ENVIRONMENTAL IMPACT STATEMENT

NISOURCE GAS TRANSMISSION AND STORAGE, INC.

MULTI-SPECIES HABITAT CONSERVATION PLAN

****

APPLICATION FOR INCIDENTAL TAKE PERMIT

May, 2013

U.S. Fish and Wildlife Service
Federal Energy Regulatory Commission
U.S.D.A. Forest Service
U.S. Army Corps of Engineers
National Park Service

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EXECUTIVE SUMMARY

Introduction

Private landowners, corporations, State or local governments, or other non-Federal entities who wish to conduct activities that might incidentally "take" animals listed as threatened or endangered under the Endangered Species Act (ESA) must first obtain an Incidental Take Permit (hereafter "ITP") from the U.S. Fish and Wildlife Service (Service) to avoid liability under the ESA. Section 9 of the ESA and its implementing regulations prohibit the take of animals listed as federally threatened or endangered. Take, as defined by the ESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. These are addressed in Section 7(a)(2) for federal actions and Section 10(a)(1)(B) for non-federal actions.

In late 2005, NiSource Gas Transmission and Storage (NiSource) contacted the Service to discuss options for obtaining ESA compliance under Section 10(a)(1)(B) for their natural gas transmission and storage activities. The Service agreed to assist NiSource with the development of a Multi-Species Habitat Conservation Plan (MSHCP).

On July 16, 2009, NiSource filed an application with the Service for a Section 10(a)(1)(B) Incidental Take Permit (hereafter "ITP") for 10 ESA listed species that occur in portions of their 14-state operating territory (hereafter "Covered Land"). The Covered Land for the MSHCP and requested ITP includes 12 counties in Ohio, Pennsylvania, Maryland, and West Virginia; and a one-mile wide corridor associated with 15,562 miles of existing NiSource right-of-way.

The NiSource MSHCP was prepared to meet the requirements of Section 10(a)(1)(B) of the ESA; cover a 50-year timeframe; and include a suite of conservation measures designed to avoid, minimize, and mitigate potential impacts to species. The MSHCP also includes a monitoring and adaptive management strategy designed to minimize risk associated with uncertainty, and to allow for continuous improvement of the MSHCP, including a process for amending the MSHCP and ITP, when appropriate.

Issuance of an ITP by the Service to NiSource is a federal action that may affect the quality of the human environment and therefore subject to review under the National Environmental Policy

Act (NEPA). To comply with the NEPA, the Service prepared this Environmental Impact Statement (EIS). The EIS analyzes and discloses potential impacts that could result from issuance of an ITP to NiSource and through subsequent implementation of their MSHCP (Proposed Action). As required by NEPA, this EIS also evaluates alternatives to the Proposed Action, which were developed in response to public, stakeholder, and agency input.

The Service was the lead federal agency for preparation of this EIS. The Federal Energy Regulatory Commission (FERC), the U.S. Army Corps of Engineers (USACE), the U.S. Department of Agriculture (USDA) Forest Service (USFS) Eastern Region and Southern Region, and the National Park Service (NPS) Southeast Region served as cooperating agencies.

MSHCP Overview

The NiSource activities addressed in their MSHCP are those activities necessary for safe and efficient operation of NiSource's pipeline system, many of which are performed pursuant to the regulations and guidance of the FERC, the USDOT, and other regulatory authorities. These activities (hereafter "Covered Activities") can be divided into three main categories of activities related to NiSource's natural gas pipeline system: (1) general operation and maintenance; (2) safety-related repairs, replacements, and maintenance; and (3) certain expansion activities.

Forty-three species from nine taxonomic groups were originally analyzed in the MSHCP. Since that original analysis, one of the candidate species (sheepnose) was listed as endangered and the Lake Erie watersnake was delisted. The remaining 42 MSHCP species include six mammals, one bird, one reptile, two amphibians, six fish, two crustaceans, 17 freshwater mussels, four insects, and three plants. However, after analysis of the species and the Covered Land, it was concluded that NiSource Covered Activities will have no impact on 32 of the 42 MSHCP species. It was determined that 23 of these 32 species were absent from the Covered Land, and for the remaining nine species, NiSource agreed to implement conservation measures to avoid all impacts, which are described in the MSHCP and in the Service's Biological Opinion. Therefore, NiSource is requesting incidental take for the remaining 10 species, for which take could be minimized, but not avoided. These species (hereafter "Take Species") include: Indiana bat, bog turtle, Madison Cave isopod, clubshell mussel, northern

riffleshell mussel, fanshell mussel, james spinymussel, sheepnose mussel, Nashville crayfish, and American burying beetle.

In addition to the 42 species in the MSHCP, 46 additional ESA-listed, proposed, or candidate species are either known to occur or potentially occur within the NiSource Covered Land. Potential impacts to these species are discussed in this EIS and in the Service's Biological Opinion.

Purpose and Need

The purpose of issuing an ITP to NiSource is to authorize take of 10 listed species that is incidental to, but not the purpose of, their otherwise lawful activities. The ITP would also require implementation of the MSHCP. The decision whether to issue an ITP to NiSource is based upon the statutory and regulatory criteria of the ESA, which are detailed in Section 1.6.1 of this EIS.

Presently, NiSource complies with the ESA through the Federal nexus it has with the FERC and consultation with the Service required by Section 7(a)(2) of the ESA. The primary need for the Proposed Action is based on the desire by NiSource to receive incidental take authorization under Section 10 of the ESA rather than Section 7 of the ESA. NiSource believes that, under Section 10 of the ESA, the Company would have more certainty in planning their future operation and maintenance and new construction activities for their business.

Scope of the Analysis

The scope of the analysis in this EIS covers the direct, indirect, and cumulative effects (i.e., impacts) of the proposed incidental take, and environmental consequences associated with implementing the species avoidance, minimization, and mitigation measures in the MSHCP within the Covered Land. Additional analyses are presented in the EIS on other federally listed species that NiSource could potentially encounter, with the understanding that future ESA Section 7 consultations will occur for those species.

Due to the geographic breadth of the proposed Covered Lands, and the inability of NiSource to identify the precise location and timing of future projects, including mitigation, the Service's analyses are necessarily limited in scope. Further, conservation measures designed to avoid

and minimize impacts to species and species habitat from NiSource Covered Activities may only be implemented in areas where a species range overlaps with the NiSource Covered Land.

Public/Stakeholder Involvement

On October 11, 2007, the Service published a Notice of Intent (NOI) to prepare an EIS in the Federal Register (FR, Vol. 72, No. 196, pp 57953 - 57956), to solicit participation of federal, state, and local agencies, Tribes, and the public to determine the scope of this EIS and provide input relative to issues associated with the proposed MSHCP project. In addition to the publication of the NOI, the scoping process included informal stakeholder and agency consultations, 13 public scoping meetings and a mailing to approximately 1,300 known interested parties. The letter provided project information, information on scoping meetings, and contact numbers. Public scoping lasted until December 8, 2007. A Scoping Report is included with this EIS.

In accordance with NEPA, a draft EIS was circulated for public review and comment. The public review period was initiated with the publication of the Notice of Availability (NOA) in the FR on July 13, 2011, (FR 76, No. 134, pp 41288 - 41293) and the public comment period was extended for an additional 90 days (FR 76, No. 199, 63950). The comment period closed on December 13, 2011, culminating a 150-day public review period. A variety of comments were received on the DEIS which are available at http://www.fws.gov/midwest/endangered/permits/hcp/nisource/index.html. Written responses to public comments are appended to this document.

EIS Alternatives

Three alternatives have been identified in this EIS for detailed analysis. Six additional alternatives are discussed in Chapter 2, which were considered, but eliminated from detailed analysis. Regardless of the alternative selected, NiSource will continue to implement its Columbia Gas ECS (2008), Columbia Gulf ECS (2008), and Virginia ECS (2008) businesses per requirements set forth by regulatory agencies both federal and state.

<u>Alternative 1 – No Action Alternative (Status Quo)</u>

Under Alternative 1, NiSource would continue to comply with the ESA through Section 7(a)(2). NiSource would not receive an ESA Section 10(a)(1)(B) ITP from the Service. Incidental take

for federally listed species would be through FERC, USFS, NPS, or USACE authorizations, certifications or permits, by way of an Incidental Take Statement from the Service (see Section 1.5.2.3).

Alternative 2 – Issuance of a 50-Year ITP and Approval of NiSource's MSHCP (Proposed Action)

Under Alternative 2 (Preferred Alternative), NiSource would receive incidental take authorization for 10 federally listed species through Section 10(a)(1)(B) of the ESA. The Service would approve the NiSource MSHCP and issue NiSource a 50-year ITP for species that occur within the NiSource Covered Land.

Alternative 3 – Issuance of a 10-Year ITP and Approval of the NiSource HCP

Alternative 3, NiSource would receive incidental take authorization for 10 federally listed species through Section 10(a)(1)(B) of the ESA. The Service would approve the NiSource MSHCP and issue NiSource a 10-year ITP for species that occur within the NiSource Covered Land.

Environmental Impacts

All of the species in the NiSource MSHCP are dependent on the physical, biological, and to some extent, social resources in the Covered Land. NiSource Covered Activities impact a variety of these resources. Conservation measures designed to avoid, minimize, and mitigate impacts to species will also avoid and minimize impacts to these resources.

Over the next 50 years, NiSource anticipates 904 acres of new disturbance and 18,505 acres of disturbance on previously disturbed land, most of which is vegetation maintenance within existing rights-of-way (ROW), on an annual basis. This equates to a total annual disturbance of approximately 0.2% of the total Covered Land (0.19% within the existing ROW and 0.0092% in areas outside of their existing ROWs). While the Covered Land boundary represents the area for which NiSource seeks incidental take coverage for its Covered Activities, only a very small portion of the Covered Land will actually be impacted by NiSource's Covered Activities. Table 2.1 in the MSHCP lists anticipated annual impacts within the Covered Land.

Impacts to Physical Resources

Pipeline activities have the potential to impact surface water resources that provide habitat for several listed species (primarily mussels). This includes hydrostatic testing (water removal and disposal), clearing and grading of stream-banks, in-stream trenching or other work, trench dewatering, blasting, and weed spraying. Impacts may arise from lack of shading, suspension of sediments (turbidity), direct impact to aquatic organisms, and release of drilling fluids during horizontal directional drilling. Implementation of regulatory requirements for impact avoidance (e.g., erosion control, stream setbacks for herbicide use, agency approved crossing techniques, equipment bridges, wetland mats, seasonal restrictions, etc.) are expected to reduce or eliminate potential for long-term or otherwise significant impacts the vast majority of the time. No long-term significant impacts to surface water resources are expected to result from NiSource activities.

Future NiSource construction activities and storage field operations have the potential to directly or indirectly impact localized ground water resources. Impacts could include contamination associated with blasting activities, turbidity associated with trench construction (in shallow aquifers), reductions in ground water quantity due to dewatering, contamination associated with hydraulic fracturing activities associated with storage field construction and operations. Implementation of standard environmental construction standards (BMPs) and other regulatory requirements associated with permitting is expected to reduce the potential for significant or long term impacts.

NiSource operation and construction activities are expected to have minimal impacts to local or regional geology, topography, or geologic hazards. An example of a potential geologic impact and measures that will be used to avoid the impact would be the practice of surveying and clearly marking karst features, and identifying adequate buffers around such features during ground disturbing activities. No long-term significant impacts to geological resources are expected to result from NiSource activities.

Future impacts to soil resources from NiSource activities could include impacts to soil stability impacts, erosion, compaction, and contamination. NiSource's standard construction practices include measures to reduce or avoid potential soil impacts including temporary erosion control, stockpiling topsoil for reclamation, and standard spill prevention, containment, and control

practices. No long-term significant impacts to soil resources are expected to result from NiSource activities.

NiSource future activities would not be expected to result in large-scale changes to local or regional climate. Future operations and construction activities may potentially influence local air quality, though they would not be expected to influence climate either directly or indirectly. Required compliance with the Clean Air Act and National Ambient Air Quality Standards, as well as any local or site-specific regulations for air quality within the Covered Lands footprint, is expected to minimize impacts to air quality. Impacts from future activities may include short-term local air quality degradation related to ground disturbance (dust) and/or internal combustion exhaust.

Impacts to Biological Resources

NiSource's future activities could potentially impact a variety of non-listed fish and wildlife species, including migratory birds, depending on the nature of the activity, timing, and location. Potential impacts could include direct mortality from vehicle traffic, vegetation maintenance or mowing, noise-related impacts from construction, habitat degradation from construction, or habitat loss due to impacts to aquatic resources. NiSource's current standard construction requirements, including stipulations and standards related to mowing, clearing, grading, trenching, water body crossing, spill prevention, and restoration would serve to minimize the potential for significant impacts to wildlife from future activities.

Potential impacts to federally listed, proposed, and candidate species would be similar to that discussed for non-listed wildlife and fish. Future activities would potentially directly or indirectly impact these species depending on the nature of the activity, timing, and location. Standard avoidance and/or minimization measures that are implemented as part of NiSource's environmental construction practices, as well as MSHCP AMMs, would reduce the potential for significant impacts, with the exception of the 10 species for which the company is requesting take authorization. A summary of potential take is as follows. With respect to the 10 take species, mitigation proposed by NiSource is expected to fully compensate for any adverse impacts associated with take. As a result, we do not expect impacts to takes species to be significant.

Summary of Incidental Take Requested Over the 50-Year Permit Duration

Species	Summary of Take Requested
Indiana bat	Incidental take is requested for no more than 69,900 acres of summer and/or spring staging/fall swarming habitat that could support up to 2,584 Indiana bat individuals.
Bog turtle	Incidental take is requested for impacts to turtles and habitat at 25 sites
Madison Cave Isopod	Incidental take is requested for two populations as represented by 2,764.5 surface acres and associated subsurface area of effect of Madison Cave Isopod habitat
Clubshell Mussel	Incidental take is requested for up to 166 acres of clubshell habitat
Northern Riffleshell Mussel	Incidental take is requested for up to165.3 acres of Northern Riffleshell habitat
Fanshell Mussel	Incidental take is requested for up to 283.2 acres of Fanshell habitat
James Spinymussel	Incidental take is requested for up to 12.8 acres of James Spinymussel habitat
Sheepnose Mussel	Incidental take is requested for up to 250.4 acres of Sheepnose habitat
Nashville crayfish	Incidental take is requested for up to 4.0 acres of Nashville crayfish habitat
American burying beetle	Incidental take is requested for 4 American burying beetle individuals

Impacts to Social Resources

The Covered Land area includes federal, state, local, and private ownership, along with the various land use regulations pertaining to each. Land management agencies as well as private land owners have agreements entered into agreements with NiSource for ROW easements. As such, NiSource may access and manage the lands under easement to the extent described in the easement. Typically, NiSource is authorized to access the property for ROW maintenance and access to pipeline facilities for operation. Approval of the ITP and MSHCP and future NiSource activities is not expected to have significant direct or indirect impact to future land use within the Covered Lands footprint, although activities associated with proposed conservation and mitigation projects could serve to protect certain lands from future development.

No measurable direct or indirect impacts to employment, income, population (including low income/minority populations), housing, or public services are expected to occur as a result of NiSource Covered Activities. Variations in employment and/or goods and services associated with future construction activities, as well as any HCP-associated mitigation projects may occur, but these are expected to be localized and insignificant in scope.

With all alternatives, future NiSource projects would be subject to regulatory and utility approval, including permits for ROW encroachment, and many would also require additional state or federal level permits or review. Conditions of approval within transportation-related permits might include notification requirements and traffic control measures during construction and maintenance, depending on the activity. Mitigation related to utilities could include efforts to avoid temporary construction-related disruptions in service, coordination with utility providers prior to construction, and schedule planning to minimize disruption during construction.

Public lands that are available for recreation have existing land use restrictions that guide allowable development and uses on this land. As such, these restrictions would guide all NiSource activities regardless of the issuance of the ITP, and would not be influenced or impacted by the ITP or implementation of the MSHCP. Future NiSource projects may result in short-term impacts to localized recreation resources during construction and/or maintenance activities, though these are not expected to be large scale or of long duration. NiSource mitigation projects could increase recreation opportunities as additional land is restored and enhanced for take species.

