, and Wood	Native prairie and other dry grasslands, including airports and some croplands	Not likely	No survey proposed. Avoidance of impacts to known habitat.		
Fish	Bigmouth shiner	<i>Notropis dorsalis</i>	Not listed	Ohio - Threatened	Medina and Lorain	Lake Erie drainages; found in pools with sandy substrates.	Potential	No survey proposed. Mitigation measures	

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species		USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Common Name	Scientific Name						
Channel darter	<i>Percina copelandi</i>	Not listed	Ohio - Threatened	Columbiana, Erie, and Lorain	Occur in large, coarse sand or fine gravel bars in large rivers or along lake shores.	Potential	during construction to avoid impacts proposed. No survey proposed. Avoidance of impacts to known habitat proposed.
Greater redhorse	<i>Moxostoma valenciennesi</i>	Not listed	Ohio - Threatened	Fulton, Lucas, and Sandusky	Found in clean sand or gravel substrate of medium to large rivers within the Lake Erie drainage.	Potential	No survey proposed. Avoidance of impacts to known habitat proposed.
Iowa darter	<i>Etheostoma exile</i>	Not listed	Ohio - Endangered	Stark and Summit	Found in natural lakes and very sluggish streams or marshes with dense aquatic vegetation and clear waters.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Lake chubsucker	<i>Erimyzon sucetta</i>	Not listed	Ohio - Threatened	Wayne	Found in natural lakes and very sluggish streams or marshes with dense aquatic vegetation and clear waters.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Lake sturgeon	<i>Acipenser fluvescens</i>	Not listed	Ohio - Endangered	Erie, Lorain and Lucas	Found in larger rivers and lakes with mud and sand substrates.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Orangethroated darter	<i>Etheostoma spectabile</i>	Not listed	Michigan - Species of Concern	Monroe and Washtenaw	Occurs in small creeks to medium-sized streams with substrates of sand or gravel and slow to moderately swift	Not likely	No survey proposed. Avoidance of impacts to

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species		USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Common Name	Scientific Name						
	Pugnose minnow	<i>Opsopoeodus emiliae</i>	Not listed	Ohio - Extirpated	Summit	currents, where it is most often found among riffles. Lake Erie in bays and marshes with extremely clear waters and profuse amounts of submerged aquatic vegetation.	Not likely known habitat proposed. No survey proposed. Avoidance of impacts to known habitat proposed.
	Spotted gar	<i>Lepisosteus oculatus</i>	Not listed	Ohio - Endangered	Erie, Lorain, Sandusky, and Lucas	Found in Lake Erie.	Not likely No survey proposed. Avoidance of impacts to known habitat proposed.
	Western banded killfish	<i>Fundulus diapharus menona</i>	Not listed	Ohio - Endangered	Sandusky and Wood	Occurs in areas with an abundance of rooted aquatic vegetation, clear waters, and with substrates of clean sand or organic debris free of silt.	Not likely No survey proposed. Avoidance of impacts to known habitat proposed.
Insects	Canada darner	<i>Aeshna canadensis</i>	Not listed	Ohio	Summit	Inhabits both terrestrial and freshwater environments, including bogs, beaver ponds, lakes and other freshwater areas.	Not likely No survey proposed. Avoidance of impacts to known habitat proposed.
	Chalk-fronted corporal	<i>Ladona julia</i>	Not listed	Ohio - Endangered Michigan - Endangered	Ohio - Summit; Michigan - Lucas	Nutrient poor lakes, bogs and marshes.	Not likely No survey proposed. Avoidance of impacts to known habitat proposed.
	Elfin Skimmer	<i>Nannothemis bella</i>	Not listed	Ohio - Endangered	Summit	Primary habitat are stagnant pools and marshy places, such as bogs.	Not likely No survey proposed. Avoidance of impacts to known habitat proposed.

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species		USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Common Name	Scientific Name						
Frosted elfin	<i>Incisalia irue</i>	Not listed	Ohio-Endangered	Lucas	Inhabits oak savannas with blue lupine.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Karner blue butterfly	<i>Lycaeides melissa samuelis</i>	Endangered	Ohio-Endangered	Lucas	Pine barrens and oak savannas on sandy soils and containing wild lupines (<i>Lupinusperennis</i>), the only known food plant of larvae.	Not likely	Surveys will be conducted if suitable habitat is found within the ROW
Laura's snaketail	<i>Stylurus larvae</i>	Not listed	Michigan - Species of Concern	Washtenaw and Wayne	Occurs in shallow, well shaded, rivers and streams with cobble, sand or mud substrate.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Marsh bluet	<i>Enallagma erbiium</i>	Not listed	Ohio	Summit	Occurs at lowland lakes, ponds, and marshes, and has a definite preference for alkaline waters.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Mitchell's satyr butterfly	<i>Neonympha mitchellii</i>	Endangered	Michigan - Endangered	Washtenaw	Fens; wetlands characterized by calcareous soils which are fed by carbonate-rich water from seeps and springs.	Potential	Surveys will be conducted if suitable habitat is found within the ROW
Persius duskywing	<i>Erynnis persius</i>	Not listed	Ohio - Endangered	Lucas	Inhabits oak savannas and blue lupine.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Pipevine swallowtail	<i>Battus philenor</i>	Not listed	Michigan - Species of Concern	Lenawee, Washtenaw and Wayne	This species can be found in open fields and railroad embankments near oak-hickory	Not likely	No survey proposed. Avoidance of impacts to

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species		USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Common Name	Scientific Name						
Plains clubtail	<i>Gomphus externus</i>	Not listed	Ohio	Erie	woods or in open areas near deciduous woodlands. Occur along large, slow flowing and muddy streams and rivers.	Potential	known habitat proposed. No survey proposed. Avoidance of impacts to known habitat proposed.
Poweshiek skipperling	<i>Oarisma poweshiek</i>	Endangered	Michigan Endangered	Monroe	Wet prairies and fens.	Not likely	Surveys will be conducted if suitable habitat is found within the ROW
Purplish copper	<i>Lycaena helloides</i>	Not listed	Ohio - Endangered	Lucas	Inhabits a variety of disturbed moist areas, such as fallow fields with poor drainage, sedge meadows, wet prairies, wet ditches and low, damp areas in cultivated fields.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Racket-tailed emerald	<i>Dorocordulia libera</i>	Not listed	Ohio	Summit	Species confined to boggy pond and lake edges.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Regal fritillary	<i>Speyeria idalia</i>	Not listed	Michigan - Endangered	Lenawee, Washtenaw, and Wayne	Prairie or open environments frequently in sandy regions. Meadows, old fields, and floodplain forest openings and edges. Adults have been observed on alfalfa, common milkweed, blazing-star, and butterfly weed.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
Swamp metalmark	<i>Calephelis mutica</i>	Not listed	Michigan - Species of Concern	Lenawee	Occurs in prairie fens and southern wet meadows that support its main host plant, swamp thistle (<i>Cirsium muticum</i>).	Not likely	No survey proposed. Avoidance of impacts to

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species								
	Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Mammals	Wild indigo dustwing	<i>Eynnis baptisiae</i>	Not listed	Michigan - Species of Concern	Monroe, Washtenaw and Wayne	Commonly occurs in open oak barrens, shrubby fields, prairies and roadsides or areas where its main food source (the wild indigo) grows.	Not likely	known habitat proposed. No survey proposed. Avoidance of impacts to known habitat proposed.
	Black bear	<i>Ursus americanus</i>	Not listed	Ohio	All	Primarily inhabit heavily wooded forests, but can thrive in wetlands and swamps to dry coniferous or deciduous forests.	Potential	No survey proposed due to short-term impacts
	Evening bat	<i>Nycticeius humeralis</i>	Not listed	Michigan - Threatened	Lenawee	Inhabits old and mature forests, this species prefers to roost behind loose bark during the nonbreeding season.	Potential	Surveys will be conducted
	Indiana bat	<i>Myotis sodalis</i>	Endangered	Ohio-Endangered Michigan-Endangered	All	Inhabits caves and abandoned mines which provide cool and stable temperatures. Indiana bats then segregate in the summer; male bats roost alone or live in small bachelor colonies, females nest under loose bark of exfoliating trees or in tree hollows.	Potential	Surveys will be conducted
	Least shrew	<i>Cryptotis humeralis</i>	Not listed	Michigan - Threatened	Washtenaw	Dry upland meadows with dense coverage of grasses and forbs. However, this species can also be found in marshy areas, fencerows, and woodland edges. Nests are often found tucked under rocks, logs, discarded lumber, metal sheeting, and hay bales left in fields over winter.	Not likely	No survey proposed. Avoidance of impacts to known habitat proposed.
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Ohio-Threatened Michigan-Threatened	All	Hibernation sites used during the winter (caves, mines) and roosting sites for reproduction	Potential	Surveys will be conducted

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species		USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements	
Common Name	Scientific Name							
Mussels	Appalachian elktoe	<i>Alasmidonta marginata</i>	Not listed	Michigan - Species of Concern	Lenawee, Monroe, Washtenaw, and Wayne	(tree cavities) during the summer. Occurs in small to large sized streams and small to medium rivers. It is a riffle species, preferring swifter currents over packed sand and gravel substrates.	Potential	Survey will be conducted
	Black sandshell	<i>Ligumia recta</i>	Not listed	Michigan	Lenawee, Monroe, Washtenaw, and Wayne	Occupies rivers with strong currents and lakes with a firm substrate of gravel.	Potential	Survey will be conducted
	Eastern pondmussel	<i>Ligumia nasuta</i>	Not listed	Ohio	Erie, Lorain, Lucas and Sandusky	Occurs in slow moving streams or ponds/lakes with sandy substrate. Limited to Lake Erie and Lake Erie tributaries.	Potential	Survey will be conducted
	Northern riffleshell mussel	<i>Epioblasma torulosa rangiana</i>	Endangered	Michigan	Monroe	Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie	Potential	Survey will be conducted
	Paper pondshell	<i>Utterbackia imbecillis</i>	Not listed	Michigan - Species of Concern	Monroe, Washtenaw and Wayne	The paper pondshell is most often observed in lakes, ponds and impoundments with soft mud or sand substrates	Potential	Survey will be conducted
	Purple lilliput	<i>Toxolasma parvus</i>	Not listed	Michigan - Endangered	Monroe	Occurs in small to medium sized streams, less often in large rivers and lakes. It is most often found in well packed sand or gravel.	Potential	Survey will be conducted
	Purple wartyback	<i>Cyclonaias tuberculata</i>	Not listed	Michigan - Threatened	Lenawee, Monroe, Washtenaw, and Wayne	Found in medium to large rivers with gravel or mixed sand and gravel substrates.	Potential	Survey will be conducted
	Rayed bean	<i>Villosa fabalis</i>	Endangered	Ohio - Endangered Michigan - Endangered	Lenawee	Smaller, headwater creeks, but they are sometimes found in large rivers.	Potential	Survey will be conducted
Rainbow shell	<i>Villosa iris</i>	Not listed	Michigan - Species of Concern	Lenawee, Monroe, Washtenaw, and Wayne	Occurs in small to medium sized streams with sand and gravel substrates.	Potential	Survey will be conducted	

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species								
Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements	
Round hickorynut	<i>Obovaria subrotunda</i>	Not listed	Michigan - Endangered	Lenawee, Monroe and Wayne	Found in medium to large rivers along the shore and along lake shores. The round hickorynut generally is found in sand and gravel substrates in areas with moderate flow.	Potential	Survey will be conducted	
Slippershell	<i>Alasmidonta viridis</i>	Endangered	Ohio and Michigan - Threatened	Lenawee, Washtenaw and Wayne	Found in creeks and headwaters of rivers, but has also been reported in larger rivers and in lakes. Typically, this mussel usually occurs in sand or gravel substrate, but occasionally has been found in mud.	Potential	Survey will be conducted	
Snuffbox	<i>Epioblasma triquetra</i>	Endangered	Michigan - Endangered	Monroe	Small to medium-sized creeks in areas with a swift current and some larger rivers.	Potential	Survey will be conducted	
Threehorn wartyback	<i>Obliquaria reflexa</i>	Not listed	Ohio - Threatened	Erie, Lucas, Lorain, and Sandusky	Large rivers in sand or gravel; may be locally abundant in impoundments	Potential	Survey will be conducted	
Wavyrayed lampmussel	<i>Lampsyllis fasciola</i>	Not listed	Michigan - Threatened	Lenawee, Monroe, Washtenaw, and Wayne	Occurs in small to medium sized shallow streams, in and near riffles, with good current. The substrate preference is sand and/or gravel.	Potential	Survey will be conducted	
Reptiles								
Blanding's turtle	<i>Emydoidea blandingii</i>	Not listed	Ohio - Threatened	Erie, Fulton, Henry and Lorain	Species is typically found in clean, aquatically diverse areas with muddy substrates. Common systems include ponds, marshes, swamps, bogs, wet prairies, and river backwaters.	Potential	Survey for suitable habitat will be conducted	
Eastern massasauga	<i>Sistrurus catenatus</i>	Candidate Species	Michigan-Candidate for Endangered	Columbiana and Sandusky	Wet prairies, sedge meadows, and early successional fields. Preferred wetland habitats are marshes and fens. Prefer the cover of broad-leaved plants, emergents, and sedges.	Potential	Survey for suitable habitat will be conducted	