Implementation of any of the alternatives would not directly affect the quality of visual resources within the Covered Lands footprint. Potential direct or indirect impacts to visual resources (e.g., permanent clearing of vegetation or view shed modification due to ROW construction) may occur. To the extent that these modifications are subject to future site-specific approval, the activities would be subject to conditions of approval applied at the time of occurrence.

Cumulative Impacts

The proposed federal action in this EIS is the Service's issuance of an ESA Section 10(a)(1)(B) incidental take permit (ITP) to NiSource for the purpose of authorizing "take" of federally listed species protected by the ESA, within the context of a conservation plan. The scope of the cumulative impact analysis therefore focuses mainly on impacts to federally listed species, and

the habitat resources that support them. The geographic scope of the analysis corresponds with the NiSource Covered Lands, and the resources contained within, as described in Chapter 3. The temporal range, or how far into the past and future the analysis looked, was based on whether the effects would be temporary, short-term, long-term, or permanent. The cumulative impact analysis in Chapter 5 is organized within the three resource categories covered in Chapters 3 and 4, namely physical resources, biological resources, and social and economic resources.

The NiSource Covered Land is diverse spatially and includes a variety of topographic, geologic, ecological, and unique land-use features (see Chapter 3 of this EIS). Past and present activities within the Covered Land that have impacted physical, biological, and socioeconomic resources included natural gas production, storage, and transmission (i.e., NiSource Activities); agriculture development; wind energy development; commercial timber production; urban development; and transportation infrastructure. Collectively, these activities have had profound impacts to the Covered Land landscape, the most notable being the loss and/or conversion of native landscapes to intensive agricultural production lands, urban and rural development, and transportation infrastructure. The result is a variety of past and present actions within the Covered Land that has shaped its condition today, as described in Section 3.3.1 of this EIS.

Due to the large geographic scope of the Covered Land, a quantifiable, project-specific evaluation of past, present and reasonably foreseeable activities is not feasible or practical. However, reasonably foreseeable activities can be anticipated based on history, current land use patterns, and other factors. We assume that innumerable activities are reasonably certain to occur within the Covered Land, including those noted above.

Physical Resources

NiSource's Covered Activities are not expected to significantly contribute to loss or degradation of physical resources, including surface water, groundwater, geology, soils, or air quality, nor are they considered to create a separate, additive cumulative effect to any physical resources beyond that which already exists with the Covered Land.

Broadly, impacts could occur to surface waters or groundwater due to inadvertent spills or contamination; impacts on geologic resources due to limiting of access to mineral resources; impacts on soils due to topsoil loss, erosion, and contamination; and impacts on air quality, due

to fugitive dust emissions and pollutants. Mitigation projects, such as riparian restorations, could have positive impacts to surface water resources. However, impacts would be site-specific and negligible, at best. As such, implementation of the proposed MSHCP should not contribute to significant negative or positive cumulative impacts to physical resources within the Covered Land.

Biological Resources

NiSource's Covered Activities, AMMs and mitigation are not expected to significantly contribute to, or result in, loss or degradation of biological resources, including vegetation, wetlands, fish and wildlife, and special status species.

Vegetation and groundcover in some portions of the Covered Land area could be impacted through deforestation and destruction of vegetation, fragmentation, contamination due to chemical or petroleum spills or releases, and increases in invasive species due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development.

Impacts to wetlands would be variable and site-specific. Depending upon local conditions, wetland resources in some portions of the Covered Land could be adversely impacted (e.g., dredge and fill, degradation, contamination due to spills or releases) due to future construction activities proposed by NiSource or other entities, and due to other types of commercial, industrial, or residential development.

Past and present actions within the Covered Land have caused the cumulative loss and degradation of wildlife habitat that supported a diversity of species. Clearing and converting land for agricultural use, urban development, utility infrastructure, roads, and other uses by past and present actions have led to cumulatively increased wildlife disturbance from human activity, increased habitat fragmentation, increased wildlife mortality from roads, and the spread of non-native vegetation that reduces habitat diversity. Timber production activities have converted large tracts of old-growth forest to managed forest land, which has also resulted in disturbance from human activity, habitat loss and fragmentation, and reduced habitat diversity.

Reasonably foreseeable development activities in previously undeveloped areas would incrementally add to cumulative wildlife impacts, both through reduction of potential habitat, and

disturbance and mortality of wildlife species in and around the sites of these actions. For instance, evidence shows that certain species of bats are particularly susceptible to mortality from operating wind turbines. Of the 45 species of bats found in North America, 11 have been observed dead at wind energy facilities. Of these, nearly 75% were eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and silver-haired bats (*Lasionycteris noctivagans*). Other bat species documented killed by wind turbines in the U.S. and of special concern to the Service include the little brown bat (*Myotis lucifugus*) and northern long-eared bat (*Myotis septentrionalis*).

Past and present actions have also resulted in cumulative impacts to fish. These include agricultural and timber harvest activities, transportation infrastructure, and other human developments, especially in floodplains. These past actions have caused the loss of streamside riparian cover and function, the loss of large in-stream woody debris sources, and the addition of sediment into streams.

Reasonably foreseeable future actions that could cumulatively impact fish include actions that would remove shade vegetation in riparian areas along rivers or streams and actions that degrade water quality in rivers or streams from soil erosion. These future actions include forest harvest activities, residential and commercial development (especially in floodplains), and creation or expansion of ROWs for gas transmission and/or power transmission lines. NiSource Covered Activities, regardless of the alternative, would, to a small degree, remove forested vegetation in riparian areas along the ROWs and access roads, and these areas would be managed by restricting future vegetation growth. However, projects and practices will also be implemented to mitigate riparian functions. In particular, riparian area restoration and protection projects by NiSource as mitigation for mussel species take would result in additional riparian habitat being restored and protected, and would likely improve water quality for many fish and aquatic species.

Cumulative impacts of past, present, and future actions on special status species due to future construction activities proposed by NiSource or other entities, as well as due to commercial, industrial or residential development, would be similar to those on other wildlife and fish species. Through the application of species-specific AMMs and mitigation, impacts to MSHCP and take species would be avoided, minimized, or compensated for in regards to NiSource activities. Similarly, local, state, and federal wildlife laws such as the ESA would serve to reduce the

potential for impacts from other potential projects in the area. Overall, NiSource Covered Activities are not expected to result in cumulative impacts to T&E or special status species.

Social Resource

NiSource Covered Activities are not expected to significantly contribute to loss or adverse impacts to social and/or economic resources, including land use, transportation and utilities, cultural resources, recreation, visual resources or noise, nor are they considered to create a separate, additive cumulative effect to any social and/or economic resources beyond that which already exists with the Covered Land area. Potential cumulative impacts due to future construction activities by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development, would vary state-to-state, county-to-county, and city-to-city.

NiSource Covered Activities would not cause significant demands on public services or facilities. During construction, public services such as police, fire, and medical facilities, would be needed only in cases of emergency, which would likely be the case with other construction projects that could potentially coincide with Covered Activities. Covered Activities would not have a noticeable adverse impact on local landfill resources or their ability to handle other current or future waste streams. NiSource Covered Activities would not contribute to cumulative impacts to public services or facilities.

Future urbanization within the Covered Land, as well as industrial development and associated transportation and infrastructure development, could translate into an increase in population within the general vicinity of that development, along with potential changes to employment, tax revenues, and personal income. No specific environmental justice impacts are anticipated to occur to low income or minority populations due to such cumulative actions.

Employment created by NiSource or other entities would be temporary jobs that would last only through project construction. If construction coincides with construction-related activities from other reasonably foreseeable future actions, such as those described above, this would increase the number and/or duration of temporary jobs, which would increase the cumulative need for temporary construction workers in the area. None of the alternatives would change populations or the need for permanent housing. There likely would be a need for temporary lodging for construction workers not hired from the local area. These impacts would be

cumulatively beneficial as they would increase lodging-related revenue and other ancillary businesses such as restaurants, grocery stores, gas stations, and other businesses necessary to support temporary construction workers.

While beneficial, local construction-related expenditures, employment, and earnings would be small relative to the total amount of economic activity in the Covered Land area, and would, as a result, make a small positive contribution to cumulative impacts on any local economy. Other reasonably foreseeable projects would make similar positive, yet small contributions to local economies. Overall, the cumulative actions combined with the proposed project would have a small beneficial cumulative effect on local economies.

Chapter 1 Introduction

1.1 Overview

The U.S. Fish and Wildlife Service (Service) is in receipt of an application from NiSource Gas Transmission and Storage (NiSource) for an Incidental Take Permit (ITP), pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973 (ESA or Act), as amended. Specifically, NiSource filed an application on July 16, 2009, seeking authorization for incidental take of ten federally-listed and proposed species that would result from NiSource's otherwise lawful interstate natural gas transmission (INGT) activities across a 14-state operating territory. The duration of the requested ITP is 50 years. One aspect of the application is the associated Multi-species Habitat Conservation Plan (MSHCP). The NiSource MSHCP evaluates effects to 42 species representing nine taxonomic groups. Of these, NiSource anticipates take of ten federally listed species (hereafter referred to as "take species"). The MSHCP concludes that NiSource's activities will not cause take to the remaining 32 species (hereafter referred to as "MSHCP Species").

The MSHCP Covered Activities, or those NiSource activities that fall under the purview of the ITP, include a wide range of operation, maintenance, and new construction activities (described more fully in Chapter 2) that are specific to NiSource Inc.'s wholly owned pipeline subsidiaries: Columbia Gas Transmission, LLC, Columbia Gulf Transmission Company, Crossroads Pipeline Company, Central Kentucky Transmission Company, and NiSource Gas Transmission and Storage Company (companies referred to collectively as "NiSource"), and to the area covered by the NiSource MSHCP (hereafter referred to as "Covered Land") (see **Figures 1.1-1** through **Figures 1.1-4**). The Covered Land for the MSHCP includes 12 counties in Ohio, Pennsylvania, and West Virginia; and a one-mile wide corridor associated with 15,562 miles of existing NiSource right-of-way (see Chapter 2 of the MSHCP for a complete discussion of NiSource Covered Land and Covered Activities).

Preparation of this EIS has been conducted in accordance with the requirements of NEPA, its implementing regulations (40 Code of Federal Regulations (CFR) Parts 1500-1508), the U.S. Department of the Interior's (USDOI) NEPA Procedures (43 CFR Part 46), and other Service guidance for compliance with those regulations. The Service is the lead federal agency for

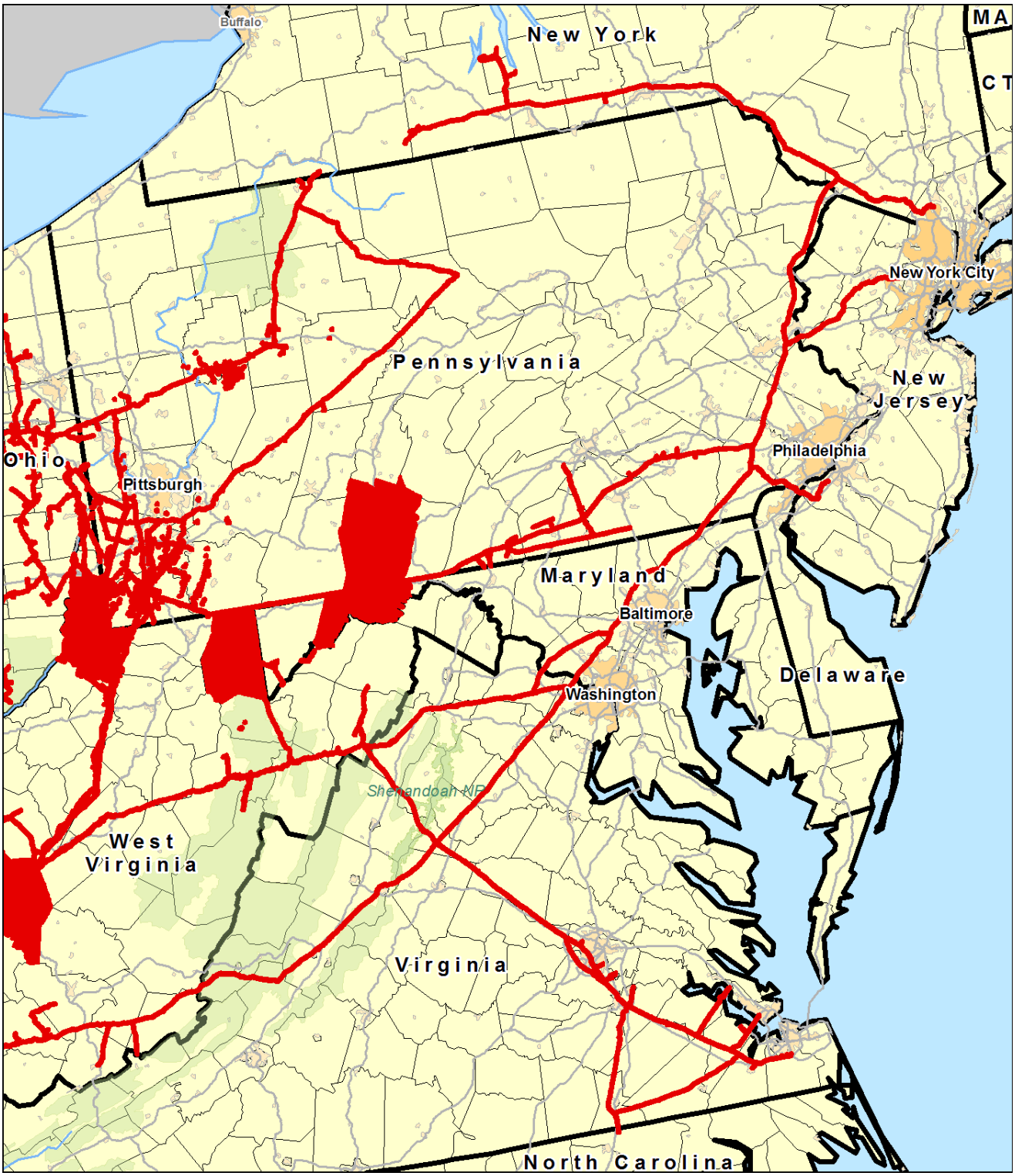
preparation of the EIS. The Federal Energy Regulatory Commission (FERC), the U.S. Army Corps of Engineers (USACE), the U.S. Forest Service (USFS), and the National Park Service (NPS) were formal cooperators with the Service on the production of this EIS. NiSource's activities are under FERC's jurisdiction, and FERC will use this EIS and MSHCP in its analysis and evaluate the need for any further consultation with Service to comply with ESA.

1.2 Purpose

The purpose of ITP issuance is to comply with the ESA by providing protection and conservation of certain listed species while enabling NiSource to conduct legally authorized activities associated with (1) construction and expansion; (2) general operation and maintenance activities that do not require significant earth disturbance; and (3) safety-related repairs, replacements, and maintenance. The ITP would also require implementation of the MSHCP. The decision whether to issue the ITP to NiSource is based upon the statutory and regulatory criteria of the ESA, and is further detailed in Section 1.6.1. In applying these criteria, the Service has analyzed the effect of proposed Covered Activities on species within the NiSource Covered Lands and proposed conservation measures to minimize impacts. Consistent with Service guidance, we considered the appropriateness of the proposed permit duration, the adaptive management strategy, and other issuance criteria. These determinations are documented in the ESA Section 10 Findings document, the NEPA Record of Decision (ROD), and the Intra/Inter-Service ESA Section 7 consultation and resulting Biological Opinion (BO).

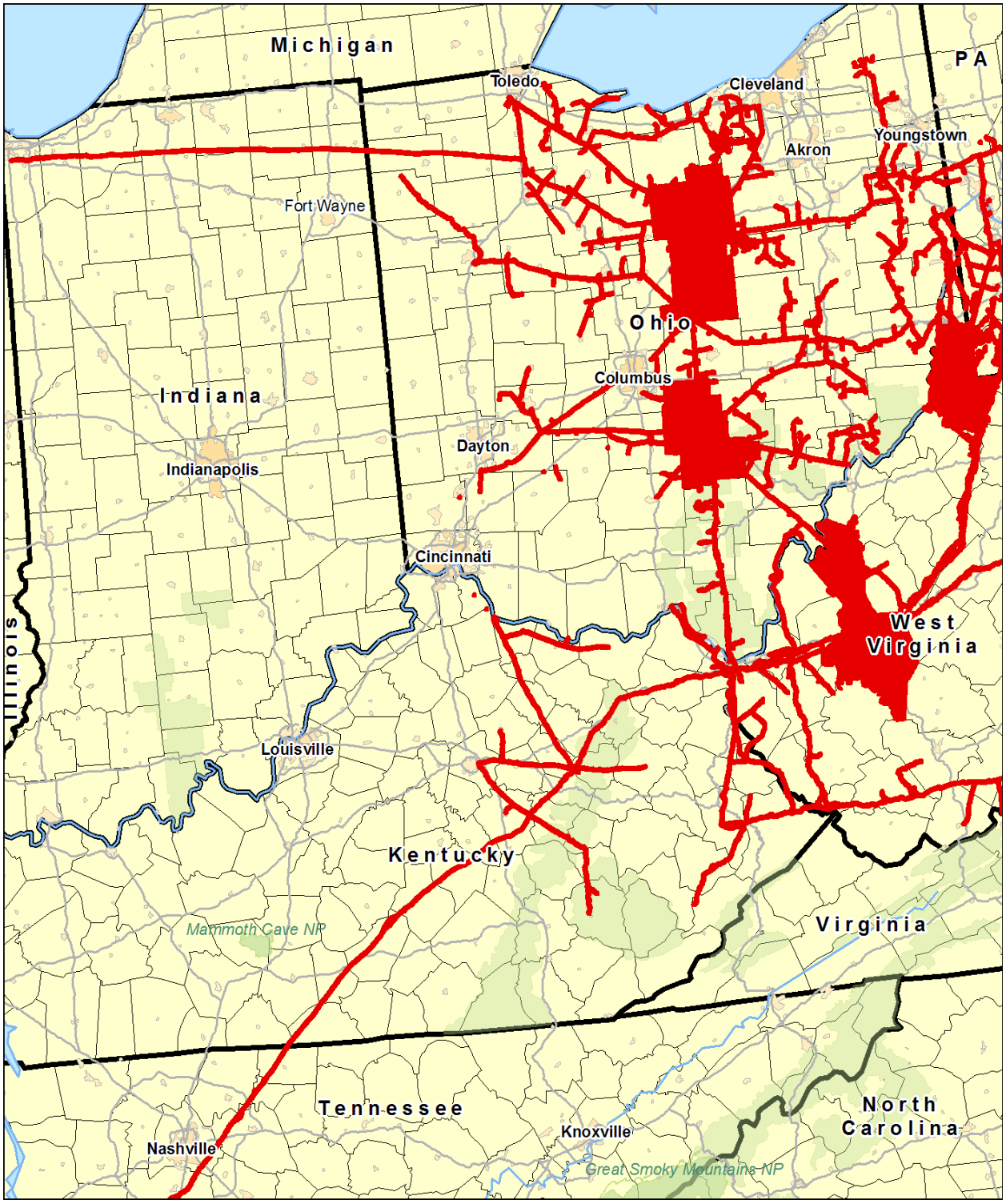
Source: ESRI 2004

Figure 1.2-1: NiSource Covered Lands Overview Map



Source: ESRI 2004

Figure 1.2-2: NiSource Covered Lands Northeast Map



Source: ESRI 2004

Figure 1.2-3: NiSource Covered lands Central Map

Source: ESRI 2004

Figure 1.2-4: NiSource Covered Lands South Map

1.3 Need

Section 9 of the ESA ("Prohibited Acts") describes the prohibitions for listed species (T&E) and what may constitute "take." Presently, NiSource complies with the ESA through the Federal nexus it has with FERC and consultation with the Service required by Section 7 of the ESA. The primary need for the Proposed Action is based on the desire by NiSource to receive incidental take authorization under Section 10 of the ESA rather than Section 7 of the ESA. NiSource feels that under Section 10 of the ESA, the Company would have more certainty in planning their future operation and maintenance and new construction activities for their business. NiSource is designated as FERC's non-Federal representative for purposes of informal consultations with the Service (18 CFR Section 380.13 (b)(1)) for Section 7 of the ESA and regularly consults with the Service regarding the effects to species caused by proposed NiSource activities, which FERC authorizes, licenses or approves. Traditionally, the take of a listed species that is incidental to otherwise lawful activities has been evaluated and authorized through project-by-project and/or annual consultations under Section 7 of the ESA. NiSource however has elected to seek take authorization through Section 10 of the ESA, with preparation of an MSHCP and issuance of an ITP by the Service. The ITP that NiSource has applied for would authorize incidental take of 10 listed species (See Table 2.3-1) that might occur incidental to implementation of NiSource Covered Activities. The Service may specify additional conservation measures as permit conditions. The Service must also find that NiSource will minimize and mitigate impacts to Covered Species to the maximum extent practicable. Through the Intra/Inter-Service Consultation on the Federal action of permit issuance, the Service will ensure that NiSource's Covered Activities will not appreciably reduce the likelihood of survival and recovery in the wild, of these, or other ESA-listed species.

1.4 Proposed Action

The Proposed Action being evaluated by this EIS is the request from NiSource to the Service for an ITP authorizing take of 10 federally listed species within the NiSource Covered Land (hereafter referred to as "Take Species"), including NiSource's implementation of its MSHCP for the other 32 species. Take Species include the Indiana bat (*Myotis sodalis*), bog turtle (*Glyptemys muhlenbergii*), Madison Cave isopod (*Antrolana lira),* clubshell mussel

(*Pleurobema clava)*, northern riffleshell mussel (*Epioblasma torulosa rangiana)*, fanshell mussel (*Cyprogenia stegaria)*, James spinymussel (*Pleurobema collina*), sheepnose mussel (*Plethobasus cyphyus)*, Nashville crayfish (*Orconectes shoupi*), and the American burying beetle (*Nicrophorus americanus)*.

1.4.1 Scope of Analysis

A basic tenet of the Proposed Action of issuing NiSource an ITP and the subsequent implementation of the MSHCP is that the Service does not directly authorize the NiSource operations, maintenance, or construction activities that may cause take of species or species habitat, and regardless of the alternative selected in this EIS, NiSource will continue to implement its businesses. NiSource activities are authorized by other federal, state, and local agencies (i.e., FERC, USDOT, States, Municipalities, etc.) primarily through certifications and permitting (see section 1.5.2.3 below). The scope of analysis in this EIS therefore covers the direct, indirect, and cumulative effects (i.e., impacts) of the proposed incidental take, and environmental consequences associated with implementing the species avoidance, minimization, and mitigation measures in the MSHCP within the Covered Land. Additional analyses are presented in the EIS on other federally listed species that NiSource could potentially encounter, with the understanding that future ESA consultations would occur for those species, based in-part on the analysis presented in this EIS and ESA Consultation for the Proposed Action. However, due to the geographic breadth of the proposed Covered Lands, and the inability of NiSource to identify the precise location and timing of future projects, including mitigation, the Service's analyses are necessarily limited in scope. Further, conservation measures designed to avoid and minimize impacts to species and species habitat from NiSource Covered Activities may only be implemented in areas where a species range overlaps with the NiSource Covered Land. Notwithstanding, because NiSource presents a reasonable worst case analyses for species impacts in the MSHCP, the EIS is more robust in its analysis of species and species habitat than for other aspects of the human environment. Potential impacts to other aspects of the human environment (e.g., air quality, vegetation, resident wildlife, etc.) are discussed on a more programmatic basis.

The Proposed Action and associated analysis assumes involvement of the Cooperating Agencies in the authorization of future NiSource Covered Activities, including NEPA

compliance, where appropriate. These authorizations include Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the United States (USACE); Special Use Permits for federal land (NPS, USFS, FWS); and Certificates of Necessity for operation, maintenance, and construction of rights-of-way (FERC), to name a few. In furtherance of any continuing NEPA and ESA obligations, the Cooperating Agencies have summarized their respective regulatory authorities and procedures in Section 1.6 below. Incidental take coverage under the terms of the ITP is conditioned on NiSource having obtained all the necessary approvals, permits, and/or licenses prior to undertaking Covered Activities within the Covered Land.

1.5 Regulatory Overview

The protection of federally-listed T&E species is the responsibility of numerous federal agencies that operate and administer various Federal statutes. NiSource Covered Activities fall primarily within FERC and USDOT jurisdiction (see below). However, they may also be subject to the review and oversight of other federal agencies (such as USACE, USFS, and NPS). The following section provides information regarding governing legal authorities and the potential overlap with this NEPA document and the ITP process.

1.5.1 National Environmental Policy Act

NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals, and provides a means for carrying out the policy. NEPA and the CEQ *Regulations for Implementing NEPA* (40 CFR 1501) contain provisions to ensure that all federal agencies act according to the letter and spirit of NEPA.

The NEPA process is intended to help federal agencies make decisions that are based on an understanding of potential environmental consequences, and take actions that consider the effects of their decisions on the human environment. NEPA regulations provide the direction to achieve that purpose. NEPA procedures must ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. Accurate scientific analysis, agency comments, and public scrutiny are essential to implementing NEPA. NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail. Agencies must identify and

eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review (40 CFR 1506.3), narrowing the discussion of these issues in the EIS to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.

NEPA implementation requires that federal agencies prepare an EIS for federal actions potentially "significantly affecting the quality of the human environment" (40 CFR 1501). As described above, the Service, as the Lead Federal Agency, determined that an EIS should be prepared prior to acting on the NiSource ITP application. As indicated in Section 1.1, the FERC, USACE, USFS, and NPS cooperated with the Service on the production of this EIS. A cooperating federal agency has jurisdiction by law or special expertise with respect to environmental impacts involved with the proposal and is involved in the NEPA analysis.

1.5.2 Endangered Species Act

The purpose of the ESA is to provide a means whereby the ecosystems upon which T&E species depend may be conserved, and to provide a program for the conservation of such T&E species. Both the Service and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service have responsibilities for the conservation and protection of T&E species under the ESA. NOAA-Fisheries is responsible for enforcing provisions of the ESA for most marine and anadromous species. All of the species which would be the subject of the Proposed Action are under the sole jurisdiction of the Service. Therefore no further discussion of NOAA-Fisheries in the implementation of the ESA is included in this EIS (NOAA-Fisheries 2010).

1.5.2.1 ESA Section 9

Section 9 of the ESA and its implementing regulations prohibit the take of animal species listed as T&E. The definition of take under the Act includes the following activities: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed animal species, or attempt to engage in such conduct (16 USC § 1538). Section 9 also prohibits the removal and reduction to possession of any listed plant species from areas under Federal jurisdiction, as well as the removal, damage, or destruction of such plants on any other areas in knowing violation of any state law. The Service's implementing regulations at 50 CFR 17 further define the term "harm" to mean an act which actually kills or injures wildlife, which may include significant habitat

modification. The regulations also define “harass” as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns.

1.5.2.2 ESA Section 10

Section 10 of the ESA establishes a program whereby persons seeking to pursue activities that otherwise could give rise to liability for unlawful “take” of federally-protected species as defined in Section 9, may receive an ITP, which exempts them from such liability.

To obtain an ITP, the applicant must submit an application that includes a conservation plan that meets certain criteria (16 USC § 1539(a)(1)(B) and 1539(a)(2)(A)). The submission and issuance criteria are detailed in Section 1.6.1 of this EIS. How the applicant (NiSource) has met permit issuance criteria is detailed in the Service’s Findings Document.

Since it was originally made available in December 1996, the Service also considers the *Handbook for Habitat Conservation Planning and Incidental Take Permitting Process* (Service and NOAA 1996) (Handbook) during HCP development, review, and implementation processes. Its purpose is to provide policy and guidance for Section 10(a)(1)(B) procedures to promote efficiency and nationwide consistency within and between the Service and NOAA-Fisheries. However, as noted in Section 1.5.2, all species which would be the subject of the Proposed Action are under the sole jurisdiction of the Service.

An addendum to the Handbook was published in the Federal Register (FR) on June 1, 2000 (FR 65-106). This addendum, also known as the “Five Point Policy”, provides additional guidance on HCPs, specifically regarding: (1) biological goals; (2) adaptive management; (3) monitoring; (4) permit duration; and (5) public participation. The addendum was created in order to incorporate lessons learned, recommendations received, and methods the Service and NOAA-Fisheries were using to strengthen the HCP process since the original issuance of the Handbook.

The Service and NiSource considered the applicable statutory and regulatory criteria, the Handbook and Five Point Policy when developing the MSHCP.

1.5.2.3 ESA Section 7

Section 7 of the ESA requires all federal agencies, in consultation with the Service, to ensure that any action "authorized, funded, or carried out" by any such agency "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of critical habitat. As the applicant for such authorizations (e.g., permits), NiSource currently addresses issues related to federally listed species for its projects pursuant to Section 7, through FERC, USFS, NPS, or USACE authorizations, certifications or permits.

Before initiating an action, the federal action agency, or their designated nonfederal representative, must determine whether the proposed project may affect listed or proposed species and/or their critical habitat. If the action agency determines that their proposed project would have no effect on listed or proposed species or their critical habitat, no further consultation is required under the ESA. If the determination is that a project may have an effect, further consultation is required.

If the action agency determines (and the Service concurs) that the project is neither likely to adversely affect any listed or proposed species nor adversely modify designated critical habitat, the consultation (informal to this point) is concluded and the Service's concurrence is provided. If the action agency determines that a project may adversely affect a listed or proposed species and/or designated or proposed critical habitat, there must be formal consultation for listed species or a conference for proposed species. For intra-service consultation, which is required here because the Service is the agency issuing the ITP, the Service is also obligated to conduct a conference opinion for candidate species

During formal consultation, the Service prepares a biological opinion (BO) in response to the information provided by the federal agency (normally provided as a biological assessment or BA). The BO analyzes the effects on the listed species and analyzes whether the Proposed Action would be likely to jeopardize the continued existence of the species or destroy or adversely modify designated critical habitat. If the BO reaches a jeopardy or adverse modification conclusion, the opinion must develop a "reasonable and prudent alternative" that would avoid that result. If the BO concludes that the project, as proposed, would involve the take of a listed species, but not to an extent that would jeopardize the species' continued

existence, the BO includes an incidental take statement and specifies reasonable and prudent measures to minimize the impact of the take. The incidental take statement specifies an amount of take that the Service believes may occur as a result of the action. The Service may also make conservation recommendations, which are non-binding, such as: identifying additional discretionary conservation measures to reduce adverse effects: identifying additional needed studies, monitoring or research, and recommending how the action agency might assist species conservation in furtherance of ESA Section 7(a)(1). If the action complies with the BO and the incidental take statement, it may be implemented without violation of the ESA, and the take is thereby exempted.

The issuance of an ITP to NiSource with implementation of the associated MSHCP would be a federal action that triggers a Section 7 consultation. We refer to this as an Intra-agency consultation because the Service essentially consults with itself. But the future federal actions of the cooperating agencies over the proposed MSHCP activities also trigger a need for consultation between the Service and these agencies. This is referred to as an Inter-Agency consultation. The Service, as the federal action agency, will complete a combined Intra- and Inter-Agency consultation to perform the analysis. The resulting BO will encompass the issuance of the ITP and implementation of the MSHCP, along with anticipated actions by cooperating agencies. Because the action agencies' approvals for NiSource's Covered Activities will occur in the future, the BO will be programmatic for certain species or activities where effects cannot now be fully analyzed.

1.5.3 Natural Gas Act

The FERC, under the authority of the Natural Gas Act (NGA), has the mission to promote the development of safe reliable and efficient energy infrastructure that serves the public interest. As provided by the NGA (15 USC § 717 *et seq.*), FERC has the sole authority to grant Certificates of Public Convenience and Necessity (18 CFR 157), which allow for the construction and operation of INGT facilities. Many of the NiSource activities covered in this EIS and MSHCP are authorized through NiSource's Blanket Certificate authorizing construction, maintenance and operations, as permitted in Docket No. CP83-76-000. These types of projects are described further below, as well as FERCs planning and permitting processes, which are described in Appendix K of the MSHCP.