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species									
Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements		
Plant Species	Spotted turtle	<i>Clemmys guttata</i>	Not listed	Ohio - Threatened Michigan - Threatened	Ohio - Erie, Fulton, Lorain and Summit; Michigan - Lenawee, Washtenaw and Wayne	Clean, shallow, slowmoving bodies of water with muddy or mucky bottoms and some aquatic and emergent vegetation. Spotted turtles utilize a variety of shallow wetlands including shallow ponds, wet meadows, tamarack swamps, bogs, fens, sedge meadows, wet prairies, shallow cattail marshes, sphagnum seepages, small woodland streams and roadside ditches.	Potential	Survey for suitable habitat will be conducted	
	Hairy angelica	<i>Angelica venenosa</i>	Not listed	Special Concern - Michigan	Lenawee, Monroe, Washtenaw and Wayne Counties, Michigan	Open, upland oak forests, savanna and prairie remnants and open, sandy woodlots	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
	Purple milkweed	<i>Asclepias purpurascens</i>	Not listed	Threatened - Michigan	Lenawee, Monroe and Washtenaw Counties, Michigan	Occurs in dry woodlands (especially oak), dry thickets, shores, and in prairies.	Known to occur near Project	Botanical survey proposed in any habitat found in ROW.	
	Canadian milk vetch	<i>Astragalus canadensis</i>	Not listed	Threatened - Michigan	Lenawee and Washtenaw Counties, Michigan	Dry prairie, moist shores, river banks, marshy ground, and partly shaded ground.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
	White or prairie false indigao	<i>Baptisia lactea</i>	Not listed	Special Concern - Michigan	Lenawee, Monroe and Washtenaw Counties, Michigan	Dry to mesic prairies and savannas, dry open roadsides, along railroads, and in fencerows	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
	Davis's sedge	<i>Carex davisii</i>	Not listed	Special Concern - Michigan	Lenawee, Monroe and Washtenaw	First and second bottoms of floodplain forests in southern Lower Michigan, especially in canopy gaps and artificial	Not likely to occur	Botanical survey proposed in	

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species							
Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements
Sedge	<i>Carex seorsa</i>	Not listed	Threatened - Michigan	Counties, Michigan Washtenaw County, Michigan	clearings including riparian thickets and fields Found on hummocks in hardwood or hardwood-conifer swamps, margins of bogs, and buttonbush depressions	Not likely to occur	any habitat found in ROW. Botanical survey proposed in any habitat found in ROW.
White gentian	<i>Gentiana flavida</i>	Not listed	Endangered - Michigan	Washtenaw County, Michigan	Dry or moist prairies and open oak savanna; nearly extirpated in Michigan.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.
Pale avens	<i>Geum virginianum</i>	Not listed	Special Concern - Michigan	Lenawee, Washtenaw and Wayne Counties, Michigan	Found in openings and banks in woods	Not likely to occur	Botanical survey proposed in any habitat found in ROW.
Green violet	<i>Hybanthus concolor</i>	Not listed	Special Concern - Michigan	Lenawee, Washtenaw and Wayne Counties, Michigan	Found in floodplain forests, usually in lower bottoms, as well as mesic forests and rich hardwoods	Not likely to occur	Botanical survey proposed in any habitat found in ROW.
Twinleaf	<i>Jeffersonia diphylla</i>	Not listed	Special Concern - Michigan	Lenawee, Washtenaw and Wayne Counties, Michigan	Found in mesic forests with rich, loamy soils and in floodplain forests	Not likely to occur	Botanical survey proposed in any habitat found in ROW.
Water willow	<i>Justicia americana</i>	Not listed	Threatened - Michigan	Monroe and Washtenaw Counties, Michigan	Local colonies along the Huron and Raisin Rivers and nearby lakes and streams.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.
Ginseng	<i>Panax quinquefolius</i>	Not listed	Threatened - Michigan	Monroe and Washtenaw Counties, Michigan	Rich, swampy hardwoods, especially on slopes or ravines.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.

TABLE 3.5-1

Federal and State Listed Species Potentially Occurring Within or Near the Project Area

Species								
Common Name	Scientific Name	USFWS	State	County	Habitat	Likelihood to Occur	Survey Requirements	
Hairy wild petunia	<i>Ruellia humilis</i>	Not listed	Threatened - Michigan	Washtenaw County, Michigan	Dry to moist prairies and oak openings.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
Compass plant	<i>Silphium laciniatum</i>	Not listed	Threatened - Michigan	Washtenaw County, Michigan	Mostly to south and west of Michigan; adventive along railroads and depauperate prairies.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
Cup plant	<i>Silphium perfoliatum</i>	Not listed	Threatened - Michigan	Washtenaw County, Michigan	Found in river floodplains in forest openings and edges.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
Eastern prairie fringed orchid	<i>Plantanthera leucophaea</i>	Threatened	Threatened - Ohio and Endangered - Michigan	Wayne and Sandusky Counties, Ohio, and Monroe and Washtenaw Counties, Michigan	Wet prairies, sedge meadows, and moist roadside ditches. Typically restricted to sandy or peaty lakeshores or bogs in Michigan.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
Lakeside daisy	<i>Hymenoxys herbacea</i>	Threatened	Endangered - Ohio	Erie County, Ohio	Found in full sun, calcareous sites, and dry prairies.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	
Northern monkshood	<i>Aconitum noveboracense</i>	Threatened	Endangered - Ohio	Summit County, Ohio	On sandstone in cool, shaded ravines in close proximity to running water, seeps, talus slopes, rock shelters, vertical cliff faces.	Not likely to occur	Botanical survey proposed in any habitat found in ROW.	

TABLE 3.6-1		
Bird of Conservation Concern in Regions Traversed by the NEXUS Pipeline Project		
Habitat	Common Name	Scientific Name
Region 13- Lower Great Lakes/St. Lawrence Plain		
Forest-Deciduous	Bald eagle	<i>Haliaeetus leucocephalus</i>
	Canada warbler	<i>Cardellina cara</i>
	Cerulean warbler	<i>Dendroica cerulea</i>
	Peregrine falcon	<i>Falco peregrinus</i>
	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Forest-Shrub	Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Shrubby Fields	Blue-winged warbler	<i>Vermivora pinus</i>
	Golden-winged warbler	<i>Vermivora chrysoptera</i>
Grasslands/Pastures	Henslow's sparrow	<i>Ammodramus henslowii</i>
	Upland sandpiper	<i>Bartramia longicauda</i>
Flooded Fields/Mudflats	Lesser yellowlegs	<i>Tringa flaripes</i>
	Red knot	<i>Calidris canatus</i>
	Whimbrel	<i>Numenius phaeopus</i>
Marshes/Wetlands	American bittern	<i>Botaurus lentiginosus</i>
	Black-crowned night heron	<i>Nycticorax nycticorax</i>
	Least bittern	<i>Ixobrychus exilis</i>
	Pied-billed grebe	<i>Podilymbus podiceps</i>
	Solitary sandpiper	<i>Tringa solitaria</i>
	Short eared owl	<i>Asio flammeus</i>
Open Water/Shores	Wood thrush	<i>Hylocichia mustelina</i>
	Black tern	<i>Chiononias niger</i>
	Buff-breasted sandpiper	<i>Tryngites subruficollis</i>
	Common tern	<i>Sterna hirundo</i>
	Horned grebe	<i>Podiceps auritus</i>
	Hudsonian grebe	<i>Limosa haemastica</i>
	Marbled godwit	<i>Limosa fedoa</i>
	Semipalmated sandpiper	<i>Calidris pusilla</i>
	Region 22-Eastern Tallgrass Prairie	
Forest-Deciduous	Acadian flycatcher	<i>Empidonax vireescens</i>
	Bald eagle	<i>Haliaeetus leucocephalus</i>
	Canada warbler	<i>Cardellina cara</i>
	Cerulean warbler	<i>Dendroica cerulea</i>
	Kentucky warbler	<i>Oporonis formosus</i>
	Northern flicker	<i>Colaptes auratus</i>
	Peregrine falcon	<i>Falco peregrinus</i>
	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
	Rusty blackbird	<i>Euphagus carolinus</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>	

TABLE 3.6-1

Bird of Conservation Concern in Regions Traversed by the NEXUS Pipeline Project

Habitat	Common Name	Scientific Name
Forest-Shrub	Wood thrush	<i>Hylocichia mustelina</i>
	Bewick's Wren	<i>bewickii</i> ssp.
	Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Shrubby Fields	Bell's vireo	<i>Vireo bellii</i>
	Blue-winged warbler	<i>Vermivora pinus</i>
	Golden-winged warbler	<i>Vermivora chrysoptera</i>
Grasslands/Pastures	Grasshopper sparrow	<i>Ammodramus savannarum</i>
	Field sparrow	<i>Spizella pusilla</i>
	Dickcissel	<i>Spiza americana</i>
	Henslow's sparrow	<i>Ammodramus henslowii</i>
	Smith's longspur	<i>Calcarius pictus</i>
Flooded Fields/Mudflats	Upland sandpiper	<i>Bartramia longicauda</i>
	Lesser yellowlegs	<i>Tringa flaripes</i>
	Red knot	<i>Calidris canutus</i>
Marshes/Wetlands	Whimbrel	<i>Numenius phaeopus</i>
	American bittern	<i>Botaurus lentiginosus</i>
	Black-crowned night heron	<i>Nycticorax nycticorax</i>
	Least bittern	<i>Ixobrychus exilis</i>
	Pied-billed grebe	<i>Podilymbus podiceps</i>
	Prothonotary warbler	<i>Protonotaria citrea</i>
	Short eared owl	<i>Asio flammeus</i>
Open Water/Shores	Solitary sandpiper	<i>Tringa solitaria</i>
	Wood thrush	<i>Hylocichia mustelina</i>
	Black tern	<i>Chilodnias niger</i>
	Buff-breasted sandpiper	<i>Tryngites subruficollis</i>
	Common tern	<i>Sterna hirundo</i>
	Horned grebe	<i>Podiceps auritus</i>
	Hudsonian grebe	<i>Limosa haemastica</i>
	Marbled godwit	<i>Limosa fedoa</i>
	Semipalmated sandpiper	<i>Calidris pusilla</i>
	Short-billed dowitcher	<i>Lumnodromus griseus</i>
Region 23-Prairie Hardwood Transition		
Forest-Deciduous	Bald eagle	<i>Haliaeetus leucocephalus</i>
	Cerulean warbler	<i>Dendroica cerulea</i>
	Peregrine falcon	<i>Falco peregrinus</i>
	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
	Rusty blackbird	<i>Euphagus carolinus</i>
Forest-Shrub	Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
	Willow flycatcher	<i>Empidonax traillii</i>

TABLE 3.6-1

Bird of Conservation Concern in Regions Traversed by the NEXUS Pipeline Project

Habitat	Common Name	Scientific Name
Shrubby Fields	Blue-winged warbler	<i>Vermivora pinus</i>
	Brown thrasher	<i>Toxostoma rufum</i>
	Golden-winged warbler	<i>Vermivora chrysoptera</i>
Grasslands/Pastures	Bobolink	<i>Dolichonyx oryzivorus</i>
	Dickcissel	<i>Spiza americana</i>
	Henslow's sparrow	<i>Ammodramus henslowii</i>
	Upland sandpiper	<i>Bartramia longicauda</i>
Flooded Fields/Mudflats	Red knot	<i>Calidris canutus</i>
	Whimbrel	<i>Numenius phaeopus</i>
Marshes/Wetlands	American bittern	<i>Botaurus lentiginosus</i>
	Marsh wren	<i>Cistothorus palustris</i>
	Pied-billed grebe	<i>Podilymbus podiceps</i>
Open Water/Shores	Solitary sandpiper	<i>Tringa solitaria</i>
	Short eared owl	<i>Asio flammeus</i>
	Yellow rail	<i>Coturnicops noveboracensis</i>
	Black tern	<i>Chlidonias niger</i>
	Buff-breasted sandpiper	<i>Tryngites subruficollis</i>
	Common tern	<i>Sterna hirundo</i>
	Horned grebe	<i>Podiceps auritus</i>
	Hudsonian grebe	<i>Limosa haemastica</i>
	Marbled godwit	<i>Limosa fedoa</i>
	Short-billed dowitcher	<i>Lumnodromus griseus</i>
Region 28-Appalachian Mountains		
Forest-Deciduous	Bald eagle	<i>Haliaeetus leucocephalus</i>
	Black-capped chickadee	<i>Poecile atricapillus</i>
	Canada warbler	<i>Cardellina cara</i>
	Cerulean warbler	<i>Dendroica cerulea</i>
	Kentucky warbler	<i>Oporonis formosus</i>
	Louisiana waterthrush	<i>Parkesia motacilla</i>
	Northern saw-whet owl	<i>Aegolius acadicus</i>
	Olive-sided flycatcher	<i>Contopus cooperi</i>
	Peregrine falcon	<i>Falco peregrinus</i>
	Red crossbill	<i>Loxia curvirostra</i>
	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
	Rusty blackbird	<i>Euphagus carolinus</i>
	Whip-poor-will	<i>Caprimulgus vociferus</i>
	Wood thrush	<i>Hylocichia mustelina</i>
Worm-eating warbler	<i>Helmitheros vermivorum</i>	
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	

TABLE 3.6-1		
Bird of Conservation Concern in Regions Traversed by the NEXUS Pipeline Project		
Habitat	Common Name	Scientific Name
Forest-Shrub	Bewick's Wren	<i>bewickii</i> ssp.
Shrubby Fields	Blue-winged warbler	<i>Vermivora pinus</i>
	Golden-winged warbler	<i>Vermivora chrysoptera</i>
	Prairie warbler	<i>Setophaga discolor</i>
Grasslands/Pastures	Henslow's sparrow	<i>Ammodramus henslowii</i>
	Upland sandpiper	<i>Bartramia longicauda</i>
Flooded Swamplands	Swainson's warbler	<i>Limnothlypis swainsonii</i>
Marshes/Wetlands	Sedge wren	<i>Cistothorus platensis</i>
	Wood thrush	<i>Hylocichia mustelina</i>

APPENDIX 3A

**Indiana Bat, Northern Long-Eared Bat and Evening Bat Survey Study Plan
for the NEXUS Gas Transmission Project**

**PRIVILEGED AND CONFIDENTIAL
BOUND SEPARATELY IN VOLUME III**

APPENDIX 3B

**Mitchell's Satyr, Poweshiek Skipperling, Karner Blue Butterfly Survey
Protocol for the NEXUS Gas Transmission Project**

**PRIVILEGED AND CONFIDENTIAL
BOUND SEPARATELY IN VOLUME III**

**Ohio and Michigan Mussel Habitat Assessments and
Survey Protocols
For the
NEXUS Gas Transmission Project**

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February 2015

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ATTACHMENTS

Attachment A: Project Stream Crossings and Classifications

1.0 PROJECT CONTEXT AND DESCRIPTION

1.1 Project Context

NEXUS Gas Transmission, LLC (“NEXUS”) is proposing to develop, own and operate the NEXUS Gas Transmission Project (“Project”), an approximately 250 mile high-pressure natural gas pipeline beginning at Kensington in Columbiana County, Ohio and extending west through Ohio, and terminating at Willow Run in Washtenaw County, Michigan. The proposed pipeline route is not finalized, but it is expected to parallel existing powerlines and/or pipeline rights-of-way (“ROWS”) as much as practicable (approximately 60%). The Project will also include construction of up to four (4) new natural gas-fired compressor stations and associated aboveground support facilities, as shown in Figure 1. NEXUS is committed to siting and designing the facilities to minimize environmental and community impacts to the largest extent practicable.

The purpose of this document is to describe the regulatory status of freshwater mussels in Ohio and Michigan and the survey protocols used to identify potential habitat and survey for native freshwater mussels.

1.2 Project Area Description

Figure 1 depicts the location of the NEXUS Project. The Project area is best characterized by its rolling to flat plains, cool climate, high annual precipitation, and high snowfall. The average maximum temperature in Cleveland and Detroit during the month of July is approximately 83°F. The average minimum temperature during the month of January is approximately 22°F in Cleveland and 19°F in Detroit. The average annual precipitation is 39.1 inches in Ohio and 32.8 inches in Michigan. Average snowfall is 30.4 inches in Ohio and 44.7 inches in Michigan. The proposed pipeline ranges in elevation from 574 feet in Erie county Ohio to 1324 feet in Columbiana county Ohio (Current Results 2015).

The Project area (see Figure 1) is located in four (4) EPA Level III Ecoregions across Ohio and Michigan. However, the pipeline is located primarily in two (2), the Erie/Ontario Drift and Lake Plain Ecoregion and the Huron/Erie Lake Plains Ecoregion. Short sections of

the proposed pipeline route cross the Eastern Corn Belt Plains Ecoregion and the Western Allegheny Plateau Ecoregion.

The rolling to level terrain of the Erie/Ontario Drift and Lake Plain is characterized by low lime drift and lacustrine deposits. Lakes, wetlands, and swampy streams occur where stream networks converge or where the land is flat and comprised of clay. Soils are lower in carbonate and are naturally less fertile than other glaciated ecoregions. Land use is comprised of primarily agricultural activities intermixed with smaller areas of urban development and, industrial activity, and agricultural activities. Scattered woodlots also occur. Lake Erie influences the regions climate increasing the growing season, winter cloudiness and snowfall (EPA, 2014).

The Huron/Erie Lake Plains is a broad, fertile, flat plain marked by relict sand dunes, beach ridges, and low end moraines. Due to the typically poor drainage characterized by the area, elm-ash swamps and beech forests were originally dominant. Oak savannas are found on sandy, well-drained dunes and beach ridges. Presently, the area has mainly been cleared and drained and contains highly productive farms. Urban and industrial areas are also extensive in this ecoregion. Stream habitat and quality has been degraded by channelization, ditching, and agricultural activities (EPA, 2014).

The Eastern Corn Belt Plains is a rolling till plain with local end moraines. It is characterized by loamier and better drained soils than the Huron/Lake Erie Plains Ecoregion. Glacial deposits of Wisconsinan age are widespread. The vegetation was originally composed of beech, sugar maple, and basswood forests. The area is presently predominantly characterized by extensive agricultural activities. This has led to degradation of stream chemistry and turbidity (EPA, 2014).

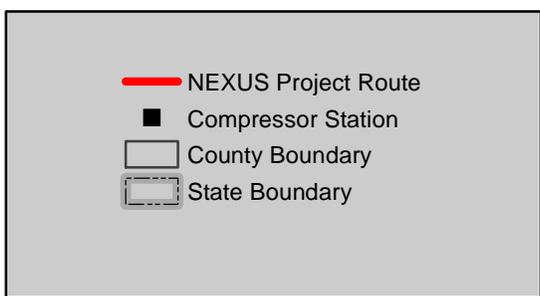


Figure 1
NEXUS Project Location Map


2/26/2015

More rugged than agricultural till plains ecoregions, the Western Allegheny Plateau was not as highly impacted by glaciation. This area was originally characterized by mixed mesophytic forests and mixed oak forests. Presently, the majority of its rounded hills remain in forest and agricultural activities and residential developments are concentrated in the valleys. This region is composed of horizontally-bedded, sedimentary rock and has been mined for bituminous coal (EPA, 2014).

Across the rolling to flat plains found in the four (4) ecoregions that are predominated by agricultural and industrial activities, based on review of available data, the proposed pipeline currently crosses a total of 457 streams, including several streams that are crossed multiple times. There is the potential for freshwater mussels and mussel habitat to be present at some of these stream crossings. Given that several native freshwater mussel species are protected at both the state and federal level in Michigan and Ohio, it was necessary to develop this work plan to identify the presence/absence of mussels in streams crossed by the Project. The following sections describe the regulatory status of native freshwater mussels in Ohio and Michigan and the survey protocols to be employed to survey for native freshwater mussels at stream crossings along the proposed pipeline.

2.0 PROTOCOL INTRODUCTION

2.1 Legal Status of Native Freshwater Mussels in Ohio

In Ohio, all native mussels are protected under section 1533.324 of the Ohio Revised Code. Additionally, ten (10) Federally Listed Species (“FLS”) occur in the State of Ohio and are protected by the Endangered Species Act (“ESA”), 87 Stat. 884, as amended; 16 U.S.C. § 1531 et seq.

Because native freshwater mussels in Ohio are regulated by both federal and state law and the Project has the potential to affect streams in Ohio, consultation with both the United States Fish and Wildlife Service (“USFWS”) and Ohio Department of Natural Resources (“ODNR”), was undertaken. The *Ohio Mussel Survey Protocol* was developed by the ODNR and USFWS as guidance to project proponents on how to approach identifying and conserving native freshwater mussels in Ohio. The *Ohio Mussel Survey Protocol* outlines the process for identifying mussels to be potentially impacted by a project, and steps to relocate native freshwater mussels if avoidance is not practicable.

2.2 Legal Status of Native Freshwater Mussels in Michigan

In Michigan, there are nine (9) mussel species within the vicinity of the Project area protected under the Natural Resources and Environmental Protection Act (“NREPA”), Act 451 Article III Ch. 1 Endangered Species section 324.36505 which is administered by the Michigan Department of Natural Resources (“MDNR”). There are also three (3) mussel species within the vicinity of the Project federally protected under the Endangered Species Act (“ESA”), 87 Stat. 884, as amended; 16 U.S.C. § 1531 et seq. One of the FLS is also a state protected species, therefore there are twelve (12) unique protected species within the Project vicinity.

Because native freshwater mussels in Michigan are regulated by both federal and state law, consultation with both the USFWS and MDNR was conducted. The USFWS stated that Michigan is currently developing a standard mussel survey protocol and advised NEXUS to follow the *Ohio Mussel Survey Protocol* that was developed by the ODNR and USFWS.

2.3 Observations within the Project Area

A Geographical Information Service (“GIS”) analysis of the pipeline’s proposed centerline was conducted to identify stream crossings. Attachment A contains maps of the streams crossed and a table summarizes the characteristics of these streams. The stream crossings listed in Attachment A include field delineated resources and approximate stream (“AS”) boundaries. AS boundaries were delineated by photographic interpretation of aerial and topographic maps. This information will determine where surveys for native freshwater mussels need to be conducted. As field surveys continue, the list of stream crossing may be adjusted to include a more accurate description of Project streams. Currently, the Project has a total of 457 stream crossings, including several streams crossed multiple times. Table 1 below identifies the number of streams in each stream classification category according to the *Ohio Mussel Survey Protocol* and the number of streams that have watersheds 10 mi² or larger above the area of direct impact (ADI).

Table 1: NEXUS Stream Crossings Summary Table

Category	Total number of stream crossings	Stream crossings with watershed above ADI ≥ 10 mi ²
Unlisted	435	25
Group 1	19	11
Group 2	1	1
Group 3	2	2
Group 4	0	0

2.4 NEXUS Mussel Survey Protocol

The survey protocol proposed for the NEXUS Project is based on the methods described in the *Ohio Mussel Survey Protocol* that was developed by the ODNR and USFWS.

2.4.1 Stream Classification

The streams crossed by the Project are divided into the four categories listed below. These categories determine the level of survey effort and protocols necessary for the listed streams in Appendix A of the *Ohio Mussel Survey Protocol*. Any stream not listed in Appendix A is considered an unlisted stream. Appendix A is updated regularly and posted on the ODNR's website <http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits> and streams traversed by the Project currently categorized as unlisted will be compared to the most current version of Appendix A of the *Ohio Mussel Survey Protocol* prior to surveys in the summer of 2015 (ODNR and USFWS 2014). As Michigan does not currently have its own Mussel Survey Protocol or associated stream classifications, the *Ohio Mussel Survey Protocol* will be followed for all Project streams. Consequently, all streams in Michigan will be classified as unlisted.

- Unlisted: Streams not included in Appendix A of the *Ohio Mussel Survey Protocol*
- Group 1: Small to mid-sized streams, FLS not expected.
- Group 2: Small to mid-sized streams, FLS expected.
- Group 3: Large Rivers, FLS not expected.
- Group 4: Large Rivers, FLS expected.

2.4.2 Survey Season

The survey season is from May 1 to October 1. Surveys will be conducted within the seasonal window preferably from July-September when flows are at seasonal lows and the substrate is more visible.

2.4.3 Workable Flow Requirements

If the effectiveness of the survey is compromised by existing flow conditions or if the survey cannot be conducted due to existing flow conditions it must be rescheduled. The appropriate State and Federal agencies must approve any variance (ODNR and USFWS 2014).

2.4.4 Visibility Requirements

At survey depth, there must be a minimum visibility of a half meter, with or without lights for visual or surface searches. The actual visibility must be recorded with the data from the survey. If visibility is not suitable at the time of the survey, the survey must be rescheduled or a different protocol must be employed after consulting with the appropriate state and federal agencies. Visibility requirements may be lifted if low visibility is typical of normal flow conditions (ODNR and USFWS 2014).

2.4.5 Survey Area

The survey area will include the area of direct impact (“ADI”), upstream buffer (“US”), downstream buffer (“DS”) and lateral buffers (“LT”). Appendix G of the *Ohio Mussel Survey Protocol* outlines survey area buffer distances, salvage area buffer distances, and maximum transect spacing. A summary of the appendix as it pertains to the NEXUS Project is outlined in Table 2 below (ODNR and USFWS 2014). Buffer distances and transect spacing for unlisted streams are not included in Appendix G however the buffer distances for Group 1 will be applied to the unlisted streams.

Table 2: Summary of Survey Area Requirements (ODNR and USFWS 2014).

Waterline/Pipeline Corridor Project	Survey Area Buffers (in addition to ADI). (meters)			Salvage Area Buffers (in addition to ADI). (meters)		Maximum Transect Spacing (meters)
	US	DS	LT	US & LT	DS	
Stream Category						
Group 4	50	150	BB	5	10	10
Group 3	10	25	BB	5	10	TS
Group 2	50	150	BB	5	10	10
Group 1	10	25	BB	5	5	TS
Reconnaissance Survey for Unionid Mussels	200	400				

BB – Bank to bank

TS – Qualitative Timed Search Survey Permitted

2.5 Purpose and Objectives

The purpose of the 2015 mussel survey is to evaluate stream crossings along the proposed pipeline route for presence or absence of native freshwater mussels. Table 3 identifies the streams requiring mussel survey.

Study Objectives for 2015 include:

- Survey all Group (1) streams and any unlisted streams where the watershed area above the ADI is 10 mi² or larger using the *Reconnaissance Survey for Unionid Mussels* to determine if mussels are present (ODNR and USFWS 2014).
- Survey all Group 2, 3, and 4 streams with a watershed area of 10 mi² or larger above the area of direct impact (ADI) (ODNR and USFWS 2014).
- Avoid any mussels that are identified where practicable and if necessary, work with the appropriate agency to relocate them (ODNR and USFWS 2014).

Table 3: Stream Crossings to be Surveyed by Ohio Mussel Survey Protocol

Resource ID	Stream Group	Drainage Area	Map Page Number
A14-97-S1	Unlisted	14.5	31
AS-SU-37	Group 1	160	51
AS-ME-73	Group 1	12.5	81
A14-50-S1	Group 1	169	91
AS-LO-19	Group 1	29.6	97
AS-LO-20	Group 1	82.1	98
A14-148-S1	Unlisted	29	108
A14-197-S1	Group 1	204	110
AS-ER-11	Unlisted	18.4	116 and 117
A14-187-S1	Unlisted	10.9	120
A14-186-S1 & AS-ER-19	Unlisted	385	124
E14-94-S1	Unlisted	24.2	137
D14-6-S1	Unlisted	29	145
D14-11-S1	Group 1	78.4	151
D14-40-S1	Unlisted	10.5	153
E14-31-S1 & AS-SA-5	Group 1	1310	156
E14-27-S1	Unlisted	11.6	159
E14-43-S1	Group 1	63.6	164

Resource ID	Stream Group	Drainage Area	Map Page Number
D14-25-S1	Group 1	54.5	169
E14-32-S1	Unlisted	416	174
E14-175-S1	Unlisted	36	179
AS-WO-8	Unlisted	11.2	190
E14-81-S1 & AS-WO-2	Unlisted	13.1	193
AS-LC-1	Group 3	6290	195
AS-LC-1A	Group 3	6251.01	195
AS-LC-9	Unlisted	15.8	202
E14-83-S1	Unlisted	12.8	203
E14-10-S1	Group 2	14.8	208
E14-4-S1	Unlisted	14.9	213
D14-45-S1 & AS-FU-23	Unlisted	22.6	221
AS-LE-3 & E14-140-S1	Unlisted	628.5	229
E14-76-S1	Unlisted	11.56	237
E14-127-S1	Unlisted	10.97	242
E14-87-S1	Unlisted	24.58	245
AS-MO-4	Unlisted	17.54	252
E14-157-S1	Unlisted	110.45	254
E14-164-S1 & AS-WA-6	Unlisted	21.52	263
AS-WA-11	Unlisted	826.67	268
AS-WA-36*	Unlisted	21.19	277

*Option B

3.0 METHODS

3.1 Survey Protocol

3.1.1 *Reconnaissance Survey for Unionid Mussels*

Appendix B of the *Ohio Mussel Survey Protocol* the *Reconnaissance Survey for Unionid Mussels* is to be used on Group 1 streams or on unlisted streams that have a watershed area above the ADI that is 10 mi² or larger. This survey is meant to be utilized in small wade-able streams not known to contain FLS. Streams that are very deep, turbid, or streams that have problems that prevent searching the stream bottom should not use this survey protocol (ODNR and USFWS 2014).