FERC provides three permitting tracks for natural gas pipeline projects. Very small projects are categorically excluded from reporting or filing at FERC. Examples of categorically excluded projects are constructing facilities within fenced pipe yards (e.g., dehydrators, gas cooling equipment, station buildings, etc.), painting and greasing valves and pig traps, and installing and painting pipeline right-of-way markers. FERC also offers a Blanket Automatic Authorization certificate. Under a blanket certificate issued pursuant to section 7(c) of the Natural Gas Act, a natural gas company may undertake a restricted array of routine activities without the need to obtain a case-specific certificate for each individual project. The blanket certificate program provides an administratively efficient means to enable a company to construct, modify, acquire, operate, and abandon a limited set of natural gas facilities, and offer a limited set of services, provided each activity complies with constraints on costs and environmental impacts set forth in FERC regulations. There are two types of blanket certificate projects: 1) Automatic and 2) Prior Public Notice.

Automatic projects are smaller scale blanket certificate projects where the company must notify potentially affected landowners of the planned project at least 45 days in advance, describing the planned project and how a landowner can contact the company. The notification must also include an explanation of the FERC's Enforcement Hotline procedures and the Enforcement Hotline phone number. The FERC and the public, other than the affected landowners, do not receive notification of planned projects that qualify under this type of blanket certificate authority. The project may proceed after the landowner notification requirement has been met.

All other blanket certificate projects are subject to Prior Public Notice, whereby a company, in addition to providing potentially affected landowners with advance notice, must also file a description of a planned project with the FERC. Notice of the planned project will be issued by the FERC and published in the Federal Register. Within 60 days of publication in the Federal Register, any person may participate by intervening or by protesting a planned project. Once the 60-day period expires, if no protest has been filed, the project may proceed. However, if a protest is filed by the public or by FERC staff, interested persons have 30 days to resolve the issues. If the issues are not resolved, and the protest is not withdrawn or dismissed, the planned project may not be authorized under the company's blanket certificate, but will instead be subject to Section 7 (c) for full review.

NiSource activities that would fall under the Blanket Certificate Authorization are minor piping changes or adjustments that do not enlarge the certificated design delivery capacity of the system, miscellaneous rearrangement of facilities due to highway construction, dam construction, etc. The FERC has done a NEPA analysis on potential impacts of activities certificated under its Blanket Certificate Program, and the results were a "finding of no significant impact" (FONSI).[1] If, in fact, NiSource would undertake to construct and operate a facility under its FERC blanket certificate that was something other than a FONSI, then that undertaking would not be permissible and NiSource would have to file a complete Section (7)c application with the FERC to seek authorization. Larger pipeline projects that exceed the established criteria for blanket certification require applicants to follow the FERC natural gas certificate process.

FERC oversees environmental matters related to INGT projects, including the evaluation of project impacts under NEPA (see FERC's 1981 Blanket Certificate Program Environmental Assessment). During its project review, NiSource, as FERCs non-federal representative, consults with the Service when projects have the potential to affect federally listed species. The Service does not authorize activities for placement or operation of those INGT facilities; rather, the Service provides direction related to conservation of listed species within a proposed project area. Projects that qualify for coverage under blanket certificates may not include construction in areas that include sensitive species or their habitats unless further review is completed. In the event that sensitive species (or habitats) occur within an area, NiSource would be required to file additional reports with FERC.

1.5.4 Natural Gas Pipeline Safety Act

The Natural Gas Pipeline Safety Act of 1968 (PSA), as amended, 49 USC § Chapter 601, authorizes the U.S. Department of Transportation (USDOT), through the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), to regulate pipeline transportation of natural gas and other gases. The federal pipeline safety regulations promulgated under the PSA (1) assure safety in design, construction, inspection, testing, operation, and maintenance of pipeline facilities; and (2) set out parameters for

[1] As discussed elsewhere in this EIS, we adopt and incorporate FERC's NEPA analysis for its blanket certificate program by reference.

administering the pipeline safety program (49 CFR parts 190-199). The regulations are written as minimum performance standards.

NiSource's activities must achieve compliance under the PSA and its associated regulations. When there is a federal permit involved under other legislation, the activities themselves are typically under the purview of other federal agencies (e.g., FERC, USACE Section 10 and/or 404 permit, USFS Special Use Permit, or NPS authorization).

1.5.5 USACE Regulatory Authorities

The USACE Regulatory mission is to protect the Nation's aquatic resources, while allowing reasonable development through fair, flexible and balanced permit decisions.

The USACE is authorized to issue permits to allow the discharges of dredged or fill material into waters of the U.S. pursuant to Section 404 of the Clean Water Act (CWA) (33 USC § 1344; 33 CFR 320-332). Other activities are regulated under other permit authorities of the USACE, including certain structures or work in or affecting navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403; 33 CFR 320-332). In all cases, the USACE must comply with NEPA, ESA, and other statutes as part of their regulatory review in the decision-making process. To the extent that impacts to the human environment are not fully analyzed in previous USACE permit decision documents, additional NEPA review may be necessary, and this EIS may be utilized to the extent it applies to threatened and endangered species or other resource concerns.

1.5.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), 16 USC § 703 *et seq.*, implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and Russia for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful as is taking of any parts, nests, or eggs of such birds.

FERC and the Service entered into a Memorandum of Understanding under Executive Order 13186 relative to migratory bird conservation on March 30, 2011. This MOU will enhance protection for birds over the long term for projects that fall under FERC jurisdiction. FERC has committed to evaluate environmental impacts for projects it authorizes with special

consideration for effects on migratory birds and an emphasis on birds that are species of special concern, priority habitats, and key risk factors. It is important to note that this consideration will be broader than simply looking at federally-listed birds under the ESA. For this EIS, we evaluate impacts to migratory birds in addition to listed bird species.

For those species that are listed as threatened or endangered under the ESA and also protected by the MBTA, an ITP can function as a Special Purpose Permit under the MBTA (50 CFR § 21.27). A Special Purpose Permit would be valid for three years from the effective date of the permit, provided that the ITP remains in effect for that period. The Special Purpose Permit is renewed provided that the permittee continues to fulfill its obligations under the MSHCP and Implementation Agreement (IA). Each renewal would be valid for the period allowed by 50 CFR § 21.27 or its successor at the time of renewal.

NiSource's MSHCP has analyzed the effects on one federally-listed migratory bird, the Interior least tern (*Sterna antillarum*), which is proposed as an MSHCP Species in the NiSource Covered Lands area. The MSHCP provides measures to avoid potential effects to the species, therefore, no take is anticipated or requested. Since the ITP would not authorize take of the Interior least tern, a Special Purpose Permit would not be required in this case. Should other federally-listed bird species be requested for inclusion in the future, the Service would evaluate whether the ITP would serve as a Special Purpose Permit for those species as part of the ITP amendment request.

1.5.7 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA), 16 USC § 668 *et seq.*, as amended, prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald or golden eagles, including their parts, nests, or eggs. Take is defined in the Act as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." In the context of the NiSource pipeline operations, anticipated take would come in the form of disturbance. FWS has defined the term "disturb" to mean "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior". BGEPA Regulations (50 CFR 22) require that a

project proponent apply for a non-purposeful take permit in the event that a new activity near an eagle nest may disturb or otherwise cause the take of eagles.

This EIS includes a discussion of potential impacts associated with implementing the MSHCP as it relates to bald and golden eagle disturbance and/or protections.

1.5.8 The National Historic Preservation Act

The National Historic Preservation Act (NHPA) is a procedural statute that prescribes the steps an agency must follow before approving a permit or a license that might result in adverse effects to historic properties. The following summarizes the NHPA procedures applicable to NiSource's Covered Activities.

Section 106 of the NHPA, and its implementing regulations, apply when two thresholds are met: (1) there is an undertaking, and (2) such undertaking has the potential to affect properties listed or eligible for listing in the National Register of Historic Places.

The regulations implementing Section 106 impose a series of procedural requirements federal agencies must satisfy before approving a project. In part, these requirements include: (1) consideration of potential effects from the project to historic properties; (2) consultation with the relevant State Historic Preservation Officers (SHPOs); (3) consultation with any Indian tribes that attach religious and cultural significance to historic properties that may be affected by the project (including properties not located on tribal lands); (4) consultation with local governments; and, in some cases, (5) consultation directly with the federal Advisory Council on Historic Preservation (ACHP).

Each federal agency with licensing or permitting authority over some part of a project is individually responsible for compliance with Section 106. However, when multiple federal agencies are involved in an undertaking, some or all of the agencies may designate a lead federal agency to act on their behalf, fulfilling their collective Section 106 obligations. Similarly, when more than one state is involved in an undertaking, the relevant SHPOs may agree to designate a SHPO to take the lead and act on their behalf in the Section 106 process, including taking actions that would conclude such process.

Typically, the Section 106 review begins with the identification of the relevant SHPOs, potentially interested Indian tribes, state or local governments with jurisdiction over the Project, and/or other potentially interested parties. Then the agency's qualified experts or consultants make a reasonable and good-faith effort to identify historic properties that may be affected by the Project. This may involve a records review, a literature search, and/or a survey of the areas of potential effect (APEs) for direct and visual effects for the proposed Project. The agency must then determine whether any previously unlisted properties were subsequently listed or are eligible for listing on the National Register of Historic Places. In consultation with the SHPO, the agency will determine whether the proposed activity will adversely affect any qualified properties.

If the agency makes a determination for the Project of either "no historic properties affected" or "no adverse effect," and the relevant SHPO(s) concur(s), the Project may go forward. If the agency finds an adverse effect to one or more historic properties, the agency must consult further to avoid, minimize, or mitigate such adverse effect(s), and resolve the same by executing with the SHPO(s) a memorandum of agreement (MOA) specifying the measures required for such resolution. Failing agreement on an MOA, the agency must submit the matter to the ACHP for its comments, to which the head of the federal agency must respond in writing.

This consultation process is generally coordinated with the National Environmental Policy Act (NEPA) process and documented in the NEPA analysis. If the agency notifies the ACHP and complies with certain procedures, it may use the NEPA process and documentation to comply with Section 106 in lieu of the procedures in the ACHP's rules. A project sponsor (like NiSource) requiring a certificate from the Federal Energy Regulatory Commission (FERC) under Section 7 of the Natural Gas Act (NGA) is required to follow the procedures in the applicable FERC regulations and guidelines to assist the FERC in complying with Section 106. Projects constructed under the Natural Gas Policy Act (NGPA) or the NGA blanket certificate program must also meet requirements of the NHPA and comply with the applicable FERC regulations. Therefore, a project sponsor's construction and operation and maintenance activities must be in compliance with the NHPA to be authorized.

Under FERC's regulations, project sponsors assist the FERC in meeting its NHPA obligations. For NGA Section 7 projects, the project sponsor must submit a cultural resources report with its

application for a certificate. The resource report must contain the following information: (1) documentation of the applicant's initial cultural resources consultation, including consultations with Native Americans and other interested persons (if appropriate); (2) overview and survey reports, as appropriate, which describe information gathered and surveys done to identify the cultural resources that may be affected by the project; (3) an evaluation report, as appropriate, which assesses site eligibility and project impacts; (4) a treatment plan, as appropriate, which provides a proposal for the mitigation of effects upon any historic property that a project would affect; and (5) written comments from the SHPO(s) and applicable land-managing agencies.

FERC prefers that projects avoid historic properties, wherever possible. However, if avoidance is not possible and the project would affect historic properties, the project sponsor must prepare a treatment plan to mitigate effects. The treatment plan can include data recovery, documentation, restoration, or other measures. The project sponsor then must implement the treatment plan after FERC has consulted with all appropriate parties, executed a Memorandum of Agreement, if applicable, and has issued written notification to proceed. NiSource must present the results of any treatment in a management summary and/or a treatment report.

For activities conducted under FERC blanket certificates, the FERC regulations require that the activity to be authorized under such blanket certificate comply with the NHPA. To that end, the certificate holder must (1) check the National Register of Historic Places and consult with the SHPO to identify all listed properties within the area of the project's potential environmental impact; (2) consult with the SHPO – and, to the extent deemed appropriate by the SHPO, check public records and consult with other individuals and organizations with historical and cultural expertise – to determine whether unlisted properties that satisfy the National Register Criteria for Evaluation are known or likely to occur within the area of the project's potential environmental impact; and (3) consult with the SHPO to determine the need for surveys to identify unknown unlisted properties. The certificate holder must evaluate the eligibility of any known unlisted properties located within the area of the project's potential environmental impact according to the National Register Criteria for Evaluation.

If the SHPO deems that cultural resource surveys are required, the certificate holder must complete such surveys and submit the results to the SHPO. The certificate holder will be

deemed to be in compliance with FERC's regulation requiring NHPA compliance when one of the following conditions is satisfied:

(1) if the SHPO agrees with the certificate holder that no survey is required, and that no listed properties or unlisted properties that satisfy the National Register Criteria for Evaluation occur in the area of the project's potential environmental impact;

(2) if, upon conclusion of the surveys, the certificate holder and the SHPO agree that no listed properties, and no unlisted properties which satisfy the National Register Criteria for Evaluation, occur in the area of the project's potential environmental impact;

(3) if the certificate holder and the SHPO, or Tribal Historic Preservation Officer (THPO), as appropriate, agree that the project will not affect the historical, architectural, archeological, or cultural characteristics of a property that qualified such property to meet National Register Criteria for Evaluation; or

(4) if the certificate holder relocates the project to a site where no such properties occur, if either the certificate holder or the SHPO finds that the project may affect a listed property or an unlisted property which satisfies the National Register Criteria for Evaluation, located within the area of the project's potential environmental impact.

If the certificate holder and the SHPO, as appropriate, are unable to agree upon the need for a survey, the adequacy of a survey, or the results of application of the National Register Criteria for Evaluation to an unlisted property, the project cannot proceed under the blanket certificate.

Operation and maintenance activities that occur on ancillary facilities associated with FERC jurisdictional facilities, but that are not under FERC's jurisdiction, usually do not involve surface disturbance. However, for those operation and maintenance activities that could result in minor ground disturbance (e.g., cathodic protection ground-bed installation), NiSource personnel follow the FERC's Plan for Unanticipated Historic Properties and Human Remains to minimize potential impacts to cultural resources.

The Nationwide Permit (NWP) program administered by the USACE includes a general condition requiring compliance with the NHPA for all NWPs. The NWP general condition states: "In cases where the district engineer determines that the activity may affect properties listed, or

eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the [NHPA] have been satisfied." If the proposed activity may have the potential to cause effects to historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties, a non-federal permittee must submit a pre-construction notification (PCN) to the district engineer. The USACE will proceed to process the PCN in accordance with General Condition 31 of the 2012 Nationwide Permits regulation (77 FR 10184) and subsequent reissuances of the Nationwide Permit Program. Compliance with NHPA for standard individual permit reviews is outlined in Appendix C to 33 CFR Part 325 and applicable agency guidance.

When a project requires both a certificate from FERC and a permit from the USACE, FERC is the lead agency for NHPA compliance.

1.5.9 Relationship to Other Plans and Regulations

In addition to the regulatory requirements discussed above, NiSource's INGT activities are also subject to various other federal, state, local, and private regulatory or easement-related requirements. The EIS and subsequent issuance of the ITP would not conflict with or supersede those requirements. In fact, NiSource must be in compliance with other applicable laws for an ITP to be valid. All requirements beyond the direct scope of this EIS and the associated permit action are separate and solely the responsibility of NiSource to ensure compliance.

NiSource's facilities cross lands administered by the USFS, USACE, Service, and NPS. In those instances, depending on the scope or nature of NiSource's activities, those activities may require independent agency authorization. These approvals are sometimes referred to as "Special Use Permits." Issuance of permits or authorizations for NiSource actions represent "federal actions" and are subject to both NEPA and ESA compliance.

Specific to the USFS, the National Forest Management Act (NFMA) reorganized, expanded and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. The NFMA requires the Secretary of Agriculture to assess forest lands, develop a management program

based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System (NFS). It is the primary statute governing the administration of national forests.

The Act requires the Secretary of Agriculture to specify guidelines for developing management plans (also known as Forest Plans) that ensure consideration of both economic and environmental factors, provide for wildlife and fish and recreation, provide for diversity of plant and animal communities, ensure timber harvesting will occur only where water quality and fish habitat are adequately protected from serious detriment, ensure timber harvesting will be done where it may be done in a manner consistent with the protection of soil, watersheds, fish, wildlife, recreation, aesthetic resources, and regeneration of timber resources. The Forest Plans must be updated when significant new information or conditions are identified or at least once every 15 years.