The buffer zone, and ADI should be visually searched for evidence of shells, shell fragments, or live mussels. Searches should begin at the downstream edge of the buffer zone. All habitats within the ADI and buffer zone must be searched, with special attention paid to areas where it may be difficult to see living mussels. The use of mussel viewing tubes or glass-bottom buckets is acceptable. Smaller streams (10-100 mi²) should be searched for at least 30 minutes and larger streams (>100 mi²) should be searched for at least 60 minutes. Upon finding live mussels or fresh dead shells the survey does not have to continue. However, if only weathered shells are found the entire survey time should be utilized to determine if mussels are still present. Photos will be taken that represent the survey area, stream substrates, stream habitats and any shell material or living mussels that are identified. The presence of any fresh shell material and any live mussels will prompt a mussel survey by a qualified surveyor. Any unlisted streams that trigger a mussel survey will be treated as a Group 1 stream and will follow the Group 1 stream survey protocols (ODNR and USFWS 2014).

At the direction of the *Ohio Mussel Survey Protocol* when completing the *Ohio Mussel Habitat Assessment Form* the following information must be included in the additional information box (ODNR and USFWS 2014).

1. Total length of survey area.
2. A brief description of the search methods used at the site.

3. A habitat description including substrate types, average water depths, stream development, and any obvious pollution or stream stability issues.
4. Approximate numbers and location(s) of shells and live mussels (include species list if experienced in mussel identification).

3.1.2 Survey Techniques

Only streams with watershed areas $\geq 10\text{mi}^2$ above the ADI will require mussel surveys. Those streams will be surveyed using the following survey techniques, the survey method used is dependent upon the stream category and some streams may be surveyed using a combination of techniques (ODNR and USFWS 2014).

Visual or Surface Searches: This survey technique includes moving larger substrate such as cobble, gravel and woody debris. Silt, sand and other small debris should be swept away by hand. The upper 5cm should be probed or disturbed in order to locate any mussels that may be there. At a minimum 1 minute per meter squared of searching should be expended in each segment of heterogeneous substrate (ODNR and USFWS 2014).

Timed Search Surveys: This survey technique consists of visually searching throughout a defined area such as the US and DS buffers, ADI, or mussel concentration for a given period of time. This type of search can be used to define the limits of a mussel concentration or to generate a species richness curve (ODNR and USFWS 2014).

Transect Surveys: This survey technique consists of placing transects perpendicular to the river or stream. In Group 3 streams transects will be divided into 10-m segments and in Group 2 streams transects will be divided into 5-m segments. An area 1-m wide along the transect will be visually searched for mussels (ODNR and USFWS 2014).

Quantitative Samples: Required as part of a phase 2 survey on a Group 2 stream, the samples will consist of 0.25m^2 systematic quadrats and will use the three random start methodology described by Smith (2001). Excavation of substrate will be to a depth of 15cm or hardpan. All material will be collected and taken to the surface to be sorted, separating all living and dead shell material (ODNR and USFWS 2014).

3.1.3 Group 1 Streams

Timed visual search surveys will be used for all Group 1 streams and unlisted streams that require a mussel survey. Data for the ADI, US buffer, and DS buffer will be reported separately. Relocation in these streams can occur at the time of the survey provided no FLS are identified. If FLS are identified the mussels will not be relocated or relocation activities will halt and USFWS will be contacted for guidance (ODNR and USFWS 2014).

3.1.4 Group 2 Streams

Phase 1: Three timed search surveys will be conducted, one per area (ADI, US buffer, DS buffer). In addition three transects will be surveyed within the ADI, one of which will be placed centerline on the proposed route. Transects will be spaced a maximum of 10-meters apart, and data will be recorded in 5-m segments. A phase 2 survey will be triggered if mussel density is $0.5/m^2$ within any 5-m segment along each transect or at least two species alive or recently dead are observed that are not in Appendix H of the *Ohio Mussel Survey Protocol*. A phase 2 survey will only be triggered if avoidance of impacts is not feasible (ODNR and USFWS 2014).

A species richness curve must be developed for all Group 2 streams. The searches used for curve development should be contained to the area of mussel concentrations. Searches should be conducted for 5 to 10 minutes and repeated until at least six consecutive samples are collected with the addition of no new species (ODNR and USFWS 2014).

Phase 2: The phase 2 survey consists of quantitative surveys using excavations. This technique is described by Smith (2001). The three random start methodology will be used throughout the area that triggered the phase 2 survey. Quantitative samples will be collected at the rate of 2 quads per 10-m of transect (ODNR and USFWS 2014).

3.1.5 Group 3 Streams

Three timed search surveys will be conducted, one per area (ADI, US buffer, DS buffer). Data for the ADI, US buffer, and DS buffer will be reported separately. In addition three transects will be surveyed within the ADI, one of which will be placed centerline on the proposed route. Transects will be spaced a maximum of 100-m apart, and data will be

recorded in 10-m segments. Relocation in these streams can occur at the time of the survey provided no FLS are identified. If FLS are identified the mussels will not be relocated or relocation activities will halt and USFWS will be contacted for guidance (ODNR and USFWS 2014).

3.1.6 Mussel Processing

Any mussels observed in each segment will be brought to the surface for positive identification, unless it has been previously agreed upon by the appropriate USFWS and State agency representatives to allow identification to occur at survey depth. Mussels should be kept in water at all times, except to be measured and photographed this period of time is not to exceed 1 minute. Information including depth and habitat conditions both suitable and unsuitable, will be recorded along each transect (ODNR and USFWS 2014).

3.1.7 Mussel Relocation

NEXUS is committed to evaluating alternatives to avoid potential impacts to native freshwater mussels. If an avoidance alternative is not identified, any mussels observed in the ADI and salvage area buffer zones must be relocated. The salvage area buffers are defined in Table 2. If mussels are assumed to be present at a Group 1 or 3 stream a relocation plan can be developed without a survey in coordination with the appropriate state agency. For Group 2 streams, formal consultation with the USFWS and a Biological Assessment (“BA”) are required. The BA outlines the potential impacts and begins the process for incidental take authorization from the USFWS. The process can take up to 135 days from submittal of a completed BA and authorization from the USFWS is needed prior to conducting any activities that could adversely affect any mussels. Impacts to federally listed species will be avoided and minimized as much as is reasonably practicable (ODNR and USFWS 2014).

When relocating mussels, multiple passes will need to be made through an area until less than 5 percent of the number collected on the original pass are collected on the final pass. The relocation effort will be systematic using either transects or cells not to exceed 10m x 10m. In either case, the entire area needs to be searched for mussels. The effort used in these searches will meet the same level of effort used in the visual or surface searches. This

includes moving cobble and debris, hand sweeping and probing. If during the relocation process FLS are identified in areas where they had not been previously identified and no authorization from the USFWS has been granted, then relocation efforts will stop and consultation with USFWS will be initiated (ODNR and USFWS 2014).

Relocation sites will be upstream in area of equal or better habitat, or in a discrete area recommended by the USFWS or state agency. A qualitative survey of the relocation site will be conducted utilizing the *Ohio Mussel Habitat Assessment Form* and any observations of resident mussels/mussel concentrations at the relocation site will be recorded. The coordinates of any relocated mussels and any mussel concentrations at the relocation site will be provided to the USFWS for FLS and to the appropriate state agency for state listed species (ODNR and USFWS 2014).

Relocations must be conducted within the mussel survey season. If in-stream activities are to occur before June 15th the relocation can be conducted during the previous survey season. This may require some additional effort just prior to in-stream construction activities (ODNR and USFWS 2014).

3.1.8 Surveyor Qualifications

Group 2 Streams: Personnel performing surveys of Group 2 streams will have the appropriate federal permit from USFWS.

Group 1 and 3 Streams: Personnel performing surveys of Group 1 and 3 streams will meet the following criteria from Appendix D of the *Ohio Mussel Survey Protocol* (ODNR and USFWS 2014).

Survey Experience: At least 2 years field experience in conducting mussel surveys.

Proficient in Identification: A passing grade on the *Standardized Freshwater Mussel Identification Test*. The test is administered by Ohio State University.

Education: A B.S. in biology, natural resources or related field. A minimum of 3 credit hours from or related to the following courses: Aquatic ecology, Fisheries, Hydrology, Aquatic Entomology, Limnology, Ichthyology, and Plant Taxonomy.

Qualifying Experience: In place of the educational requirement listed above, surveyors must have at least 4 years of experience conducting surveys and documenting aquatic fauna and flora.

Reconnaissance of Group 1 and unlisted streams: Personnel performing surveys of Group 1 or unlisted streams must satisfy the educational or qualifying experience listed above (ODNR and USFWS 2014).

3.1.9 Data Collection

A data sheet including at a minimum all of the data outlined in Appendix F of the *Ohio Mussel Survey Protocol* will be created prior to conducting surveys. This data will be reported electronically in accordance with the issued State and Federal permits and site specific conditions. Data will be considered valid for five years from the survey date. Vouchered specimens will be sent to the Museum of Biological Diversity at The Ohio State University, 1315 Kinnear Road, Columbus, OH 43212 (ODNR and USFWS 2014) or as otherwise directed by the applicable agencies.

4.0 REFERENCES

Current Results. 2015. Average Weather in the United States.

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Attachment A
Project Stream Crossings and Classifications

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
0.00	AS-CO-1	TGP Lateral	Columbiana	OH	5030101001168	Brush Creek	Unlisted	No	1.01
0.00	AS-CO-1	TGP Lateral	Columbiana	OH	5030101001168	Brush Creek	Unlisted	No	1.01
0.00	AS-CO-2	TGP Lateral	Carroll	OH	-	-	Unlisted	No	<10.00
0.06	AS-CO-4	TE Lateral	Columbiana	OH	5030101001168	Tributary to Brush Creek	Unlisted	No	0.17
0.91	AS-CO-6	Mainline, Spread 1	Columbiana	OH	5040001001368	Tributary to Sandy Creek	Unlisted	No	0.38
1.00	A14-2-S1	Mainline, Spread 1	Columbiana	OH	5040001005412	Tributary to Sandy Creek	Unlisted	No	0.08
1.76	A14-5-S1	Mainline, Spread 1	Columbiana	OH	5040001001363	Sandy Creek	Group 1	No	7.34
3.26	A14-6-S1	Mainline, Spread 1	Columbiana	OH	5040001005278	Tributary to Sandy Creek	Unlisted	No	0.10
3.71	A14-8-S1	Mainline, Spread 1	Columbiana	OH	5040001000788	Tributary to Sandy Creek	Unlisted	No	0.10
4.72	A14-10-S1	Mainline, Spread 1	Columbiana	OH	5040001001381	Conser Run	Unlisted	No	7.60
5.06	A14-11-S1	Mainline, Spread 1	Columbiana	OH	5040001005147	Tributary to Conser Run	Unlisted	No	0.09
5.4	A14-126-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
5.47	A14-127-S1	Mainline, Spread 1	Columbiana	OH	5040001005112	Tributary to Conser Run	Unlisted	No	0.10
6.19	A14-12-S1	Mainline, Spread 1	Columbiana	OH	5040001001392	Tributary to Conser Run	Unlisted	No	0.41
6.7	A14-125-S2	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
7.4	A14-190-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
7.5	A14-191-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
7.63	AS-CO-7	Mainline, Spread 1	Columbiana	OH	5030103000164	Tributary to Mahoning River	Unlisted	No	0.73
7.78	AS-CO-9	Mainline, Spread 1	Columbiana	OH	5030103003251	Tributary to Mahoning River	Unlisted	No	0.19
8.8	A14-33-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
9.1	A14-193-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
9.2	A14-194-S2	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
9.51	A14-196-S1	Mainline, Spread 1	Columbiana	OH	5040001001403	Tributary to Middle Branch Sandy Creek	Unlisted	No	0.46
9.8	A14-13-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
10.3	A14-15-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
10.64	AS-CO-11	Mainline, Spread 1	Columbiana	OH	5040001001400	Middle Branch Sandy Creek	Unlisted	No	5.23
11.16	AS-CO-12	Mainline, Spread 1	Columbiana	OH	5040001004775	Tributary to Middle Branch Sandy Creek	Unlisted	No	0.19
11.2	AS-CO-12A	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
11.4	AS-CO-12A	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
11.84	A14-165-S2	Mainline, Spread 1	Columbiana	OH	5040001001404	Tributary to Middle Branch Sandy Creek	Unlisted	No	0.64
11.9	A14-165-S1	Mainline, Spread 1	Columbiana	OH	-	-	Unlisted	No	<10.00
12.6	A14-108-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
12.6	A14-108-S3	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
12.82	A14-19-S1	Mainline, Spread 1	Stark	OH	5040001004712	Tributary to Middle Branch Sandy Creek	Unlisted	No	0.19
13.1	AS-ST-2	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
16.55	AS-ST-7	Mainline, Spread 1	Stark	OH	5030103000198	Beech Creek	Unlisted	No	3.36
16.7	AS-ST-7A	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
17.2	A14-105-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
17.58	A14-103-S1	Mainline, Spread 1	Stark	OH	5030103003751	Tributary to Beech Creek	Unlisted	No	0.03
18.24	AS-ST-8	Mainline, Spread 1	Stark	OH	5030103003349	Tributary to Beech Creek	Unlisted	No	0.15
18.81	A14-23-S1	Mainline, Spread 1	Stark	OH	5030103000776	Tributary to Beech Creek	Unlisted	No	0.73
19.5	A14-172-S3	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
19.6	A14-173-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
20.00	A14-176-S1	Mainline, Spread 1	Stark	OH	5030103000775	Tributary to Red Pine Lake	Unlisted	No	0.97
21.23	A14-25-S1	Mainline, Spread 1	Stark	OH	5040001000231	Middle Branch Nimishillen Creek	Group 1	No	0.45
21.95	A14-175-S1	Mainline, Spread 1	Stark	OH	5040001001514	Tributary to Middle Branch Nimishillen Creek	Unlisted	No	0.31
22.2	A14-174-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
23.3	A14-27-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
23.79	A14-161-S1	Mainline, Spread 1	Stark	OH	5040001001513	Tributary to Middle Branch Nimishillen Creek	Unlisted	No	1.22
23.8	A14-161-S2	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
24.9	A14-31-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
25.97	A14-99-S1	Mainline, Spread 1	Stark	OH	5040001003019	Middle Branch Nimishillen Creek	Group 1	No	9.71
26	A14-99-S2	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
26.44	A14-97-S1	Mainline, Spread 1	Stark	OH	5040001000726	Swartz Ditch	Unlisted	Yes	14.50
26.93	A14-34-S1	Mainline, Spread 1	Stark	OH	5040001004186	Tributary to Swartz Ditch	Unlisted	No	0.07