In the event that NiSource must implement one or more of the Covered Activities on NFS lands, the USFS, through its special use permitting process, would assess whether the activities are allowed by that unit's Forest Plan, and then conducts project-specific NEPA analysis to identify and evaluate effects to various resources. As part of the site-specific analysis, a Biological Evaluation is conducted (Forest Service Manual 2670.31) to determine the potential for effect on T&E species, species proposed for listing, and Regional Forester Sensitive Species. Normally the USFS has consulted with the Service for their Forest Plan through a programmatic BO and initiates consultation or conference with the Service (through a tiered consultation) when the USFS determines that proposed activities may have an effect on T&E species; are likely to jeopardize the continued existence of a proposed species; or result in the destruction or adverse modification of critical or proposed critical habitat.

In addition to permits, the USACE may, under Army Regulation 405-80 (Management of Title and Granting Use of Real Property), require real estate instruments (including modifications to existing instruments, if any, or new temporary construction easements) wherever the NiSource Covered Lands area crosses government fee property and flowage easements (i.e., Cumberland River, Old Hickory Lake, Tennessee). Real estate management activities may include third-party use of Army and Civil Works property including use under instruments such as leases, easements, licenses or permits. USACE Engineer Regulation 405-1-12, The Real

Estate Handbook, (USACE 1985) requires compliance with NEPA and other environmental laws prior to the issuance of any real estate instrument. The USACE will evaluate NEPA requirements for future transactions and their effects to endangered species, to determine whether this EIS satisfies the endangered species aspects of permitting and land management regulations and thus may be tiered from for these purposes.

National Wildlife Refuge System (NWRS) lands managed by the Service are generally closed to public use unless expressly authorized and opened by Service. Under the National Wildlife Refuge System Improvement Act, and its implementing regulations, a refuge may be opened for use as a right-of-way provided certain criteria are satisfied (50 CFR Part 25 and Part 29, subpart B). Authorization is also required to knowingly disturb, injure, cut, burn, remove, destroy, or possess real or personal property of the U.S., including natural growth; take or possess any fish, bird, mammal, wild vertebrate or invertebrate animal, or part, nest or egg; enter, use, or occupy a System area. Additional findings may be required in determining whether proposed or existing uses of National Wildlife Refuges are appropriate or compatible with their establishing purposes and the mission of the NWRS. All recreational activities and economic or other uses of a Refuge by the public or other non-Service entity require compatibility determinations, which must include an analysis of all facilities, structures, and improvements associated with the uses. Economic uses must also contribute to achieving refuge purposes and the mission of the NWRS. Activities authorized under a Special Use Permit on NWRS lands are subject to review under NEPA and Section 7 of the ESA, in accordance with the regulations and policy.

Lands under NPS management are managed individually under the enabling legislation establishing that particular property. As presented in the U.S. Department of the Interior's (USDOI) NPS Management Policies (NPS 2006a), "A right-of-way is a special park use allowing a utility to pass over, under, or through NPS property. It may be issued only pursuant to specific statutory authority, and generally only if there is no practicable alternative to such use of NPS lands." Before a written application is submitted to the NPS, potential applicants for a right-of-way permit should meet with the NPS to discuss the proposed project. Once an application for a right-of-way is submitted, a compliance analysis must be conducted according to NEPA, NHPA, and other statutory compliance requirements as appropriate. As such, when and if NiSource applies for permission to cross Park property, the NPS will determine appropriate NEPA and effects to ESA species and to the extent NPS believes this EIS addresses the effects

to those species may tier from it. NiSource covered activities would have to comply with all authorized uses as determined by each individual NPS property crossed by the NiSource Covered Lands area. NPS regulations pertaining to the issuance of rights-of-way are found in 36 CFR Part 14 and NPS Reference Manual 53: Special Park Uses."

1.6 Decisions and Related Actions

1.6.1 U.S. Fish & Wildlife Service

The decision to be made by the Service is whether to issue NiSource an ITP. Section 10(a)(2)(B) of the ESA and the implementing regulations found in 50 CFR Part 17 require that specific criteria be met for the permit to be issued. The determination as to whether and how the criteria have been achieved will be described in the Service's decision documents.

1.6.1.1 ITP Application and HCP Submission Criteria

An Applicant must prepare and submit to the Service for approval an HCP containing the mandatory elements of Section 10(a)(2)(A) and 50 CFR 17.22(b)(1)/17.32(b)(1) before an ITP can be issued. As such, the HCP must specify the following:

- The impact that will likely result from the taking;
- What steps the applicant will take to monitor, minimize, and mitigate such impacts; the funding available to implement such steps; and the procedures to be used to deal with unforeseen circumstances;
- What alternative actions to such taking the applicant considered and the reasons why such alternatives are not proposed to be used; and
- Other measures that the Service may require as being necessary or appropriate for the purposes of the plan.

1.6.1.2 Incidental Take Permit Issuance Criteria

The issuance criteria for an ITP are contained in Section 10(a)(2)(B) of the ESA and the implementing regulations for the ESA (50 CFR 17.22(b)(2)/17.32(b)(2)). These issuance criteria are listed below:

- All taking of federally-listed fish and wildlife species must be incidental to otherwise lawful activities;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the HCP and procedures to deal with changed circumstances, including adequate funding to address such changes will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild;
- The applicant will ensure that other measures that the Service may require as being necessary or appropriate will be provided; and
- The Service has received such other assurances as may be required that the HCP will be implemented.

Further, the Service's regulations require that "the Director also consider the anticipated duration and geographic scope of the applicant's planned activities, including the amount of listed species habitat that is involved and the degree to which listed species and their habitats are affected…." (50 CFR 17.22(b)(2)(ii))

NiSource has worked with the Service to develop an MSHCP that covers a wide array of natural gas pipeline activities over a broad geographic region, provides numerous avoidance and minimization measures (AMMs) for the Take and MSHCP Species, and identifies mitigation for species for which take is likely to occur.

As detailed in Section 1.5.2, issuance of a Section 10 permit involves a federal authorization that has been evaluated under Section 7 of the ESA. In this case, the Service conducted a Section 7 consultation that is both intra- and inter-agency in nature. The results of this multiple-agency consultation will be documented in a BO, which is incorporated to this EIS by reference.

1.6.2 Compliance with the National Environmental Policy Act

As detailed in earlier sections, issuance of an ITP is a federal action subject to NEPA compliance. An EIS is required when a major federal action has the potential to significantly affect the quality of the human environment, though an agency may produce an EIS at its discretion even in cases where significant effects are not likely to occur. The Service determined that the issuance of an ITP to NiSource would require preparation of an EIS. This NEPA EIS process culminates in a ROD, which documents the Service's decision on the Proposed Action.

1.6.3 Federal Energy Regulatory Commission

For projects under FERC's authority pursuant to the NGA, the analysis contained in this EIS may provide valuable information to the FERC when it conducts project-specific environmental reviews on NiSource Covered Activities within the Covered Lands. As a cooperating agency, FERC is providing expertise as it relates to projects under FERC's jurisdiction pursuant to the NGA. When future site-specific reviews are conducted, FERC will determine the extent to which NiSource's compliance with an ITP satisfies the Commission's NEPA requirements and Section 7 responsibilities. FERC would consider the project impacts in light of the AMMs and other terms of the ITP/MSHCP that would be part of the site-specific project at that time. This provides FERC with a mechanism to streamline project review and expedite the ESA consultation process.

FERC has promulgated regulations that NiSource must follow during its process of providing natural gas via its interstate pipeline. There are three processes that NiSource uses to obtain FERC approval and assure compliance. Selection of the process to follow depends on the size of the activity (defined in economic terms) and the on-the-ground impact. A summary of the three processes is presented below.

1.6.3.1 Blanket Certificate Program

The regulations (18 CFR 157.203) provide specific criteria that are applicable to the blanket certificate program. Within this program, it is the company's responsibility to assure that the projects that go forward fully comply with all provisions. These include limits for the impacts and procedures for assuring that projects comply with the Endangered Species Act, Clean Water Act, Historic Preservation Act, and other Federal laws. As NiSource plans its future activities, it will continue to assure compliance for those activities that fit under this Program. However, in the case of the Endangered Species Act, NiSource has additional authority with the ITP and associated documents in place and NiSource may proceed with activities under the Blanket Certificate Program, as discussed below, provided the proposed project is within the MSHCP covered lands and falls within the scope of the ITP and B.O.

Prior to the issuance of the ITP, NiSource was limited under the blanket certificate program to activities that could be concluded through the informal Section 7 ESA process (acting as the non-Federal representative for FERC). With informal Section 7 ESA consultation, the impacts to species must be limited to activities that result in a determination of "not likely to adversely affect." Prior to obtaining the ITP, NiSource would need to enlist FERC in the initiation of formal consultation for any activities that might result in take of threatened or endangered species. With the ITP in place, the authorization to take certain species while conducting otherwise lawful activities exists; therefore, NiSource will be able to proceed with those activities under the programmatic blanket certificate program provided they comply with the ITP and MSHCP as well as all other criteria applicable to the programmatic blanket certificate program.

There is not a separate NEPA review conducted for a project that meets the criteria for the blanket certificate program pursuant to 18 CFR 157.208. However, each project is reviewed for compliance with certain environmental conditions set forth in 18 CFR 157,206(b). When FERC promulgated regulations for the program, an Environmental Assessment was prepared and a FONSI was issued. The EA describes the general nature of impacts resulting from activities that fall under the blanket certificate program. Some examples of activities include limited pipeline replacement, installation of minor above-ground facilities occurring on the existing right-of-way, and work on a compressor station that does not increase capacity by more than 0.5%. The EA concludes that provided the impacts do not exceed those contemplated at the inception

of the blanket certificate program (via the EA and regulations, as updated), no new NEPA document is prepared before implementing a qualifying activity. NiSource then follows the FERC process for reporting activities conducted under the blanket certificate on an annual basis. It bears repeating that the difference here is that certain activities that could previously be conducted only with formal ESA Section 7 consultation will have that process completed for certain species and the activities may proceed without additional review by the Service, provided all other blanket certificate criteria are met and activities only involve those species and activities covered by the MSHCP, ITP or the biological opinion that covers the issuance of the ITP and its implementation. Further discussion of the implementation requirements pursuant to the biological opinion is found in the B.O. itself, which is appended to this FEIS and incorporated by reference (Appendix G). In addition, a summary of the steps required is provided at the end of this section.

1.6.3.2 Prior Notification

For activities that exceed thresholds set for the blanket certificate program, the next level of review is referred to as “prior notification”, which is outlined in 18 CFR 157.208(b). The process for the prior notification includes (1) the applicant filing an application for the project, which is given a docket number; and (2) FERC will prepare a Notice of Application allowing a time period for intervention and protest. FERC environmental staff will prepare a short environmental review document (normally an Environmental Assessment) that assesses compliance with relevant environmental regulations (18 CFR 157.206(b)) environmental issues on a site-specific basis, which is published and placed in FERC’s eLibrary for public review. If the findings are not contested by FERC, another agency, or member of the public, the project is approved to be implemented under this regulation after a 60 day period. In the event the project is contested and the issues are not resolved, and the protest is not withdrawn or dismissed, the planned project may not be authorized under the company’s blanket certificate, but may be reviewed as a 7(c) filing, in which a NEPA document would be prepared.

1.6.3.3 NGA 7c Process

When a project cannot be completed under the programmatic blanket certificate program or prior notification process, then NiSource’s proposed project will be reviewed in the 7c Process

under the Natural Gas Act. For projects to proceed, there are a number of administrative steps that an action agency (or NiSource, when serving as the representative) must take. NiSource will be responsible for coordinating between the agencies to assure that proper process is followed. When NiSource submits an application to FERC it must also file for all other Federal authorizations (e.g., USACE permit application), which initiates a certain timeframe and sequence of events between the agencies and FERC. NiSource will be responsible to assure that the involved agencies have all of the documentation needed to adequately review the request and issue its authorization or permit in full coordination with FERC and in accordance with established timeframes. The preconstruction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work, located in the vicinity of the proposed activity, or utilize the designated critical habitat as well as any other information required for 7 c filing. As a result of formal or informal consultation with the Service, the FERC may add species-specific regional endangered species conditions to its authorization.

The following steps would guide how NiSource's projects would be evaluated by FERC to comply with Endangered Species Act for Covered Activities under the MSHCP. However, no further consultation with the Service would be required for the MSHCP species provided the proposal meets all the criteria outlined in the ROD and BO issued by the Service:

Prior to undertaking any covered activity, NiSource will provide project specific information:

- Identify whether species are present in the project area and what listed, proposed, and candidate species (MSHCP and non-MSHCP) or designated or proposed critical habitats may be in the action area;
- Identify species specific avoidance, minimization and mitigation measures that have been approved by the Service as part of MSHCP and BO.
- Identify species that are outside the MSHCP and BO;
- NiSource will identify any applicable reasonable and prudent measures and terms and conditions from the biological opinion for the MSHCP that would be implemented during project construction, restoration and operation.

- NiSource will make a determination if the Covered Activity would affect any non-MSHCP species or designated critical habitat.

- When the Service's IPaC system is available, NiSource will use this internet-based tool to specify a project location and activity, and receive resource information about the project site. IPaC will provide data on the biological resources within the project location (i.e., the MSHCP species as well as other species not addressed in the MSHCP) and the AMMs and environmental construction standards to implement in the project area.

- If IPaC is not available, NiSource will continue its current tracking, monitoring, and reporting methods until such time as the IPaC system (or something similar) is functional.

- To expedite ESA section 7 consultation process for all MSHCP species (including species that are likely to be adversely affected) no additional consultation would be necessary provided NiSource provides adequate documentation that the activity is conducted with all appropriate AMMs and is in accord with MSHCP and BO requirements as identified the ROD issued by the Service.

- For all non-MSHCP species, a tiered approach to consultation would be required, per the instructions in the BO, MSHCP and the supplemental EA. Therefore, additional consultation may be necessary. *Level 1 Consultation*: No additional consultation would be necessary if the FERC determines that there will be no effect on the species. *Level 2 Consultation*: Projects that may affect, but are not likely to adversely affect non-MSHCP species or designated critical habitat require written concurrence from the Service as part of informal consultation. *Level 3 Consultation*: Projects that would adversely affect a species or its habitat require that NiSource provide survey information and documentation of initial consultation with the Service.

Based on the above information FERC would review to ensure if the proposal contains all AMMs outlined in the Service's ROD and BO for MSHCP species and Non-MSHCP species, and make a determination if section 7(c) ESA consultation is necessary in compliance with ESA. The FERC typically requests Service's concurrence on its biological assessment and effects determinations before authorizing construction, however, no further consultation with the Service would be required for the MSHCP species if the proposal met all criteria outlined in the

ROD and the BO. For the Non-MSHCP species, a tiered consultation would be required, per the instructions in the BO and the supplemental EA.

1.6.4 U.S. Army Corps of Engineers

For projects under the authority of the USACE, the analysis contained in this EIS will provide information for future site-specific project review and USACE permitting. The USACE will conduct site-specific analyses when NiSource proposes projects within the MSHCP Covered Lands footprint involving activities that fall under USACE jurisdiction. As a cooperating agency, the USACE will utilize the EIS analysis and the Service's BO to expedite its compliance with the ESA on future NiSource project reviews. USACE reviews would consider the site-specific action in light of the AMMs and other MSHCP terms that are in effect for the project area.

As previously discussed in this Chapter, the USACE is authorized to issue permits for discharges of dredged or fill material into waters of the U.S. pursuant to Section 404 of the Clean Water Act (CWA) (33 USC § 1344; 33 CFR 320-332). Other activities are also regulated under other permit authorities of the USACE, including permitting (or authorizing) the placement of certain structures or work in or affecting navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403; 33 CFR 320-332).

Many of NiSource's activities under the MSHCP require permits from the USACE, particularly those activities impacting streams and wetlands. New Jersey has been delegated Section 404 authority under the CWA, thus permits must be obtained from the NJ Department of Environmental Protection (NJDEP). No other states within the NiSource covered lands have been delegated Section 404 authority. In general there are two types of USACE permits: individual permits, including standard permits and letters of permission, and general permits, including Nationwide permits, regional general permits and programmatic general permits. The following includes descriptions of the various permit authorizations , including the methods by which NiSource and the USACE will ensure compliance with the MSHCP, ITP, and Section 7 consultation documentation (i.e., BO and no effect and not likely to adversely affect concurrence letters).

1.6.4.1 Individual Permits

Individual permits may be issued for activities that result in more than minimal adverse effect on the aquatic environment and do not otherwise qualify for a general permit. Letters of Permission are issued for minor, non-controversial projects through an abbreviated processing procedure which includes coordination with federal and state resource agencies, and a public interest evaluation, but without the publishing of an individual public notice. Activities that do not qualify for authorization under Letters of Permission may qualify for authorization by Standard Permit. Standard permits require a public notice with a 15 to 30-day comment period. The USACE considers comments received, completes a public interest review and 404(b)(1) Guidelines analysis as appropriate, and makes a decision to issue, issue with conditions, or deny. Permit decisions are based on probable impacts, including cumulative impacts, of the proposed activity on the public interest (33 CFR 320.4). A permit is granted if the proposed project is not contrary to the public interest and meets other legal requirements.

1.6.4.2 General Permits

General permits are issued nationwide or regionally for a category or categories of activities that are similar in nature and cause only minimal individual and cumulative adverse effects on the aquatic environment. General permits are issued for a period of five years and include terms and conditions that may require preconstruction notification to the USACE. Preconstruction notification to the USACE may be required under a number of circumstances including if threatened or endangered species or its critical habitat might be affected by the activity or is in the vicinity of the project. The applicant may not begin the activity until notified by the USACE that the activity meets the terms and conditions of the permit, including the requirements of the Endangered Species Act and any other applicable statutes. There are currently 50 Nationwide Permits (published on February 19, 2012 and expire on March 18, 2017) with 31 general conditions. Regional permits vary by location within the MSHCP Covered Lands.

1.6.4.3 Guidelines for USACE Permits for Covered Activities under the MSHCP

Application requirements vary by permit type. Individual Permit applications are reviewed on a case-by-case basis by the USACE for potential effects to threatened or endangered species.

Permit applicants should provide information to the USACE that addresses whether the proposed project may affect federally listed endangered or threatened species or critical habitat. For authorization under nationwide, regional, or programmatic general permits, prospective permittees must submit a pre-construction notification to the USACE (even if pre-construction notification is not otherwise required) if any listed species or designated critical habitat might be affected or is in the vicinity of the project. The preconstruction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat, as well as any other information required by the general permit. As a result of formal or informal consultation with the Service, the USACE may add species-specific regional endangered species conditions to general permit verifications or individual permits. Under all permit types and authorization, permittees may not begin work until notified by the USACE that the requirements of the Endangered Species Act (and any other applicable statutes) have been satisfied and the activity is authorized.

The following procedures will guide how NiSource addresses ESA issues as part of applying for USACE individual permits or providing preconstruction notification for general permits:

- NiSource's Natural Resource Permitting Group (NRP) will gather further site-specific information related to the covered activity's potential impacts on listed species and identify appropriate AMMs. NiSource will also include any reasonable and prudent measures and terms and conditions from the BO for the MSHCP. NiSource will also determine if the activity may affect a non-MSHCP listed species or designated critical habitat, in which case programmatic consultation may be required.
    - If the Service's IPaC system is available, NiSource will use this internet-based tool to specify a project location and activity, and receive resource information about the project site. IPaC will provide data on the biological resources within the project location (i.e., the MSHCP species as well as other species not addressed in the MSHCP) and the AMMs and environmental construction standards to implement in the project area.

  - If IPaC is not available, NiSource will continue its current tracking, monitoring, and reporting methods until such time as the IPaC system (or something similar) is functional.

- NiSource will prepare and submit an application package or preconstruction notification documenting all of the information noted above to the USACE to address ESA issues that may occur as a result of their proposed activities in waters of the U.S. . The application package will include their recommended determination of effect for each species and any critical habitat with reference to whether the activity is covered under the Service's BO and not likely to adversely affect concurrence letters.

- The USACE will review the information packet provided by NiSource and determine if they concur with NiSource's recommended effect determinations for listed species or critical habitat. For all MSHCP species (including species that are likely to be adversely affected), no additional consultation with the Service is necessary if USACE determines NiSource has provided adequate documentation that the activity is conducted with all appropriate AMMs and is therefore in compliance with the ESA.

- For all non-MSHCP species, additional consultation may be necessary. No additional consultation is needed if the USACE determines that there will be no effect to the species. Projects that may affect, but are not likely to adversely affect non-MSHCP species or designated critical habitat require written concurrence from the Service through informal Level 2 consultation. Upon making such a determination, the USACE will contact the local Service field office to initiate Level 2 of the programmatic consultation for the MSHCP.

1.6.5 U.S. Forest Service

It is the Service's and the USFS intent that NiSource's receipt of an ITP, its compliance with the MSHCP, and the associated Biological Opinion for the ITP, will satisfy USFS's statutory and regulatory obligations under ESA Section 7 for all future Covered Activities authorized by the USFS on national forest lands within the NiSource Covered Lands. No additional consultation with the Service or further avoidance, minimization, and/or mitigation measures for Covered Species will be required.

The USFS will conduct site-specific analysis as projects within the Covered Lands footprint are proposed on national forest lands. It will be able to consider and incorporate relevant portions of this EIS as it conducts its own regulatory and NEPA reviews. And it will be able to rely on the MSHCP and BO to determine which AMMs or other conditions apply when authorizing those projects. The intent of the Service and the USFS is to provide a mechanism to streamline the project review and concurrence process.

1.6.5.1 Existing Special Use Permit – not Expired

NiSource, through its operating companies, is in receipt of special use permits for operation and maintenance of its existing transmission lines and facilities from specific National Forests in Regions 8 and 9. These active operations and maintenance activities have been permitted after completion of a NEPA analysis (per Forest Service Handbook (FSH) 1909.15). These special use permits are typically authorized for 20-30 years before they need to be renewed. Permit monitoring occurs according to requirements outlined in the permit and project file.

Per direction in FSH 1909.15(18) and (18.1), decision makers must be alert for new information and changed circumstances that might affect decisions for ongoing projects, such as these special use permits, to determine if the projects' environmental analysis and documentation must be corrected, supplemented, or revised.

The responsible official would review the information in the ROD and its associated BO to determine its importance relative to the original decision and permit. Consideration would be given to whether or not the new information or changed circumstances are within the scope and range of effects considered in the original analysis.

The interdisciplinary review would be documented in the special use permit file. This documentation is often referred to as a Supplemental Information Report (SIR) and would conclude with the responsible official's determination of whether or not a correction, supplement, or revision of the original NEPA decision is needed, and if not, the reasons why.

If, after an interdisciplinary review and consideration of new information within the context of the special use permit, the responsible official determines that a correction, supplement, or revision

to an environmental document is not necessary, implementation of the special use permit would continue.

A SIR is not a NEPA document and therefore is not used to fulfill the requirements for a revised or supplemental EA or EIS. A SIR will not repair deficiencies in the original environmental analysis or documentation, nor will it change a decision. If the responsible official determines that a correction, supplement, or revision to an existing environmental document is necessary, he/she will follow the relevant direction in FSH 1909.15(18.2 - 18.4).

1.6.5.2 NiSource Proposal to Renew a Special Use Permit

Special use permits are authorized for a specific period of time. Upon a permit's expiration, the permittee may approach the Forest Service to renew the permit. In such a case, the responsible official would review the proposal to ensure it contains all avoidance and minimization measures outlined in the ROD and BO for MSHCP species and non-MSHCP species.

Once the proposal is accepted, the responsible official would follow FSH 1909.15 to analyze and document the environmental consequences of the proposed action. Once the appropriate analysis and public involvement is concluded, the responsible official would make their decision on the proposal to renew the project.

As with any project under review, the effects to federally listed species present in or near the affected area on the National Forest would be considered. However, consultation with the FWS would be streamlined, following separate procedures based on whether the federally listed species are addressed in the MSHCP (MSHCP species) or not (non-MSHCP species). The Forest Service typically requests FWS concurrence of their biological assessment findings and determinations before the responsible official makes their decision; however no further consultation with the FWS would be required for the MSHCP species if the proposal met all criteria outlined in the ROD and BO[2]. For the non-MSHCP species, a tiered consultation would be required, per the instructions in the BO.

[2] The responsible official would document this compliance in the project record.

If the responsible official proposes to select a project alternative that varies from the criteria listed in the ROD and BO, then additional consultation with FWS would be required. Examples of when this may occur are (1) an AMM in the ROD or BO cannot be used because it would adversely affect a resource, and (2) a Forest Plan Standard or Guideline offers more protection to a species or resource than an AMM.

1.6.5.3 NiSource Project Proposal Requiring a New Special Use Permit

Once the proposal is accepted, the responsible official would follow FSH 1909.15 to analyze and document the environmental consequences of the proposed action. Once the appropriate analysis and public involvement is concluded, the responsible official would make their decision on the proposal to renew the project.

As with any project under review, the effects to federally listed species present in or near the affected area on the National Forest would be considered. However, consultation with the FWS would be streamlined, following separate procedures based on whether the federally listed species are addressed in the MSHCP (MSHCP species) or not (non-MSHCP species). The Forest Service typically requests FWS concurrence of their biological assessment findings and determinations before the responsible official makes their decision; however no further consultation with the FWS would be required for the MSHCP species if the proposal met all criteria outlined in the ROD and BO[3]. For the non-MSHCP species, a tiered consultation would be required, per the instructions in the BO.

If the responsible official proposes to select a project alternative that varies from the criteria listed in the ROD and BO, then additional consultation with FWS would be required. Examples of when this may occur are (1) an AMM in the ROD or BO cannot be used because it would adversely affect a resource, and (2) a Forest Plan Standard or Guideline offers more protection to a species or resource than an AMM.

[3] The responsible official would document this compliance in the project record.

1.6.6 National Park Service

It is the Service's and the NPS's intent that NiSource's receipt of an ITP, its compliance with the MSHCP, and the associated biological opinion for the ITP, will satisfy NPS's statutory and regulatory obligations under ESA Section 7 for all future covered activities authorized by the NPS on national park service lands within the NiSource Covered Land. No additional consultation with the Service or further avoidance, minimization, and/or mitigation measures for Covered Species will be required.

The NPS will conduct site-specific analysis as projects within the Covered Lands footprint are proposed on NPS lands. It will be able to consider and incorporate relevant portions of this EIS as it conducts its own regulatory and NEPA reviews. And it will be able to rely on the MSHCP and BO to determine which AMMs or other conditions apply when authorizing those projects. The intent of the Service and the NPS is to provide a mechanism to streamline the project review and concurrence process.

Lands under National Park Service (NPS) management are managed individually under the enabling legislation established for that particular property. As presented in the U.S. Department of the Interior's (USDI) NPS Management Policies (NPS 2006a), "A right-of-way is a special park use allowing a utility to pass over, under, or through NPS property. It may be issued only pursuant to specific statutory authority, and generally only if there is no practicable alternative to such use of NPS lands." Before a written application is submitted to the NPS, potential applicants for a right-of-way permit should meet with the NPS to discuss the proposed project. Once an application for a right-of-way is submitted, a compliance analysis must be conducted according to NEPA, NHPA, and other statutory compliance requirements as appropriate. As such, NiSource covered activities will have to comply with all authorized uses as determined by each individual NPS property crossed by the NCL area. NPS regulations pertaining to the issuance of rights-of-way are found in 36 CFR Part 14 and NPS Reference Manual 53: Special Park Uses.

1.6.7 National Wildlife Refuge System

It is the Service's intent that NiSource's receipt of an ITP, its compliance with the MSHCP, and the associated Biological Opinion for the ITP, will satisfy the Service's statutory and regulatory

obligations under ESA Section 7 for all future covered activities authorized by the Service on Service land within the Covered Land. No additional consultation with the Service or further avoidance, minimization, and/or mitigation measures for Covered Species will be required.

The Service will conduct site-specific analysis as projects within the Covered Lands footprint are proposed on Service lands. It will be able to consider and incorporate relevant portions of this EIS as it conducts its own regulatory and NEPA reviews. And it will be able to rely on the MSHCP and BO to determine which AMMs or other conditions apply when authorizing those projects. The intent of the Service is to provide a mechanism to streamline the project review and concurrence process.

1.7 Public/Stakeholder Participation

Scoping is a crucial step in the early planning stage of an environmental document. The objectives of scoping are to identify significant issues and to translate these into the purpose for the action, the needs for the action, the action or actions to be taken, alternatives to be considered in detail, alternatives not to be considered in detail, and impacts to be addressed. Scoping is used to design an EIS, and if effective, should reduce paperwork, delays, and costs; and improve the effectiveness of the NEPA process. Scoping is a public participation process that begins with the publication in the Federal Register of the Notice of Intent (NOI) to prepare an EIS (FR, Vol. 72, No. 196, pp. 57953 – 57956).

1.7.1 NEPA Public Outreach

1.7.1.1 EIS Notice of Intent (NOI)

On October 11, 2007, the Service published an NOI in the Federal Register to solicit participation of responsible federal, state, and local agencies, Tribes, and the public in determining the scope of this EIS. Publication and distribution of the NOI initiated the process of public scoping for this EIS. Copies of the NOI can be found in **Appendix A**.

1.7.1.2 EIS Scoping

As noted, scoping refers to the process used to determine the focus and content of an EIS. Scoping solicits input and comments from the public and stakeholders on the potential topics to

be addressed in an EIS, the range of project alternatives, and possible mitigation measures. Scoping is also helpful in establishing methods of assessment and in selecting the environmental effects to be considered in detail. The Service consulted with state and federal agencies, and Tribes. Tools used in scoping this EIS included informal stakeholder and agency consultations, numerous public scoping meetings, and publication of the NOI.

The scoping period began with publication of the NOI, and extended to December 8, 2007. On October 18, 2007, a public scoping/*Dear Interested Party* letter was sent to over 1,300 known interested parties including agencies, organizations, and the public. In addition, the public scoping letter was sent to federally recognized Native American Tribes in each of Louisiana, Maine, Massachusetts, Mississippi, and New York. The letter provided information on the project and the EIS, and included the dates of the 13 scoping meetings with the times and locations of the scoping meetings provided on a separate enclosed *"Venues for Open Houses"* document. Notification was given that written comments would be received until December 8, 2007, through either U.S. Postal Mail, facsimile or the Service website.

For those people requiring further information, the names, e-mail addresses, and telephone numbers of two key Service representatives, along with a 1-800 number, were also provided.

Thirteen public scoping meetings were held during the scoping period between 5, and 15 November 2007. The meetings were held in the cities of Portsmouth, New Hampshire; Lafayette, Louisiana; Binghamton, New York; Lexington, Kentucky; Jackson, Mississippi; Philadelphia, Pennsylvania; Columbus, Ohio; Nashville, Tennessee; Charleston, West Virginia; Washington, D.C.; Cleveland, Ohio; Richmond, Virginia; and Pittsburgh, Pennsylvania. The Scoping Report, including specific time and location information for the scoping meetings can be found in Appendix A; Scoping Report appendices are available at

http://www.fws.gov/midwest/endangered/permits/hcp/nisource/scopingreport.html

The scoping meetings provided an opportunity for the attendees to learn about the Proposed Action and comment on environmental issues of concern and the alternatives that should be discussed in the EIS. Scoping comments and letters are also described in Appendix A.

The Scoping Report includes the following information related to the scoping process and development of the draft EIS:

- Background information on the regulatory framework relative to the issuance of an ITP to NiSource or any of its interstate natural gas transmission subsidiaries;
- Definition, and Purpose and Need for the Proposed Action;
- Description of the preliminary alternatives, including the no-action alternative;
- Summary of the scoping process and comments received; and
- Summary of impact areas and issues to be addressed in the EIS.

We received 43 written responses during the scoping period: 25 from federal, state, and local agencies and 18 comments from the public or non-governmental organizations. The comments and input obtained during the scoping process were considered in developing this EIS. In some cases, specific issues were raised with respect to individual species or locations. In other cases, more generic issues or questions were raised with respect to the overall scope of the MSHCP or the ITP. Where appropriate, input from the scoping process is discussed in the relevant section of the EIS.

Chapter 2 of the EIS details the process used to respond to comments received during scoping and to develop alternatives to the Proposed Action that are analyzed in subsequent chapters of the EIS.