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
27.14	AS-ST-13	Mainline, Spread 1	Stark	OH	5040001004187	Tributary to Swartz Ditch	Unlisted	No	0.40
28.1	A14-168-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
28.5	AS-ST-14	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
28.52	AS-ST-15	Mainline, Spread 1	Stark	OH	5040001004159	Tributary to West Branch Nimishillen Creek	Unlisted	No	0.10
28.83	AS-ST-17	Mainline, Spread 1	Stark	OH	5040001001519	Tributary to West Branch Nimishillen Creek	Unlisted	No	0.41
29.3	A14-157-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
29.8	A14-159-S1	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
29.96	A14-158-S1	Mainline, Spread 1	Stark	OH	5040001001520	Tributary to West Branch Nimishillen Creek	Unlisted	No	1.41
30.5	AS-ST-21	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
30.64	A14-163-S1	Mainline, Spread 1	Stark	OH	5040001004071	Tributary to West Branch Nimishillen Creek	Unlisted	No	0.12
30.97	A14-164-S1	Mainline, Spread 1	Stark	OH	5040001000678	West Branch Nimishillen Creek	Unlisted	No	1.63
31	A14-164-S2	Mainline, Spread 1	Stark	OH	-	-	Unlisted	No	<10.00
31.21	A14-164-S1	Mainline, Spread 1	Stark	OH	5040001004029	Tributary to West Branch Nimishillen Creek	Unlisted	No	0.69
33.4	AS-SU-1A	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
34.30	AS-SU-5	Mainline, Spread 1	Summit	OH	5040001001625	Metzgers Ditch	Unlisted	No	0.31
35.28	AS-SU-43	Mainline, Spread 1	Summit	OH	5040001001592	Tributary to Willowdale Lake	Unlisted	No	0.34
35.7	AS-SU-8	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
35.98	AS-SU-9	Mainline, Spread 1	Summit	OH	5040001001591	Tributary to Nimisila Reservoir	Unlisted	No	0.44
36.03	AS-SU-9	Mainline, Spread 1	Summit	OH	5040001001591	Tributary to Nimisila Reservoir	Unlisted	No	0.45
36.05	AS-SU-9	Mainline, Spread 1	Summit	OH	5040001001591	Tributary to Nimisila Reservoir	Unlisted	No	0.45
36.3	AS-SU-10	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
36.65	A14-166-S1	Mainline, Spread 1	Summit	OH	5040001001590	Tributary to Nimisila Reservoir	Unlisted	No	0.14
36.99	A14-112-S1	Mainline, Spread 1	Summit	OH	5040001001590	Tributary to Nimisila Reservoir	Unlisted	No	0.25
37.41	A14-112-S1-a	Mainline, Spread 1	Summit	OH	5040001001590	Tributary to Nimisila Reservoir	Unlisted	No	0.82
37.59	A14-112-S1-b	Mainline, Spread 1	Summit	OH	5040001001590	Tributary to Nimisila Reservoir	Unlisted	No	0.95
37.6	A14-112-S2	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
37.90	AS-SU-13A	Mainline, Spread 1	Summit	OH	5040001001590	Tributary to Nimisila Reservoir	Unlisted	No	1.14

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
38.4	A14-120-S2	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
38.5	A14-120-S1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
38.60	AS-SU-15	Mainline, Spread 1	Summit	OH	5040001001587	Flows from Nimisila Reservoir and Tributary to Lake Noah	Unlisted	No	7.95
39.5	AS-SU-17	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
39.6	AS-SU-17A	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
40.23	AS-SU-18	Mainline, Spread 1	Summit	OH	5040001003739	Tributary to Nimisla Creek	Unlisted	No	0.22
41	A14-117-S1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
41.5	AS-SU-21A	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
41.7	AS-SU-1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
41.93	AS-SU-23	Mainline, Spread 1	Summit	OH	5040001001594	Tributary to Nimisla Creek	Unlisted	No	1.69
43.7	AS-SU-29	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
44	AS-SU-30	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
44.2	A14-119-S1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
44.56	AS-SU-32	Mainline, Spread 1	Summit	OH	5040001001599	Tributary to Tuscarawas River	Unlisted	No	0.78
44.6	AS-SU-34	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
44.8	AS-SU-35A	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
45.87	AS-SU-37	Mainline, Spread 1	Summit	OH	5040001000260	Tuscarawas River	Group 1	Yes	160.00
46.63	AS-SU-40	Mainline, Spread 1	Summit	OH	5040001001696	Pancake Creek	Unlisted	No	4.90
47.3	A14-41-S2	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
47.5	A14-41-S1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
47.7	A14-42-S1	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
47.7	A14-42-S2	Mainline, Spread 1	Summit	OH	-	-	Unlisted	No	<10.00
47.99	AS-WE-1	Mainline, Spread 1	Wayne	OH	5040001003582	Tributary to Pancake Creek	Unlisted	No	0.10
49	AS-WE-5	Mainline, Spread 1	Wayne	OH	-	-	Unlisted	No	<10.00
49.1	AS-WE-6	Mainline, Spread 1	Wayne	OH	-	-	Unlisted	No	<10.00
49.7	AS-WE-9	Mainline, Spread 1	Wayne	OH	-	-	Unlisted	No	<10.00
50.09	A14-124-S2	Mainline, Spread 1	Wayne	OH	5040001003545	Tributary to Silver Creek	Unlisted	No	0.55
50.17	A14-124-S1	Mainline, Spread 1	Wayne	OH	5040001000642	Silver Creek	Unlisted	No	3.41
50.6	AS-WE-11	Mainline, Spread 1	Wayne	OH	-	-	Unlisted	No	<10.00
50.6	AS-WE-11A	Mainline, Spread 1	Wayne	OH	-	-	Unlisted	No	<10.00
51.4	A14-91-S1	Mainline, Spread 2	Wayne	OH	-	-	Unlisted	No	<10.00

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
52.48	AS-WE-16	Mainline, Spread 2	Wayne	OH	5040001003489	Tributary to Mill Creek	Unlisted	No	0.79
52.86	AS-WE-17	Mainline, Spread 2	Wayne	OH	5040001000553	Mill Creek	Unlisted	No	3.24
53	AS-WE-18	Mainline, Spread 2	Wayne	OH	-	-	Unlisted	No	<10.00
53.2	AS-WA-23	Mainline, Spread 2	Wayne	OH	-	-	Unlisted	No	<10.00
54.2	AS-ME-1	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
54.89	A14-43-S1	Mainline, Spread 2	Medina	OH	5040001000654	Styx River	Group 1	Yes	23.80
54.9	AS-ME-6	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
56	AS-ME-7	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
56.76	AS-ME-14	Mainline, Spread 2	Medina	OH	5040001001718	Tributary to Styx River	Unlisted	No	0.61
57	AS-ME-16	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
57.2	AS-ME-17	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
57.61	A14-39-S1	Mainline, Spread 2	Medina	OH	5040001000668	Tommy Run	Unlisted	No	2.02
57.8	A14-40-S1	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
57.8	A14-40-S2	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
58.71	AS-ME-19	Mainline, Spread 2	Medina	OH	5040001003371	Tributary to Chippewa Creek	Unlisted	No	0.11
59	AS-ME-20	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
59.45	AS-ME-22	Mainline, Spread 2	Medina	OH	5040001001722	Tributary to Chippewa Creek	Unlisted	No	0.43
59.49	AS-ME-22	Mainline, Spread 2	Medina	OH	5040001001722	Tributary to Chippewa Creek	Unlisted	No	0.43
59.6	A14-49-S1	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
62.08	A14-116-S2	Mainline, Spread 2	Medina	OH	5040001001724	Tributary to Hubbard Creek	Unlisted	No	1.49
62.1	A14-116-S5	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
62.8	AS-ME-24	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
62.99	B14-4-S1	Mainline, Spread 2	Medina	OH	5040001000468	Hubbard Creek	Unlisted	No	1.31
64.19	AS-ME-27	Mainline, Spread 2	Medina	OH	5040001003288	Tributary to Chippewa Creek	Unlisted	No	0.18
64.38	AS-ME-30	Mainline, Spread 2	Medina	OH	5040001003284	Tributary to Chippewa Creek	Unlisted	No	0.26
64.4	AS-ME-31	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
64.5	AS-ME-31A	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
64.6	AS-ME-31B	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
64.7	AS-ME-32	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
64.92	AS-ME-34	Mainline, Spread 2	Medina	OH	5040001002233	Tributary to Chippewa Creek	Unlisted	No	1.52
65.3	AS-ME-35	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
65.55	AS-ME-37A	Mainline, Spread 2	Medina	OH	5040001003269	Tributary to McCabe Creek	Unlisted	No	0.47

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
65.63	AS-ME-37	Mainline, Spread 2	Medina	OH	5040001001746	McCabe Creek	Unlisted	No	1.64
66.2	AS-ME-39A	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
66.50	AS-ME-40	Mainline, Spread 2	Medina	OH	5040001003262	Tributary to The Inlet	Unlisted	No	0.11
66.69	AS-ME-41A	Mainline, Spread 2	Medina	OH	5040001001733	Tributary to The Inlet	Unlisted	No	0.24
66.78	AS-ME-41	Mainline, Spread 2	Medina	OH	5040001003257	Tributary to The Inlet	Unlisted	No	0.39
67.63	AS-ME-46	Mainline, Spread 2	Medina	OH	5040001000293	The Inlet	Unlisted	No	9.48
67.7	AS-ME-47	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
67.94	AS-ME-48	Mainline, Spread 2	Medina	OH	5040001001741	Tributary to The Inlet	Unlisted	No	0.97
68.1	A14-46-S2	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
68.18	A14-46-S1	Mainline, Spread 2	Medina	OH	5040001001740	Tributary to The Inlet	Unlisted	No	3.93
69.1	A14-47-S1	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
69.1	A14-47-S2	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
69.75	AS-ME-53	Mainline, Spread 2	Medina	OH	4110001000393	Mallet Creek	Unlisted	No	0.97
69.78	AS-ME-53	Mainline, Spread 2	Medina	OH	4110001000393	Mallet Creek	Unlisted	No	0.97
69.9	AS-ME-53A	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
69.9	AS-ME-53B	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
70.17	AS-ME-53	Mainline, Spread 2	Medina	OH	4110001000391	Mallet Creek	Group 1	No	1.98
70.5	AS-ME-56	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
70.66	AS-ME-58A	Mainline, Spread 2	Medina	OH	4110001002373	Tributary to Mallet Creek	Unlisted	No	0.03
70.7	AS-ME-58C	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
70.78	AS-ME-58B	Mainline, Spread 2	Medina	OH	4110001000394	Tributary to Mallet Creek	Unlisted	No	1.26
71.67	AS-ME-62	Mainline, Spread 2	Medina	OH	4110001002233	Tributary to Mallet Creek	Unlisted	No	0.07
71.89	B14-10-S1	Mainline, Spread 2	Medina	OH	4110001002223	Tributary to Mallet Creek	Unlisted	No	0.06
72.37	AS-ME-64	Mainline, Spread 2	Medina	OH	4110001000385	Tributary to Mallet Creek	Unlisted	No	0.46
73.1	AS-ME-67	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
73.3	AS-ME-69	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
73.73	AS-ME-73	Mainline, Spread 2	Medina	OH	4110001000375	Mallet Creek	Group 1	Yes	12.50
73.9	AS-ME-74B	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
73.94	AS-ME-74	Mainline, Spread 2	Medina	OH	4110001002146	Tributary to Mallet Creek	Unlisted	No	0.14
74.32	AS-ME-75	Mainline, Spread 2	Medina	OH	4110001000378	Tributary to Mallet Creek	Unlisted	No	0.50
74.8	AS-ME-77B	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
74.9	AS-ME-77	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
74.9	AS-ME-77C	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
75.3	AS-ME-83	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
75.4	AS-ME-84	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
75.64	AS-ME-86	Mainline, Spread 2	Medina	OH	4110001002090	Tributary to West Branch Rocky River	Unlisted	No	0.41
75.74	B14-6-S2	Mainline, Spread 2	Medina	OH	4110001000371	Tributary to West Branch Rocky River	Unlisted	No	0.24
76.6	AS-ME-88	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
76.7	AS-LO-1C	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
76.7	AS-ME-90	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
76.8	AS-LO-1B	Mainline, Spread 2	Medina	OH	-	-	Unlisted	No	<10.00
76.90	AS-LO-1	Mainline, Spread 2	Medina	OH	4110001001003	Tributary to West Branch Rocky River	Unlisted	No	0.04
76.98	AS-LO-1	Mainline, Spread 2	Medina	OH	4110001001003	Tributary to West Branch Rocky River	Unlisted	No	0.04
77.10	AS-LO-1	Mainline, Spread 2	Medina	OH	4110001001003	Tributary to West Branch Rocky River	Unlisted	No	0.04
77.3	AS-LO-31B	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
77.5	AS-LO-34	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
77.80	A14-56-S2	Mainline, Spread 2	Lorain	OH	-	Tributary to East Branch Black River	Unlisted	No	<10.00
77.94	A14-56-S1	Mainline, Spread 2	Lorain	OH	4110001001005	Tributary to East Branch Black River	Unlisted	No	0.42
78.92	AS-LO-38	Mainline, Spread 2	Lorain	OH	4110001001977	Tributary to East Branch Black River	Unlisted	No	0.17
79.00	A14-61-S1	Mainline, Spread 2	Lorain	OH	4110001001974	Tributary to East Branch Black River	Unlisted	No	0.33
80.72	A14-69-S4	Mainline, Spread 2	Lorain	OH	4110001000297	Salt Creek	Unlisted	No	5.17
80.9	AS-LO-45	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
82.13	AS-LO-10	Mainline, Spread 2	Lorain	OH	4110001001017	Tributary to East Branch Black River	Unlisted	No	0.48