1.7.1.3 Draft EIS Public Review

In accordance with NEPA, this EIS was circulated for public review and comment. The public review period was initiated with the publication of the Notice of Availability (NOA) in the FR on July 13, 2011, (FR 76, No. 134, 41288-41293) and the public comment period was extended for an additional 90 days (FR 76, No. 199, 63950). The comment period closed on December 13, 2011, culminating a 150-day public review period.

A variety of comments were received on the DEIS which are available at http://www.fws.gov/midwest/endangered/permits/hcp/nisource/index.html. Written responses to public comments are appended to this document.

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Chapter 2 Description of Alternatives

This chapter presents the alternative formulation and evaluation process, and describes and compares two “Action” alternatives and one “No Action” alternative with respect to the applicant’s request for an Incidental Take Permit from the Service.

2.1 Formulation and Evaluation of Alternatives

The Service and Cooperating Agencies considered a range of options and alternatives during development of this EIS (See Section 2.3). Alternative development focused primarily on identifying actions that would achieve the proposed action’s purpose and need, with an emphasis on those that could be practicably implemented. In developing alternatives, the Service and Cooperating Agencies also considered, among other factors, the scope of potential impacts to MSHCP Species and compliance with ESA; public input/scoping comments; and the impacts on NiSource’s safety and delivery obligations. The process by which alternatives were considered is presented below, along with a full description of the alternatives carried forward for further analysis.

2.1.1 Elements Common to all Alternatives, including the No Action Alternative

2.1.1.1 NiSource Covered Activities

Regardless of the alternative selected, NiSource will continue to implement its Columbia Gas ECS (2008), Columbia Gulf ECS (2008), and Virginia ECS (2008) businesses per requirements from regulatory agencies both federal and state. NiSource’s Environmental Construction Standards (ECS) set the requirements, both Federal and state, that must be followed in order to undertake pipeline and other facility construction, operation, and maintenance activities, including ROW maintenance and monitoring, (NiSource 2010a). NiSource plans to use a trained Environmental Inspector who will be responsible for implementing and assuring compliance with all project specific Environmental Management and Construction Plans (EM&CPs).

In its MSHCP, NiSource estimates the annual average disturbance from both general O&M and construction activities to be 19,409 acres. Of this total, NiSource estimates that 18,505 acres

would involve existing ROW and existing compressor station lands (i.e. previously disturbed lands); most of which would result from routine vegetation management. New construction, including establishment of new ROW and new storage fields, is estimated to account for 904 acres annually.

In Table 2.1 of their MSHCP, NiSource divides the 19,409 acres of impacts into four categories of activities: ROW maintenance, other O&M, Medium Capital Expansion Projects, and Large Capital Expansion Projects. NiSource defines Medium Capital Expansion Projects as 1) the construction of a new pipeline up to 50-miles in length, 2) the drilling of up to 30 wells within existing storage fields, and 3) the addition of up to four compressor stations. NiSource defines Large Capital Expansion Projects as construction of new pipelines between 50 and 200 miles in length. Of these four categories, annualized impacts of 19,409 acres were broken down as follows: a total 16,667 acres for ROW maintenance, 1,102 acres for other O&M activities, 670 acres for Medium Capital Expansion projects, and 970 acres (on average) for Large Capital Expansion projects.

2.1.1.2 Compliance with ESA

In addition to NEPA requirements, ESA requirements were also considered in the formulation of alternatives. The issuance criteria for ESA Incidental Take Permits described in Chapter 1 provided guidance for developing alternatives. A foremost purpose of this EIS is to address the potential impacts of issuance of the ITP on federally listed species and related resources. Of particular importance are the permit issuance criteria, which require that 1) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking; 2) adequate funding and procedures to deal with unforeseen circumstances will be provided; and 3) the taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild (16 USC 668; 50 CFR 17.22).

The third factor is essentially the determination of “jeopardy” as defined in the Service’s ESA Section 7 regulations (50 CFR Part 402.02). Service regulations define the term "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." Any alternative that did not meet these criteria were not given consideration. In other words, with the

exception of the no action alternative, we focused on those alternatives that would allow the Service to issue a permit consistent with its own permit issuance criteria.

2.1.2 Purpose & Need and Compliance with NEPA

As described in Chapter 1, issuance of an ITP is a federal action requiring compliance with NEPA. NEPA implementing regulations require lead agencies to develop and assess a range of alternatives that meet the Purpose of and Need for the Proposed Action. In this case the Purpose of the Proposed Action is to comply with the ESA by providing protection and conservation of certain listed species while enabling NiSource to conduct legally authorized activities associated with (1) general O&M; (2) safety-related repairs, replacements, and maintenance; and (3) construction and expansion (includes abandonment and replacement).

The Need for the Proposed Action is based on the fact that take of a listed species incidental to otherwise lawful activities can be authorized under Section 10(a)(1)(B) of the ESA with preparation of an HCP and issuance of an ITP. In addition, there are several overarching goals that are closely linked to the Purpose of and Need for the Proposed Action as detailed in Section 1.4. These include:

- Certainty of consistent and meaningful ESA compliance resulting in efficient consultation and NEPA compliance for cooperating agencies regarding endangered species;
- Foster Efficient Use of public and private Time and Money;
- Assure the Conservation and Recovery of MSHCP Species related to activities associated with natural gas transmission; and
- Develop and Coordinate Mitigation Opportunities for listed species

In developing alternatives, the Service and Cooperating Agencies were cognizant of NiSource's desire to provide certainty to its ESA obligations. Though a laudable goal, this facet of the applicant's proposed action did not constrain our consideration of feasible alternatives. Further, NEPA and DOI policy and regulations state that the alternatives selected for detailed analysis should be reasonable and implementable, should be given equal treatment, and should provide

clear choices for the decision-makers and the public. These regulations also require lead agencies to:

- Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated;
- Devote substantial treatment to each alternative considered in detail, including the proposed action, so that reviewers may evaluate their comparative merits;
- Include reasonable alternatives not within the jurisdiction of the lead agency;
- Include the alternative of no action;
- Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference; and
- Include appropriate mitigation measures not already included in the proposed action or alternatives.

2.1.3 Public Input

Public input was solicited through scoping meetings and public notices (Federal Register NOI and NOA) as further detailed in Chapter 1, the appended Scoping Report and the appended Response to Public Comments (**Appendix A**). A range of input and alternatives were identified by landowners, resource agencies, and other stakeholders during the public scoping period and the public comment period on the draft EIS. Alternatives or suggestions that were deemed to be within the scope of this analysis are categorized as follows:

- Alternatives to the proposed ***Permit Duration***
- Alternatives to the proposed ***Covered Species***
- Alternatives to the proposed ***Covered Land***
- Alternatives to the proposed ***Covered Activities***
- Alternatives to the proposed ***Implementation Strategies***

2.1.4 Impacts on NiSource's Transmission/Storage & Safety Obligations

As described in Chapter 1, NiSource's primary INGT operations fall under the authority of the Federal Energy Regulatory Commission (FERC) and the Natural Gas Act, as well as U.S. Department of Transportation (DOT) and the Pipeline Safety Act (PSA).

NiSource transports/stores natural gas for its customer/market(s) under a federal mandate issued by FERC. That mandate comes in the form of a Certificate of Public Convenience and Necessity (Certificate). A Certificate affords NiSource certain rights, which among other things, allows them to site, construct, and operate its facilities, within limitations. With those same rights however come various legally binding obligations, including the obligation to provide the certificated level of natural gas transmission and or storage capacity to the specified customer/market(s). Also, once the facilities are placed in service, NiSource's operations must comply with safety requirements subject to the PSA.

Any alternative that does not allow NiSource to meet its transmission/storage obligations in a safe manner would have a negative impact on the customer/market(s) that rely on NiSource's services, and would subject NiSource to potential legal liability. Therefore, alternatives that did not conflict with NiSource's federally mandated transmission/storage and safety obligations were given consideration over those that did.

2.1.5 Feasibility of AMMs and Service Guidance

ESA permit issuance criteria require that the applicant (NiSource), through development of an HCP, will, to the maximum extent practicable, minimize and mitigate the impact of taking a species covered by an ITP. Issuance criteria require the Service to examine and predict the efficacy of the applicants' proposed minimization and mitigation measures. It is important to understand that in doing so, the Service is focused solely on measures to be undertaken to reduce the likelihood and extent of the <u>impact of take resulting from the project as proposed, as well as appropriate compensatory measures</u>. The Service interprets this section to mean that the impacts of the proposed project including the HCP that weren't *eliminated* as a result of informal negotiation process, must be minimized to the maximum extent practicable, and those remaining impacts that can't be further minimized, must be mitigated to the maximum extent practicable. These standards are based in a *biological determination* of the impacts of the

project as proposed, what would further minimize those impacts, and then what would biologically mitigate, or compensate for those remaining impacts. Alternatives that achieved compliance with those factors were given preference over those that did not.

2.2 Alternatives Considered But Eliminated From Consideration

Alternative topics that were assessed and dismissed from further consideration are discussed below.

2.2.1 Alternatives with Varying Processes or Scope

It should be noted that for the purpose of NEPA, the Service and Cooperating Agencies dismissed three alternatives that would have altered the process or scope of requested incidental take coverage. These include 1) the breadth of the species to be included (i.e., MSHCP species), 2) the breadth of the Covered Lands, and 3) the inclusion of storage fields (i.e., storage field counties). We acknowledge that these alternatives are viable and the Service retains authority to condition a permit to limit or expand the scope of species, breadth of Covered Lands, or inclusion and exclusion of certain areas. However, evaluating these permutations in this NEPA document would not produce a meaningful comparison of environmental consequences. That is because of the unique nature of the proposal, which hybridizes an ESA Section 10 permitting process with a Section 7 consultation process, and a NEPA process. Thus, these alternatives are essentially procedural in application, as under any of the above citied alternatives, all of the environmental consequences will ultimately be similar.

The list of species incorporated into NiSource's MSHCP is at the discretion of NiSource. However, the Service can only issue an ITP for those species under its jurisdiction. Receipt of an ITP would not release NiSource from any obligations related to state-specific species regulations or requirements. Also, NiSource's activities that have the potential to impact federally listed species not covered by or included in the MSHCP and ITP are still subject to the requirements of the ESA, and conservation of these species must be accomplished in some manner to remain in compliance with ESA.

2.2.2 Covered Activities Alternative

Public input was received regarding the proposed extent of Covered Activities. Specifically, one commenter suggested that other than small-scale maintenance activities, activities that include "new construction, expansion, or major maintenance should be excluded from the ITP". The commenter further suggested that these excluded activities undergo a more "traditional ESA review". The Service assumes that a reference to "traditional ESA review" refers to ESA compliance under Section 7, which is how NiSource presently complies with ESA.

As described in Chapter 1, Section 10 of the ESA allows for issuance of an ITP when an appropriate HCP has been developed. Limiting the range of activities would conflict with the action's intended purpose of enabling NiSource to conduct activities associated with (1) general O&M; (2) safety-related repairs, replacements, and maintenance; and (3) construction and expansion (includes abandonment and replacement).

If it is determined that the MSHCP is insufficient at identifying and addressing impacts associated with the proposed incidental take, an ITP would not be issued. Similarly, if Covered Activities are not able to meet issuance criteria, they will not be included in an ITP, or further restrictions will be mandated by the Service. However, limiting the range of activities in the MSHCP would not meet the applicant's ITP request, which would have resulted in NiSource withdrawing their ITP application.. For this reason, during negotiations on development of the MSHCP, the Service agreed that there is no benefit to the species from limiting the range of activities in the MSHCP, and thus the applicant's request would be fully considered in terms of the Covered Activities.

2.2.3 Implementation Strategies Alternative

Comments were received which addressed specific implementation protocols. Most of those comments related to construction, or more specifically, best management practices (BMPs) associated with construction activities. Some comments received were determined to restrict flexibility, and were unsubstantiated in practice, and thus dismissed. For example, one commenter suggested that the Service require NiSource to use Horizontal Directional Drilling (HDD) at all stream and/or river crossings to avoid or minimize impacts to aquatic species. While the Service recognizes the HDD technology as an important option to avoid and minimize

impacts to aquatic species, it is also true that HDD methodology is not appropriate or feasible in all situations. Both geologic and geographic constraints can prevent successful completion of an HDD, and may actually result in grave negative environmental consequences in the event of an uncontrolled migration of drilling mud rising to the surface and escaping in to an aquatic ecosystem. Given the scope of activities proposed for coverage under the ITP, the Service believes that flexibility to implement the most environmentally sound practice for the circumstances at hand is appropriate. The Service concurs with the Applicant that utilizing a range of methodologies may be more appropriate given the numerous circumstances expected to occur over a 14-state operating territory. The Service asserts that an appropriate MSHCP will adequately address minimization and mitigation, while also allowing for a level of flexibility so that NiSource may utilize the most environmentally appropriate methodology for specific site conditions, as well as allow for flexibility to integrate new technologies as they are developed.

2.2.4 Reduced Take Alternative

An alternative was suggested that would reduce the requested level of take in the Proposed Action (See also Section 2.2.6). NiSource developed the MSHCP in collaboration with the Service, and estimated take levels using reasonable worst case scenarios. In doing so, NiSource is required, by both the ESA and Service regulations, to minimize and mitigate the impact of take to the maximum extent practicable. The process of negotiating AMMs with NiSource therefore has resulted in an MSHCP that avoids and minimizes take to the maximum extent practicable. What take remains after minimization measures will be mitigated to fully off-set any impacts from the taking.

2.2.5 All AMMs Mandatory Alternative

Instead of allowing for the non-mandatory AMM implementation as is currently proposed for some species with the Proposed Action, this alternative would require that all available AMMs be mandatory and implemented all of the time, perhaps resulting in a reduced level of take for some species. During initial analysis as to the merits of this alternative, discussions were held with NiSource as to the feasibility of implementing all AMMs as mandatory during pipeline operation, maintenance, and construction. NiSource has indicated (See MSHCP Chapter 5) that during the development of the MSHCP, a suite of potential AMMs was identified that cannot be reasonably implemented in every instance, but, when feasible, might provide some additional

conservation benefits. These were identified as "non-mandatory AMMs" for purposes of the MSHCP, and were not included in the calculation of take. The reasons cited by NiSource why these AMMs cannot be implemented for all proposed projects include: location, technical or engineering feasibility, potential adverse impacts to other trust resources, project timelines, customer needs, and/or AMM effectiveness. To this end, the Service felt that requiring implementation of non-mandatory AMMs for all projects all of the time would not be reasonable, and at times, not in the best interest of species conservation. As a result, this alternative was dismissed from further analysis.

2.2.6 Alternative Approach to Mitigation

An alternative was considered that would require a different approach to mitigation, whether in the form of other means to accomplish mitigation, alternative locations, amounts, quality, purposes, etc. While the Service felt that it was prudent to consider alternative forms of mitigation than that proposed by NiSource, the fundamental question arose as to whether NiSource's approach is reasonable and adequate, and would it meet the requirement that mitigation must fully compensate for the impact of take. NiSource's proposed mitigation relies on situation-specific factors that will be determined based on species and site-specific conditions relative to future project planning and implementation. Due to the scope and timeframe associated with the MSHCP, we believe that NiSource's approach to mitigation, including the funding commitments and third-party oversight, is both reasonable and adequate for the purposes of the MSHCP. This alternative was, therefore, dismissed from further analysis.

2.3 Alternatives Carried Forward for Detailed Analysis

2.3.1 Alternative 1 – No Action Alternative

NEPA requires that an EIS alternatives analysis include consideration of a No Action or "Status Quo" Alternative. Under the No Action Alternative, issuance of an ITP and approval of the NiSource MSHCP would not occur. However, all of the Covered Activities within the MSHCP would continue to be implemented by NiSource (see Section 2.1.1 "Covered Activities" above). NiSource compliance with the ESA would continue "status quo" through informal and formal

Section 7(a)(2) ESA consultations through the Cooperating Agencies with the Service on a project-by-project or annual basis.