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
82.23	AS-LO-10	Mainline, Spread 2	Lorain	OH	4110001001017	Tributary to East Branch Black River	Unlisted	No	0.63
83.01	A14-50-S1	Mainline, Spread 2	Lorain	OH	4110001000075	East Branch Black River	Group 1	Yes	169.00
83.4	AS-LO-11	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
83.6	A14-55-S1	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
84.41	AS-LO-13	Mainline, Spread 2	Lorain	OH	4110001001796	Tributary to West Branch Black River	Unlisted	No	0.36
84.91	A14-73-S1	Mainline, Spread 2	Lorain	OH	4110001000771	King Ditch and Tributary to West Branch Black River	Unlisted	No	1.04
85.5	A14-128-S1	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
85.5	A14-75-S1	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
85.59	A14-75-S2	Mainline, Spread 2	Lorain	OH	4110001001792	Tributary to West Branch Black River	Unlisted	No	0.93
86.50	A14-76-S1	Mainline, Spread 2	Lorain	OH	4110001000274	Kelner Ditch and Tributary to West Branch Black River	Unlisted	No	4.15
86.7	A14-130-S1	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
87.61	AS-LO-17	Mainline, Spread 2	Lorain	OH	4110001000762	Elk Creek	Unlisted	No	7.36
88.03	AS-LO-19	Mainline, Spread 2	Lorain	OH	4110001000719	Wellington Creek	Group 1	Yes	29.60
88.50	AS-LO-21	Mainline, Spread 2	Lorain	OH	4110001000718	Tributary to West Branch Black River	Unlisted	No	0.12
88.60	AS-LO-20	Mainline, Spread 2	Lorain	OH	4110001000041	West Branch Black River	Group 1	Yes	82.10
88.69	AS-LO-22	Mainline, Spread 2	Lorain	OH	4110001000621	Tributary to West Branch Black River	Unlisted	No	8.80
89.6	A14-140-S1	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
92.27	A14-141-S1	Mainline, Spread 2	Lorain	OH	4110001000295	Plum Creek	Group 1	No	2.61
92.8	AS-LO-28	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
92.90	A14-138-S1	Mainline, Spread 2	Lorain	OH	4110001001732	Tributary to Plum Creek	Unlisted	No	0.75
93	A14-138-S2	Mainline, Spread 2	Lorain	OH	-	-	Unlisted	No	<10.00
96.97	A14-152-S1	Mainline, Spread 2	Lorain	OH	4100012001221	Tributary to East Fork Vermillion River	Unlisted	No	0.18
97.67	A14-148-S1	Mainline, Spread 2	Lorain	OH	4100012000377	East Fork Vermillion River	Unlisted	Yes	29.00
99.94	A14-197-S1	Mainline, Spread 2	Erie	OH	4100012000089	Vermilion River	Group 1	Yes	204.00

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100.1	A14-197-S3	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
102.5	AB-ER-34	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
103.50	AS-ER-7	Mainline, Spread 2	Erie	OH	4100012000420	Tributary o Sugar Creek	Unlisted	No	0.72
103.7	AS-ER-8	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
103.8	AS-ER-9	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
104.15	A14-144-S1	Mainline, Spread 2	Erie	OH	4100012001080	Sugar Creek	Unlisted	No	0.20
104.4	A14-144-S2	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
104.93	A14-96-S1	Mainline, Spread 2	Erie	OH	4100012000435	Tributary to Chappel Creek	Unlisted	No	0.32
105.11	A14-96-S1	Mainline, Spread 2	Erie	OH	4100012000435	Tributary to Chappel Creek	Unlisted	No	0.77
105.45	AS-ER-10	Mainline, Spread 2	Erie	OH	4100012000435	Tributary to Chappel Creek	Unlisted	No	0.85
105.81	AS-ER-11	Mainline, Spread 2	Erie	OH	4100012000424	Chappel Creek	Unlisted	Yes	18.40
107.3	AS-ER-50	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
108.7	AS-ER-35	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
108.90	A14-187-S1	Mainline, Spread 2	Erie	OH	4100012000444	Old Woman Creek	Unlisted	Yes	10.90
109.05	A14-188-S1	Mainline, Spread 2	Erie	OH	4100012001018	Tributary to Old Woman Creek	Unlisted	No	0.17
109.05	A14-188-S2	Mainline, Spread 2	Erie	OH	4100012001018	Tributary to Old Woman Creek	Unlisted	No	0.00
109.58	AS-ER-12	Mainline, Spread 2	Erie	OH	4100012000447	Tributary to Old Woman Creek	Unlisted	No	7.47
110.00	AS-ER-13	Mainline, Spread 2	Erie	OH	4100012000450	Tributary to Old Woman Creek	Unlisted	No	1.36
111.14	AS-ER-15	Mainline, Spread 2	Erie	OH	4100012000974	Tributary to Huron River	Unlisted	No	0.33
111.46	AS-ER-16	Mainline, Spread 2	Erie	OH	4100012000756	Tributary to Huron River	Unlisted	No	3.55
111.7	AS-ER-36	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
111.8	AS-ER-36A	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
111.9	AS-ER-17	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
112.25	A14-155-S1	Mainline, Spread 2	Erie	OH	4100012000755	Tributary to Huron River	Unlisted	No	1.11
112.61	A14-186-S1, AS-ER-19	Mainline, Spread 2	Erie	OH	4100012000019	Huron River	Unlisted	Yes	385.00
112.8	AS-ER-20A	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
113.24	AS-ER-21	Mainline, Spread 2	Erie	OH	4100012000458	Tributary to Mud Creek	Unlisted	No	0.99
114.11	AS-ER-22	Mainline, Spread 2	Erie	OH	4100012000457	Tributary to Mud Creek	Unlisted	No	1.05
114.49	AS-ER37	Mainline, Spread 2	Erie	OH	4100012000923	Tributary to Mud Creek	Unlisted	No	0.29
114.64	E14-97-S1	Mainline, Spread 2	Erie	OH	4100012000161	Mud Creek	Unlisted	No	2.74
115.81	AS-ER-25	Mainline, Spread 2	Erie	OH	4100011000777	Zorn Beutal Ditch	Unlisted	No	1.32

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117.61	AS-ER-26	Mainline, Spread 2	Erie	OH	4100011000783	Sherer Ditch	Unlisted	No	1.11
117.69	AS-ER-26	Mainline, Spread 2	Erie	OH	4100011000783	Sherer Ditch	Unlisted	No	0.48
118.6	E14-96-S1	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
119.56	AS-ER-28	Mainline, Spread 2	Erie	OH	4100011000802	Tributary to Pipe Creek	Unlisted	No	0.76
121.25	AS-ER-38	Mainline, Spread 2	Erie	OH	4100011000801	Tributary to Pipe Creek	Unlisted	No	2.18
121.38	E14-95-S1	Mainline, Spread 2	Erie	OH	4100011004174	Pipe Creek	Unlisted	No	9.63
122.9	E14-49-S1	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
123.3	E14-50-S1	Mainline, Spread 2	Erie	OH	-	-	Unlisted	No	<10.00
123.58	E14-51-S1	Mainline, Spread 2	Erie	OH	4100011000815	Caswell Ditch	Unlisted	No	0.08
124.66	E14-94-S1	Mainline, Spread 2	Erie	OH	4100011004133	Mills Creek	Unlisted	Yes	24.20
129.75	D14-1-S1	Mainline, Spread 3	Sandusky	OH	4100011005407	Tributary to Lake Erie	Unlisted	No	4.27
130.76	D14-4-S1	Mainline, Spread 3	Sandusky	OH	4100011003974	Strong Creek	Unlisted	No	2.69
130.8	D14-5-S1	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
131.48	D14-6-S1	Mainline, Spread 3	Sandusky	OH	4100011000868	Fuller Creek	Unlisted	Yes	29.00
131.84	D14-7-S1	Mainline, Spread 3	Sandusky	OH	4100011000876	Tributary to Fuller Creek	Unlisted	No	0.60
132.39	AS-SA-1	Mainline, Spread 3	Sandusky	OH	4100011000752	Tributary to Fuller Creek	Unlisted	No	0.56
133.39	E14-105-S1	Mainline, Spread 3	Sandusky	OH	4100011000870	Pickrel Creek	Unlisted	No	9.69
134.02	D14-9-S1	Mainline, Spread 3	Sandusky	OH	4100011000901	Little Raccoon Creek	Unlisted	No	2.58
134.47	D14-10-S1	Mainline, Spread 3	Sandusky	OH	4100011003910	Tributary to Raccoon Creek	Unlisted	No	0.36
135.2	AS-SA-70	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
135.2	AS-SA-71	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
135.27	D14-8-S1	Mainline, Spread 3	Sandusky	OH	4100011000882	Raccoon Creek	Unlisted	No	23.40
135.93	E14-103-S1	Mainline, Spread 3	Sandusky	OH	4100011000912	South Creek	Group 1	No	9.79
136.53	AS-SA-4	Mainline, Spread 3	Sandusky	OH	4100011000915	Tributary to South Creek	Unlisted	No	6.90
137.05	D14-11-S1	Mainline, Spread 3	Sandusky	OH	4100011003859	Green Creek	Group 1	Yes	78.40
138.05	AS-SA-100	Mainline, Spread 3	Sandusky	OH	4100011000506	Tributary to Yellow Swale	Unlisted	No	0.09
138.37	E14-36-S1	Mainline, Spread 3	Sandusky	OH	4100011000519	Tributary to Yellow Swale	Unlisted	No	0.28
139.09	D14-40-S1	Mainline, Spread 3	Sandusky	OH	4100011001800	Bark Creek	Unlisted	Yes	10.50
141.10	E14-31-S1, AS-SA-5	Mainline, Spread 3	Sandusky	OH	4100011000057	Sandusky River	Group 1	Yes	1310.00
141.31	E14-30-S1	Mainline, Spread 3	Sandusky	OH	4100011003625	Tributary to Sandusky River	Unlisted	No	0.05
142.23	D14-33-S1	Mainline, Spread 3	Sandusky	OH	4100011000542	Tributary to Sandusky River	Unlisted	No	0.81

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142.4	E14-98-S1	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
142.48	E14-121-S1	Mainline, Spread 3	Sandusky	OH	4100011000542	Tributary to Sandusky River	Unlisted	No	0.60
144.07	E14-26-S1	Mainline, Spread 3	Sandusky	OH	4100011000491	Tributary to Little Muddy Creek	Unlisted	No	0.51
144.36	E14-27-S1	Mainline, Spread 3	Sandusky	OH	4100011001856	Little Muddy Creek	Unlisted	Yes	11.60
148.20	E14-43-S1	Mainline, Spread 3	Sandusky	OH	4100011000044	Muddy Creek	Group 1	Yes	63.60
148.6	E14-181-S1	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
149.30	AS-SA-10	Mainline, Spread 3	Sandusky	OH	4100011003506	Tributary to Muddy Creek	Unlisted	No	0.80
149.60	E14-109-S1	Mainline, Spread 3	Sandusky	OH	4100011001777	Tributary to Muddy Creek	Unlisted	No	0.30
150.04	E14-42-S1	Mainline, Spread 3	Sandusky	OH	4100010001335	Ninemile Creek	Unlisted	No	3.14
150.78	E14-3-S1	Mainline, Spread 3	Sandusky	OH	4100010003686	Tributary to Ninemile Creek	Unlisted	No	1.90
152.58	AS-SA-14	Mainline, Spread 3	Sandusky	OH	4100010001192	Wolf Creek	Group 1	No	0.97
153.37	D14-25-S1	Mainline, Spread 3	Sandusky	OH	4100010000966	Sugar Creek	Group 1	Yes	54.50
155.53	AS-SA-15	Mainline, Spread 3	Sandusky	OH	4100010000340	Tributary to Portage River	Unlisted	No	0.48
156.04	E14-108-S1	Mainline, Spread 3	Sandusky	OH	4100010001064	Victoria Creek	Group 1	No	1.74
156.69	AS-SA-101	Mainline, Spread 3	Sandusky	OH	4100010000299	Tributary to Portage River	Unlisted	No	0.24
157.06	E14-32-S1	Mainline, Spread 3	Sandusky	OH	4100010000044	Portage River	Unlisted	Yes	416.00
157.7	AS-SA-16	Mainline, Spread 3	Sandusky	OH	-	-	Unlisted	No	<10.00
158.50	E14-111-S1	Mainline, Spread 3	Wood	OH	4100010000248	Tributary to Toussaint Creek	Unlisted	No	5.71
158.7	AS-WO-4	Mainline, Spread 3	Wood	OH	-	-	Unlisted	No	<10.00
159.38	D14-31-S1	Mainline, Spread 3	Wood	OH	4100010000270	Tributary to Toussaint Creek	Unlisted	No	0.19
160.21	E14-85-S1	Mainline, Spread 3	Wood	OH	4100010001114	Tributary to Toussaint Creek	Unlisted	No	2.41
161.1	E14-153-S1	Mainline, Spread 3	Wood	OH	-	-	Unlisted	No	<10.00
161.40	D14-34-S1	Mainline, Spread 3	Wood	OH	4100010003389	Tributary to Toussaint Creek	Unlisted	No	0.87
161.93	E14-175-S1	Mainline, Spread 3	Wood	OH	4100010001365	Toussaint Creek	Unlisted	Yes	36.00
162.80	AS-WO-1	Mainline, Spread 3	Wood	OH	4100010000309	Tributary to Packer Creek	Unlisted	No	0.84
162.9	E14-48-S1	Mainline, Spread 3	Wood	OH	-	-	Unlisted	No	<10.00
165.04	E14-79-S1	Mainline, Spread 3	Wood	OH	4100010000166	Tributary to Packer Creek	Unlisted	No	1.69
165.40	E14-80-S1	Mainline, Spread 3	Wood	OH	4100010000165	Tributary to Packer Creek	Unlisted	No	0.49
165.72	E14-40-S1	Mainline, Spread 3	Wood	OH	4100010001284	Packer Creek	Unlisted	No	8.03
167.18	AS-WO-5	Mainline, Spread 3	Wood	OH	4100010000178	Tributary to Packer Creek	Unlisted	No	0.08
168.54	AS-WO-6	Mainline, Spread 3	Wood	OH	4100010000175	Tributary to Cedar Creek	Unlisted	No	0.35
169.09	E14-35-S1	Mainline, Spread 3	Wood	OH	4100010000172	Tributary to Cedar Creek	Unlisted	No	0.81

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170.08	AS-WO-7	Mainline, Spread 3	Wood	OH	4100010004189	Tributary to Cedar Creek	Unlisted	No	1.62
171.74	AS-WO-8	Mainline, Spread 3	Wood	OH	4100009002095	Tributary to Maumee River	Unlisted	Yes	11.20
172.48	D14-45A-S1	Mainline, Spread 3	Wood	OH	4100009001392	Tributary to Maumee River	Unlisted	No	1.25
174.24	E14-81-S1, AS-WO-2	Mainline, Spread 3	Wood	OH	4100009003055	Tributary to Maumee River	Unlisted	Yes	13.10
174.96	E14-46-S1	Mainline, Spread 3	Wood	OH	4100009002808	Tributary to Maumee River	Unlisted	No	0.01
175.09	E14-44-S1	Mainline, Spread 3	Wood	OH	4100009003051	Tributary to Maumee River	Unlisted	No	1.12
175.3	E14-47-S1	Mainline, Spread 3	Wood	OH	-	-	Unlisted	No	<10.00
175.76	AS-LC-1	Mainline, Spread 3	Wood	OH	4100009001500	Maumee River	Group 3	Yes	6290.00
176	AS-LC-1A	Mainline, Spread 3	Lucas	OH	4100009002752	Maumee River	Group 3	Yes	6251.01
176.84	E14-116-S1	Mainline, Spread 3	Lucas	OH	4100009002696	Blystome Ditch	Unlisted	No	0.08
177.56	E14-29-S1	Mainline, Spread 3	Lucas	OH	4100009002699	Tributary to Blue Creek	Unlisted	No	0.13
177.6	AS-LC-2	Mainline, Spread 3	Lucas	OH	-	-	Unlisted	No	<10.00
177.84	E14-1-S1	Mainline, Spread 3	Lucas	OH	4100009001980	Tributary to Blue Creek	Unlisted	No	0.06
177.99	AS-LC-3	Mainline, Spread 3	Lucas	OH	4100009001979	Tributary to Blue Creek	Unlisted	No	1.16
178.41	AS-LC-4	Mainline, Spread 3	Lucas	OH	4100009002651	Tributary to Blue Creek	Unlisted	No	1.45
179.53	E14-39-S1	Mainline, Spread 3	Lucas	OH	4100009001493	Tributary to Blue Creek	Unlisted	No	5.35
181.48	E14-21-S1	Mainline, Spread 3	Lucas	OH	4100009002570	Tributary to Blue Creek	Unlisted	No	0.03
181.65	AS-LC-7	Mainline, Spread 3	Lucas	OH	4100009002554	Tributary to Blue Creek	Unlisted	No	3.04
182.29	AS-LC-9	Mainline, Spread 3	Lucas	OH	4100009001294	Blue Creek	Unlisted	Yes	15.80
182.5	AS-LC-10	Mainline, Spread 3	Lucas	OH	-	-	Unlisted	No	<10.00
183.09	E14-83-S1	Mainline, Spread 3	Lucas	OH	4100009002479	Tributary to Blue Creek	Unlisted	Yes	12.80
183.60	E14-173-S1, AS-LC-12	Mainline, Spread 3	Lucas	OH	4100009001296	Tributary to Blue Creek	Unlisted	No	0.07
184.07	D14-46A-S1	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	1.86
185.11	E14-54-S1	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	0.93
185.32	AS-FU-2	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	0.71
186.14	E14-54-S1	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	0.38
186.21	AS-FU-5	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	0.37
186.28	AS-FU-5	Mainline, Spread 3	Fulton	OH	4100009001310	Tributary to Blue Creek	Unlisted	No	0.36
187.90	D14-20-S1	Mainline, Spread 3	Fulton	OH	4100009001272	Tributary to Fewless Creek	Unlisted	No	0.75
188.22	E14-7-S1	Mainline, Spread 3	Fulton	OH	4100009001259	Fewless Creek	Unlisted	No	8.81

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188.50	E14-10-S1	Mainline, Spread 3	Fulton	OH	4100009000040	Swan Creek	Group 2	Yes	14.80
189.66	AS-FU-9	Mainline, Spread 3	Fulton	OH	4100009001249	Tributary to Swan Creek	Unlisted	No	0.08
189.83	AS-FU-10	Mainline, Spread 3	Fulton	OH	4100009002371	Tributary to Swan Creek	Unlisted	No	0.07
190.44	AS-FU-15	Mainline, Spread 3	Fulton	OH	4100009000597	Tributary to Swan Creek	Unlisted	No	1.49
190.98	AS-FU-16	Mainline, Spread 3	Fulton	OH	4100009000596	Tributary to Swan Creek	Unlisted	No	1.53
191.48	AS-FU-16A	Mainline, Spread 3	Fulton	OH	4100009002359	Tributary to Swan Creek	Unlisted	No	0.05
191.74	AS-FU-17	Mainline, Spread 3	Fulton	OH	4100009002354	Tributary to Ai Creek	Unlisted	No	0.06
191.78	AS-FU-18	Mainline, Spread 3	Fulton	OH	4100009002353	Tributary to Ai Creek	Unlisted	No	0.06
191.8	AS-FU-27	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
192	AS-FU-19	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
192.94	E14-4-S1	Mainline, Spread 3	Fulton	OH	4100009001498	Ai Creek	Unlisted	Yes	14.90
194.28	AS-FU-20	Mainline, Spread 3	Fulton	OH	4100009001358	Tributary to Wolf Creek	Unlisted	No	0.29
194.85	D14-24-S1	Mainline, Spread 3	Fulton	OH	4100009002340	Tributary to Wolf Creek	Unlisted	No	0.05
195.59	E14-112-S1	Mainline, Spread 3	Fulton	OH	4100009001360	Tributary to Prairie Ditch	Unlisted	No	0.20
195.92	D14-44-S1	Mainline, Spread 3	Fulton	OH	4100001000235	Tributary to Prairie Ditch	Unlisted	No	0.58
196.00	D14-44-S1	Mainline, Spread 3	Fulton	OH	4100001000235	Tributary to Prairie Ditch	Unlisted	No	0.67
196.08	D14-44-S1	Mainline, Spread 3	Fulton	OH	4100001000235	Tributary to Prairie Ditch	Unlisted	No	0.75
197.3	E14-53-S1	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
197.6	AS-FU-21	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
198	AS-FU-22	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
198.30	E14-11-S1	Mainline, Spread 3	Fulton	OH	4100001000233	Tributary to Tenmile Creek	Unlisted	No	1.16
199	E14-12-S1	Mainline, Spread 3	Fulton	OH	-	-	Unlisted	No	<10.00
199.92	D14-45-S1, AS-FU-23	Mainline, Spread 3	Fulton	OH	4100001000099	Tenmile Creek	Unlisted	Yes	22.60
200.8	E14-113-S1	Mainline, Spread 4	Lenawee	MI	4100001001705		Unlisted	No	0.34
201	E14-114-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
202	AS-LE-1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
203	E14-78-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
204.1	E14-56-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
205	E14-137-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
205.5	E14-138-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
206	E14-139-S1	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
207.3	E14-140-S1, AS-LE-3	Mainline, Spread 4	Lenawee	MI	4100002000094	River Raisin	Unlisted	Yes	628.58
208.3	AS-LE-5	Mainline, Spread 4	Lenawee	MI	4100002000472		Unlisted	No	0.53
208.8	E14-58-S1	Mainline, Spread 4	Lenawee	MI	4100002000469		Unlisted	No	0.49
209.2	AS-LE-6	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
209.2	AS-LE-7	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
209.6	E14-59-S1	Mainline, Spread 4	Lenawee	MI	4100002000471		Unlisted	No	0.84
210.1	AS-LE-8	Mainline, Spread 4	Lenawee	MI	4100002000470		Unlisted	No	1.02
210.6	E14-141-S1	Mainline, Spread 4	Lenawee	MI	4100002000466		Unlisted	No	0.46
210.9	E14-142-S1	Mainline, Spread 4	Lenawee	MI	4100002000464		Unlisted	No	0.51
211.7	AS-LE-9	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
212.1	AS-LE-10	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
212.5	E14-143-S1	Mainline, Spread 4	Lenawee	MI	4100002000078	Little River Raisin	Unlisted	No	3.40
212.7	E14-64-S1	Mainline, Spread 4	Lenawee	MI	4100002000454	Fry Drain	Unlisted	No	0.43
214.1	E14-69-S1	Mainline, Spread 4	Lenawee	MI	4100002000455	Isley Drain	Unlisted	No	1.31
214.5	E14-76-S1	Mainline, Spread 4	Lenawee	MI	4100002000264	Swamp Raisin Creek	Unlisted	Yes	11.56
214.7	E14-77-S1	Mainline, Spread 4	Lenawee	MI	4100002000276		Unlisted	No	0.72
215.3	E14-145-S1	Mainline, Spread 4	Lenawee	MI	4100002000446	Spring Brook	Unlisted	No	4.90
215.9	E14-171-S1	Mainline, Spread 4	Lenawee	MI	4100002001581	Schwab Drain	Unlisted	No	3.05
216.5	E14-70-S1	Mainline, Spread 4	Lenawee	MI	4100002000285	Kelly Drain	Unlisted	No	2.49
217.2	AS-LE-48	Mainline, Spread 4	Lenawee	MI	4100002000283		Unlisted	No	0.77
217.8	E14-146-S1	Mainline, Spread 4	Lenawee	MI	4100002001584		Unlisted	No	0.40
218	E14-147-S1	Mainline, Spread 4	Lenawee	MI	4100002000256	Dibble Drain	Unlisted	No	5.81
218.4	E14-127-S1	Mainline, Spread 4	Lenawee	MI	4100002000071	South Branch Macon Creek	Unlisted	Yes	10.97
218.6	E14-126-S1	Mainline, Spread 4	Lenawee	MI	4100002001750		Unlisted	No	9.58
218.8	E14-74-S1	Mainline, Spread 4	Lenawee	MI	4100002001891	Schreeder Brook	Unlisted	No	9.40
219	E14-75-S1	Mainline, Spread 4	Lenawee	MI	4100002000281		Unlisted	No	9.39
220.1	E14-60-S1	Mainline, Spread 4	Lenawee	MI	4100002000288	Wahoo Prairie Drain	Unlisted	No	0.14
220.8	E14-149-S1, AS-LE-12	Mainline, Spread 4	Lenawee	MI	-	-	Unlisted	No	<10.00
221.4	E14-150-S1	Mainline, Spread 4	Lenawee	MI	4100002000278		Unlisted	No	0.35
221.5	E14-87-S1	Mainline, Spread 4	Lenawee	MI	4100002000056		Unlisted	Yes	24.58

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
221.8	E14-61-S1	Mainline, Spread 4	Lenawee	MI	4100002000408		Unlisted	No	1.97
222.7	E14-63-S1	Mainline, Spread 4	Monroe	MI	4100002000407		Unlisted	No	0.34
223.4	AS-MO-1	Mainline, Spread 4	Monroe	MI	4100002000242	Richardson Drain	Unlisted	No	0.65
223.9	E14-65-S1	Mainline, Spread 4	Monroe	MI	4100002001916	Bear Swamp Creek	Unlisted	No	6.59
224.4	E14-66-S1	Mainline, Spread 4	Monroe	MI	4100002000403		Unlisted	No	0.98
224.5	E14-67-S1	Mainline, Spread 4	Monroe	MI	-	-	Unlisted	No	<10.00
225.1	E14-86-S1	Mainline, Spread 4	Monroe	MI	4100002001590	Cone Drain	Unlisted	No	0.66
225.1	E14-86-S2	Mainline, Spread 4	Monroe	MI	-	-	Unlisted	No	<10.00
225.7	AS-MO-2	Mainline, Spread 4	Monroe	MI	-	-	Unlisted	No	<10.00
226	E14-151-S1	Mainline, Spread 4	Monroe	MI	4100002000398	Center Creek	Unlisted	No	1.70
226.8	E14-72-S1	Mainline, Spread 4	Monroe	MI	-	-	Unlisted	No	<10.00
227.2	AS-MO-3	Mainline, Spread 4	Monroe	MI	-	-	Unlisted	No	<10.00
227.8	AS-MO-4	Mainline, Spread 4	Monroe	MI	4100002000043	North Branch Macon Creek	Unlisted	Yes	17.54
229.4	E14-157-S1	Mainline, Spread 4	Washtenaw	MI	4100002000014	Saline River	Unlisted	Yes	110.45
230.1	E14-159-S1	Mainline, Spread 4	Washtenaw	MI	4100001000627		Unlisted	No	0.21
230.9	E14-88-S1	Mainline, Spread 4	Washtenaw	MI	4100001001676	McIntyre Drain	Unlisted	No	0.52
231.1	E14-89-S1	Mainline, Spread 4	Washtenaw	MI	4100001001196		Unlisted	No	0.31
231.2	E14-165-S1	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
231.2	E14-90-S1	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
231.5	E14-91-S1	Mainline, Spread 4	Washtenaw	MI	4100001001194		Unlisted	No	0.54
231.6	E14-92-S1	Mainline, Spread 4	Washtenaw	MI	4100001000626	Sugar Creek	Unlisted	No	2.15
231.7	AS-WA-2	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
232.4	E14-93-S1	Mainline, Spread 4	Washtenaw	MI	4100001001198		Unlisted	No	0.65
232.6	E14-128-S1	Mainline, Spread 4	Washtenaw	MI	4100001001720	Buck Creek	Unlisted	No	1.88
233.2	AS-WA-3	Mainline, Spread 4	Washtenaw	MI	4100001000624		Unlisted	No	0.35
233.9	E14-131-S1	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
234.1	E14-132-S1	Mainline, Spread 4	Washtenaw	MI	4100001000620	Stony Creek	Unlisted	No	1.34
234.4	E14-133-S1, AS-WA-20	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
234.8	E14-117-S1	Option B, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
235.5	E14-118-S1	Option B, Spread 4	Washtenaw	MI	4100001000610		Unlisted	No	0.62
235.5	E14-161-S1	Mainline, Spread 4	Washtenaw	MI	4100001000610		Unlisted	No	1.15

MP	Resource ID	Location	County	State	Reach Code	Tributary Names (if available)	Potential Mussel Habitat (ODNR)	Survey Required (Yes/No)	Upland Drainage Area (mi ²)
235.9	E14-135-S1	Mainline, Spread 4	Washtenaw	MI	4100001000607	McCarthy Drain	Unlisted	No	2.91
236	E14-119-S1	Option B, Spread 4	Washtenaw	MI	4100001000607	McCarthy Drain	Unlisted	No	1.12
236.5	E14-162-S1	Mainline, Spread 4	Washtenaw	MI	4100001001723	West Branch Paint Creek	Unlisted	No	3.61
236.8	E14-99-S1	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
237.4	AS-WA-22	Option B, Spread 4	Washtenaw	MI	4100001001677	Hewens Drain	Unlisted	No	0.87
237.4	AS-WA-28	Option B, Spread 4	Washtenaw	MI	4100001000601	West Branch Paint Creek	Unlisted	No	1.56
238	AS-WA-36	Option B, Spread 4	Washtenaw	MI	4100001000134	Paint Creek	Unlisted	Yes	21.19
238	E14-164-S1, AS-WA-6	Mainline, Spread 4	Washtenaw	MI	4100001000134	Paint Creek	Unlisted	No	21.52
238.3	E14-176-S1	Mainline, Spread 4	Washtenaw	MI	4100001001223		Unlisted	No	0.19
239.3	AS-WA-38	Option B, Spread 4	Washtenaw	MI	4100001000714		Unlisted	No	0.76
239.3	E14-129-S1	Mainline, Spread 4	Washtenaw	MI	4100001000714		Unlisted	No	1.46
239.8	E14-100-S1	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
240	E14-130-S1	Mainline, Spread 4	Washtenaw	MI	4100001001248		Unlisted	No	0.01
240.3	E14-177-S1, AS-WA-40	Mainline, Spread 4	Washtenaw	MI	4100001001236		Unlisted	No	0.81
242.6	AS-WA-11	Mainline, Spread 4	Washtenaw	MI	4090005005989	Huron River	Unlisted	Yes	826.67
245.9	AS-WA-15	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
246.3	AS-WA-16C	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
246.5	AS-WA-16A	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00
246.5	AS-WA-17	Mainline, Spread 4	Washtenaw	MI	-	-	Unlisted	No	<10.00

APPENDIX 3C

**Ohio and Michigan Mussel Habitat Assessments and Survey Protocols for the
NEXUS Gas Transmission Project**

APPENDIX 3D

**Bald Eagle Aerial Nest Survey Protocol
for the NEXUS Gas Transmission Project**

Bald Eagle Aerial Nest Survey Protocol
for the
NEXUS Gas Transmission Project

Prepared for:

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February 2015

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1.0 PROJECT CONTEXT AND DESCRIPTION

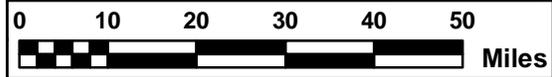
1.1 Project Context

NEXUS Gas Transmission, LLC (NEXUS) is proposing to develop, own and operate the NEXUS Gas Transmission Project (Project), an approximately 250-mile high-pressure natural gas pipeline beginning at Kensington in Columbiana County, Ohio and extending west through Ohio, and terminating at Willow Run in Washtenaw County, Michigan. The proposed pipeline route is not finalized. In an effort to reduce impacts it is expected to parallel existing powerlines and/or pipeline rights-of-way (ROWs) as much as feasible (approximately 60%). The Project will also include construction of up to four (4) new natural gas-fired compressor stations and associated aboveground support facilities, as shown in Figure 1. NEXUS is committed to siting and designing the facilities to minimize environmental and community impacts to the largest extent practicable.

The purpose of this document is to describe the regulatory status of the bald eagle (*Haliaeetus leucocephalus*) and the survey protocols used to identify active nests within a ½ mile buffer of the proposed pipeline.

1.2 Project Area Description

Figure 1 depicts the location of the NEXUS Project. The Project area is best characterized by its rolling to flat plains, cool climate, high annual precipitation, and high snowfall. The average maximum temperature in Cleveland and Detroit during the month of July is approximately 83°F. The average minimum temperature during the month of January is approximately 22°F in Cleveland and 19°F in Detroit. The average annual precipitation is 39.1 inches in Ohio and 32.8 inches in Michigan. Average snowfall is 30.4 inches in Ohio and 44.7 inches in Michigan (Weather, 2015).



- NEXUS Project Route
- Compressor Station
- ▭ County Boundary
- ▭ State Boundary

Figure 1
NEXUS Project Location Map

NEXUS
GAS TRANSMISSION

2/13/2015

The Project area (see Figure 1) is located in four (4) EPA Level III Ecoregions across Ohio and Michigan. However, the pipeline is located primarily in the following two (2) Ecoregions: the Erie/Ontario Drift and Lake Plain Ecoregion; and the Huron/Erie Lake Plains Ecoregion. Short sections of the proposed pipeline route cross the Eastern Corn Belt Plains Ecoregion and the Western Allegheny Plateau Ecoregion.

The rolling to level terrain of the Erie/Ontario Drift and Lake Plain is characterized by low lime drift and lacustrine deposits. Lakes, wetlands, and swampy streams occur where stream networks converge or where the land is flat and comprised of clay. Soils are lower in carbonate and are naturally less fertile than other glaciated ecoregions. Land use is comprised of primarily agricultural activities intermixed with smaller areas of urban development and industrial activity. Scattered woodlots also occur. Lake Erie influences the regions climate increasing the growing season, winter cloudiness and snowfall (EPA, 2014).

The Huron/Erie Lake Plains is a broad, fertile, flat plain marked by relict sand dunes, beach ridges, and low end moraines. Due to the typically poor drainage characterized by the area, elm-ash swamps and beech forests were originally dominant. Oak savannas are found on sandy, well-drained dunes and beach ridges. Presently, the area has mainly been cleared and drained and contains highly productive farms. Urban and industrial areas are also extensive in this ecoregion. Stream habitat and quality has been degraded by channelization, ditching, and agricultural activities (EPA, 2014).

The Eastern Corn Belt Plains is a rolling till plain with local end moraines. It is characterized by loamier and better drained soils than the Huron/Lake Erie Plains Ecoregion. Glacial deposits of Wisconsinan age are widespread. The vegetation was originally composed of beech, sugar maple, and basswood forests. The area is presently predominantly characterized by extensive agricultural activities. This has led to degradation of stream chemistry and turbidity (EPA, 2014).

More rugged than agricultural till plains ecoregions, the Western Allegheny Plateau was not as highly impacted by glaciation. This area was originally characterized by mixed mesophytic forests and mixed oak forests. Presently, the majority of its rounded hills remain in forest. Agricultural activities and residential developments are concentrated in the valleys. This region is composed of horizontally-bedded, sedimentary rock and has been mined for bituminous coal (EPA, 2014).

Habitat is available for bald eagles within and adjacent to the pipeline corridor. There are several large rivers, lakes and reservoirs either traversed or within several miles. Nesting habitat maybe limited in most areas within the Project area due to the heavy agricultural land use and lack of forest cover. Available nesting habitat maybe limited to the small woodlots, single trees and tall man-made structures such as nesting platforms, cellular communication towers and electrical transmission line towers. The following sections describe the regulatory status of bald eagles and the protocols to be employed to identify active nests within a mile-wide corridor centered on the proposed pipeline.

2.0 REGULATORY STATUS

2.1 Legal Status of the Bald Eagle in Ohio

In Ohio, the bald eagle and their nests are currently protected by the Bald and Golden Eagle Protection Act (Eagle Act), 16 U.S.C. §§ 668-668d, the Migratory Bird Treaty Act, 16 U.S.C. §§ 703-711, and the Lacey Act, 18 U.S.C. §§ 41-47. The species has been removed from Ohio Department of Natural Resources Division of Wildlife list of “*Wildlife That Are Considered To Be Endangered, Threatened, Species of Concern, Special Interest, Extirpated, or Extinct in Ohio*” state list.

The “National Bald Eagle Management Guidelines” (Guidelines) that were developed by the U.S. Fish and Wildlife Service (USFWS) is the primary regulatory vehicle that prescribes protection measures for bald eagles and their nests in Ohio. These guidelines outline the protective provisions of the Eagle Act as well as when and under what circumstances these provisions may apply to project activities.

2.2 Legal Status of the Bald Eagle in Michigan

In Michigan, the bald eagle and their nests are currently protected by the Eagle Act, 16 U.S.C. §§ 668-668d, the Migratory Bird Treaty Act, 16 U.S.C. §§ 703-711, and the Lacey Act, 18 U.S.C. §§ 41-47. In addition bald eagles are also state listed as “special concern” under the Natural Resources and Environmental Protection Act (N.R.E.P.A), Act 451 Article III Ch. 1 Endangered Species section 324.36505 which is administered by the Michigan Department of Natural Resources (MDNR).

Because bald eagles are regulated by both federal and state law, consultation with both the USFWS and MDNR for any project that has the potential to affect bald eagles is advisable. However, the Guidelines that were developed by the USFWS is the primary guidance document for project-proponents to follow.

2.3 National Bald Eagle Management Guidelines

Under the Guidelines, the NEXUS Project is a Category “A” project. This designation indicates that any project related activities that can be seen from a bald eagle nest must be a minimum of 660 feet from the nest. Any activity that will not be visible from the nest must be a minimum of 330 feet from the nest. Activities such as clearing and external construction that is between 330 feet and 660 feet from the bald eagle nest should be done outside of the breeding season (USFWS, 2007).

Category “G” of the Guidelines indicates that helicopters and fixed-wing aircraft should avoid operating within 1,000 feet of a nest during the breeding season, except in the case of authorized biologists trained in survey techniques (USFWS, 2007) such as proposed as part of this survey protocol.

3.0 METHODS

3.1 Purpose and Objectives

The purpose of bald eagle nest surveys is to identify active nests within 660-feet of proposed construction activities for the NEXUS Project. A 1/2-mile wide corridor will be surveyed centered on the proposed centerline of the pipeline (1/4 mile radius around proposed Project facilities) to accommodate any shifts in the route and extra workspace needed for construction. This is the “survey area”.

Survey objectives include:

- Identify potential nesting habitat located within 1/4 mile buffer of the proposed centerline of the pipeline and other proposed Project facilities;
- Conduct aerial surveys targeting the identified nesting habitat within a 1/2-mile wide survey corridor centered on the proposed pipeline, to determine if they are actively used, intact, but not active, or no longer present (fallen);
- Map previously unidentified active bald eagle nest site locations within the 1/2-mile survey corridor.
- Monitor the Project vicinity through incidental observations during other field surveys for bald eagle activity that may indicate nesting at previously undocumented sites;

3.2 Background Research/Consultation

Both the Ohio Department of Natural Resources (ODNR) and USFWS East Lansing Field Office have detailed records from previous bald eagle nest surveys. During the consultation process, the ODNR and USFWS shared the historic locations of nest within a 1/2-mile corridor centered on the pipeline centerline. The historic nest locations will also be surveyed to determine; if the nests are still active; if the nests are not currently used; or, if the nests are no longer present

3.3 Survey Protocol

3.3.1 Aerial Bald Eagle Nest Surveys

The aerial bald eagle nest survey will be conducted using a helicopter or fixed wing aircraft, flying as low as safety and practicality will allow. A single aerial survey will be conducted prior to leaf-on conditions, preferably the first week of April in 2015 when the bald eagles are likely to be on the nest. The area surveyed will include all potential nesting habitat along the proposed pipeline route from its beginning at Kensington in Columbiana County, Ohio to its terminus at Willow Run in Washtenaw County, Michigan.

Flights will only be conducted when conditions are conducive to the survey, including skies with at least one-mile visibility and steady winds that are generally less than 15 mph. The location of any active nests or other pertinent information observed will be recorded. Information recorded will include areas surveyed, location of any nests observed, and status of nests (active/inactive).

The surveys will be repeated in the survey area in April 2016 and prior to construction in 2017. The pipeline route will be more static at that point and the objective of the surveys will be to identify any new nests prior to the start of construction in early 2017. The results from each survey year will be provided to the USFWS. Consultation with the USFWS will be reinitiated if bald eagle nests are identified within survey area

In addition to formal observations during the aerial survey, any eagle activity observed in the Project vicinity will be documented as incidental observations whenever biologists are in the area.

3.3.2 Surveyor Preparedness

Personnel performing aerial nest surveys will be experienced in eagle nest identification and will have experience conducting wildlife observations.

3.3.3 Data Collection

Observations from aerial bald eagle nest survey will be recorded into field notebooks, which will be translated into electronic format upon return to the office from the field. Nest locations will be recorded with a Global Positioning System (GPS) with sub-meter accuracy and a map of nest locations will be generated.

4.0 REFERENCES

"Average Weather in the United States." *Weather Averages for the United States*. 1 Jan. 2015. Web. 8 Jan. 2015. <<http://www.currentresults.com/Weather/US/weather-averages-index.php>>.

"Level III and IV Ecoregions of the Continental United States." *EPA*. Environmental Protection Agency, 8 Dec. 2014. Web. 8 Jan. 2015. <http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm>.

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