FERC is responsible for authorizing the siting, construction, and operation of NiSource natural gas pipelines and natural gas storage field facilities pursuant to Sections 3 and 7 of the Natural Gas Act of 1938 (NGA), as amended. Most existing interstate natural gas companies, including NiSource, hold Blanket Certificates from the FERC that allow them to operate and construct facilities if they meet certain environmental standards and project cost limitations (see CFR 18, sections 157.203 and 157.205)(see FERC website at http://www.ferc.gov/industries/gas/indus-act/blank-cert.asp for a description of its Blanket Certificate Program). For projects with the potential for significant impacts, NiSource must file an application with FERC for a Case-specific Certificate under Section 7(c) of the NGA. Under both scenarios, consultation with agencies is required for land use authorizations and environmental permitting because other agencies have their own authorizations/permit requirements, with some requiring a separate NEPA analysis. Virtually all applications to the FERC for interstate natural gas projects require some level of coordination with one or more federal agencies to satisfy the FERC's requirements for environmental review, including ESA (see Chapter 1 section 1.5 Regulatory Overview).

Under Section 7(a)(2) of the ESA, federal agencies (e.g., the Cooperating Agencies) are required to consult with the Service to ensure that any proposed federal action (e.g., authorize/permit/fund/carry out) is not likely to jeopardize the continued existence of any threatened or endangered species, or adversely modify critical habitat designated for those species. Where adverse impacts to listed resources are unlikely, section 7 is completed through informal consultation. Where adverse impacts to listed resources are likely, formal consultation is required. The formal Section 7 process culminates with the Service's issuance of its BO, which transmits the opinion of the Service as to whether the proposed action is likely jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat. The BO is accompanied by an Incidental Take Statement (ITS), which exempts the federal agency and their permittee (e.g., NiSource) from the take prohibitions, provided they comply with the Reasonable and Prudent Measures (RPMs) in the BO and Terms and Conditions in the ITS. Federal agencies may designate a "non-federal representative" for purposes of informal ESA consultation with the Service (i.e., where adverse impacts to listed resources are not likely). However, non-federal representatives may not be used for formal

consultation. Regardless of the process (informal or formal), the ultimate responsibility for compliance with Section 7 of the ESA always remains with the federal action agency.

Under this alternative, NiSource would continue to be subject to full liability under Section 9 of the ESA, as any future species take would only be authorized through formal project-by-project ESA consultation with the federal action agency (primarily FERC) and the Service. The RPMs that NiSource would follow as part of the ESA Section 7 process described above would be similar to the avoidance and minimization measures in the Section 10 MSHCP process. Adverse impacts to threatened and endangered species should be similar under both Section 7 and Section 10 (MSHCP) processes. However, under Section 7 of the ESA, mitigation is not a requirement when impacts associated with species take occur. NiSource project goals relative to providing increased certainty for ESA compliance, enhancing conservation and recovery of species through coordinating mitigation projects, and increasing efficient use of time and money, would not be met under the No Action Alternative.

2.3.2 Alternative 2 – Issuance of a 50-year ITP and Approval of the NiSource MSHCP (Proposed Action)

NiSource seeks to address the full range of its ongoing activities as well as identify and manage species and their habitat impacts system-wide. The Service agreed that a multi-species habitat conservation plan developed under Section 10(a)(1)(B) of the ESA could provide the benefits of increased species conservation and increased efficiency in ESA compliance for both NiSource and the regulatory agencies. NiSource has developed an MSHCP that covers a wide array of natural gas pipeline activities over a broad geographic region. The goal of the MSHCP is to develop a mechanism that:

- Identifies conservation measures and BMPs to avoid and minimize impacts on species identified in NiSource's MSHCP;
- Identifies mitigation needs and provides a mechanism to accomplish this mitigation commensurate with the impact of the taking; and
- Implements conservation actions in a manner that allows benefits to accrue across species ranges and across Covered Lands for 50 years.

NiSource's MSHCP outreach effort began in late 2006 and has included involvement from federal, state, and private organizations. NiSource specifically involved a range of federal agencies early in the process. Beyond the Service, outreach targeted the USACE, FERC, NPS, and the USFS, all of which signed on as formal cooperators in the NEPA process. Briefings also occurred with the PHMSA and Tennessee Valley Authority (TVA). In addition to federal agencies, NiSource's MSHCP outreach efforts extended to state agencies in each of the 14 states covered by the project area. Outreach included in-person meetings to brief staff on the project, and to provide documents that addressed the specifics of the MSHCP itself.

NiSource also outreached to a number of Non-Governmental Organizations (NGOs), including The Conservation Fund (TCF), the Environmental Defense Fund (EDF), and Defenders of Wildlife (DOW). They also formed an advisory team to review aspects of MSHCP development. Advisory team members included members from both the private sector and state government. Finally, NiSource secured species-specific specialists to obtain information on the Covered Species and to provide detailed recommendations.

Alternative 2 involves issuance of an ITP for a 50-year term, approval of the NiSource MSHCP, associated IA, and acceptance by the Cooperating Agencies and the Service that ITP issuance and MSHCP compliance fulfill their obligations under Section 7 of the ESA. At this time, NiSource is requesting incidental take coverage for 10 of the 42 species analyzed in the MSHCP (see **Table 2.3-1**). No take of the remaining 32 species is anticipated. For these species, there will either be no effect or the impacts will not rise to the level of take, in large part due to NiSource's commitment in the MSHCP to implement avoidance measures for these species. Impacts to the 42 species analyzed in the MSHCP, along with other listed, proposed or candidate species within the Covered Land, are analyzed in this EIS and in the Service's BO. This alternative would authorize implementation of NiSource's MSHCP over a 50 year timeframe.

2.3.2.1 Permit Duration

Regulations issued by the Service provide that the duration of an incidental take permit must be sufficient to provide adequate assurances to the permittee to commit funding necessary for the activities authorized by the permit, including conservation activities and land use restrictions (50

C.F.R. § 17.22). Further, the Service's Five-Point Policy for Habitat Conservation Plans (HCPs) directs the Service to consider the following factors when determining the length of incidental take permits:

- The duration of the applicant's proposed activities;
- The possible positive and negative effects on Covered Species associated with the proposed duration, including the extent to which the conservation plan will enhance the habitat of listed species and increase the long-term survivability of such species;
- The extent of information underlying the HCP;
- The length of time necessary to implement and achieve the benefits of the operating conservation program;
- The extent to which the program incorporates adaptive management strategies.

65 Fed. Reg. 35242, 35355-56 (June 1, 2000); *see also* 50 C.F.R. 17.32(b)(4) (referencing the first two considerations). Based on these criteria, as described below, NiSource requested a 50-year permit term. At the end of the permit term, provided the permit functions as intended, NiSource may seek a renewal of its permit for a specified duration.

The Service's Five-Point Policy recognizes that, if the permittee's action or the implementation of the conservation measures continually occur over a long period of time, the permit would need to encompass that time period *Id*. at 35256. The project life of interstate natural gas pipeline facilities is usually between 50 and 100 years. NiSource's proposed Covered Activities include ongoing operation and maintenance and new construction for the life of its facilities, which will likely extend beyond the requested permit duration. In the absence of an incidental take permit, NiSource will undertake the Covered Activities utilizing the ESA Section 7 consultation process annually on a project-by-project basis, with requests to Field Offices operating on state boundaries as its basis for ESA compliance.

The Service believes, that in this instance, the proposed action of issuing an incidental take permit and implementing the MSHCP will allow for a landscape-level approach to mitigation and species conservation. The use of this type of system-wide conservation plan with agreed upon avoidance and minimization measures, in combination with a structured mitigation planning

process using a green infrastructure network design and decision support principles, provides the coherent consideration not practicable through annual use of project specific requests to offices operating on state boundaries. Through Section 7 consultation processes, the focus is on avoidance and minimization; the Service has not required mitigation in its biological opinions. Thus, the Service believes operating under an ITP will provide long-term conservation benefits to the listed species, compared to the current Section 7 consultation approach that lacks a required mitigation component. Also, operating under an ITP allows for certainty with regard to take limits over time. Under project-by-project Section 7 consultations, there would be no certainty of take limits.

NiSource has committed to mitigate for all anticipated impacts resulting from operation and maintenance Covered Activities over the 50-year life of the permit within the first seven years of MSHCP implementation. This commitment does not apply to a shorter-term permit. The longer duration allows enough time to implement these aspects of the MSHCP and for the listed species to experience the benefits of this early mitigation which is expected to maximize the MSHCP's contribution to the recovery of the MSHCP species.

The Service's Five-Point Policy recognizes that the gathering of new information through the monitoring program requires an appropriate period of time for meaningful interpretation of new information into changes in management, which could necessitate a permit with a longer duration. It also states that longer permits may be necessary to ensure long-term active commitments to the HCP and typically include up-front contingency planning for changed circumstances to allow appropriate changes in the conservation measures. *Id.* Both of these aspects are contained within the NiSource MSHCP.

The 50-year permit duration allows NiSource to implement longer-term conservation strategies at the landscape level and provides the Service with the certainty of long-term commitment to conservation measures and the capability to gauge success of those measures over a sufficient time period.

The Service believes a 50-year permit duration is sufficient time for the adaptive management component of the MSHCP to function, which involves continuous improvement of the conservation and mitigation measures based upon the analysis of information, improved

modeling, and adoption of new technologies that become available over-time. The MSHCP also identifies a variety of circumstances that could change, and appropriate measures to be implemented in the event changed circumstances occur. NiSource has the obligation to maintain the MSHCP as a living document by annually requesting from state and federal sources new information regarding the MSHCP species and any newly listed species that may be affected by the Covered Activities. The Service will annually review the implementation of the MSHCP to ensure that its operating conservation program is working as intended.

2.3.2.2 Covered Lands

The applicant's work is concentrated along its existing pipeline network and thus the proposed area to be covered by the ITP and associated MSHCP includes a one-mile wide corridor centered upon a majority of NiSource's existing INGT system in 14 states (Louisiana, Mississippi, Tennessee, Kentucky, Virginia, West Virginia, North Carolina, Indiana, Ohio, Pennsylvania, New York, New Jersey, Delaware and Maryland) for approximately 15,562 miles (Figures 1.1-1 – 1.1-4). In addition to the designated one-mile corridor, the ITP and associated MSHCP would also cover 12 counties in Ohio, Pennsylvania, Maryland, and West Virginia collectively, where NiSource operates some of its underground natural gas storage fields. These counties include Hocking, Fairfield, Ashland, Knox, and Richland counties in Ohio; Bedford County, Pennsylvania; Allegany County, Maryland; and Kanawha, Jackson, Preston, Marshall, and Wetzel counties in West Virginia. The original (October 2007) scoping material did not include discussion of including these 12 counties as part of the Covered Land (see below). In total, the ITP and MSHCP would cover an area of approximately 9.8 million acres. The work of NiSource will be throughout its gas transmission system which physically occupies a small fraction of the Covered Lands. The applicant states that as it conducts its business it needs flexibility to avoid newly constructed obstacles to some of its activities such as providing increased transmission capacity and thus requests planning flexibility within ½ mile of either side of its existing pipeline. Only NiSource activities specific to onshore facilities are addressed in this EIS. The vast majority of the Covered Land footprint was drawn at or near the high-tide line along coastal reaches. The MSHCP states that the only exceptions below the high-tide line include a few inland reaches of the James River in Virginia, and some waters in Louisiana.

It should be noted that the final Covered Land footprint described above has evolved since the initiation of the MSHCP process in 2007. Early in their process, NiSource was considering a Covered Land footprint that included three additional states associated with the Granite State Gas Transmission Corporation, a subsidiary of NiSource at the time. Following formal NEPA scoping, but prior to submittal of the MSHCP to the Service, NiSource sold the Granite State Gas Transmission Corporation. Given this, the Covered Land footprint was changed to include those 14 remaining states as discussed above.

Around that same time, NiSource decided to include twelve counties in Ohio, Pennsylvania, Maryland, and West Virginia to its proposed Covered Land footprint. NiSource decided on this change to account for future storage field expansion activities. Due to the highly-sensitive (U.S. Department of Homeland Security) and proprietary nature of natural gas storage field locations and boundaries, NiSource withheld the exact location of its storage fields. To maintain flexibility in locating future facilities, and to account for the sensitive nature of potential natural gas facility locations, NiSource elected to conservatively include entire counties as part of the Covered Land footprint.

Lastly, through conversations with the Service, NiSource agreed to restrict or completely avoid implementing Covered Activities in certain portions of the one-mile wide corridor where such activities could potentially impact two sensitive species, the cheat mountain salamander (*Plethodon nettingi*) and the Louisiana black bear (*Ursus americanus luteolus*) (NiSource MSHCP, Ch. 2.3).

2.3.2.3 Take and MSHCP Species

The ITP would authorize take of ten federally-listed species (see **Table 2.3-1**) as a result of NiSource Covered Activities (hereafter referred to as “take species”). In addition, the MSHCP analyzes impacts to 32 other species (hereafter referred to as “MSHCP Species”). Of these 32 MSHCP species, a no effect determination was made by the Service for 23 of the 32 species, and impacts to the remaining 9 species are not expected to rise to the level of take, as a result of NiSource agreeing to implement comprehensive species avoidance measures.

Table 2.3-1: Species Evaluated in the NiSource MSHCP

Species Common/Scientific Name	Federal Status	Determination
Mammals		
Gray bappendedat *Myotis grisescens*	Endangered	Avoid take through AMMs/BMPs
Indiana bat *Myotis sodalist*	Endangered	Take Species
Louisiana black bear *Ursus americanus luteolus*	Threatened	Avoid take through AMMs/BMPs
Virginia big-eared bat *Plecotus townsendii*	Endangered	Avoid take through AMMs/BMPs
Delmarva fox squirrel *Sciurus niger cinereus*	Endangered	No take anticipated
West Indian manatee *Trichechus manatus*	Endangered	No take anticipated
Birds		
Interior least tern *Sterna antillarum*	Endangered	Avoid take through AMMs/BMPs
Reptiles		
Bog turtle *Glyptemys muhlenbergii*	Threatened	Take Species
Amphibians		
Cheat mountain salamander *Plethodon netting*	Threatened	Avoid take through AMMs/BMPs
Shenandoah salamander *Plethodon Shenandoah*	Threatened	No take anticipated
Fish		
Maryland darter *Etheostoma sellare*	Endangered	No take anticipated
Blackside dace *Phoxinus cumberlandensis*	Threatened	No take anticipated
Cumberland darter *Etheostoma susanae*	Candidate	No take anticipated
Gulf sturgeon *Acipenser oxyrinchus desotoi*	Threatened	No take anticipated
Scioto madtom *Noturus trautmani*	Endangered	No take anticipated
Slackwater darter *Etheostoma boschungi*	Threatened	No take anticipated
Crustaceans		
Madison cave isopod *Antrolana lira*	Threatened	Take Species
Nashville crayfish *Orconectes shoupi*	Endangered	Take Species
Mollusks		
Birdwing pearlymussel *Lemiox rimosus*	Endangered	Avoid take through AMMs/BMPs

Species Common/Scientific Name	Federal Status	Determination
Clubshell *Pleurobema clava*	Endangered	Take Species
Cracking pearlymussel *Hemistena lata*	Endangered	Avoid take through AMMs/BMPs
Cumberland bean pearlymussel *Villosa trabalis*	Endangered (XN)	No take anticipated
Cumberland monkeyface pearlymussel *Quadrula intermedia*	Endangered	Avoid take through AMMs/BMPs
Dromedary pearlymussel *Dromus dromas*	Endangered (XN)	No take anticipated
Fanshell *Cyprogenia stegaria*	Endangered	Take Species
James spinymussel *Pleurobema collina*	Endangered	Take Species
Louisiana pearlshell *Margaritifera hembeli*	Endangered	No take anticipated
Northern riffleshell *Epioblasma torulosa rangiana*	Endangered	Take Species
Oyster mussel *Epioblasma capsaeformis*	Endangered	Avoid take through AMMs/BMPs
Pale liliput pearlymussel *Toxolasma cylindrellus*	Threatened	No take anticipated
Purple cat's paw pearlymussel *Epioblasma obliquata*	Endangered	No take anticipated
Sheepnose *Plethobasus cyphyus*	Endangered	Take Species
Tan riffleshell *Epioblasma florentina walker*	Endangered	No take anticipated
White cat's paw pearlymussel *Epioblasma obliquata perobliqua*	Endangered	No take anticipated
White wartyback pearlymussel *Plethobasus cicatriocosus*	Endangered	No take anticipated
Insects		
American burying beetle *Nicophorus americanus*	Endangered	Take Species
Karner blue butterfly *Lycaeides melissa samuelis*	Endangered	No take anticipated
Mitchell's satyr butterfly *Neonympha mitchellii mitchellii*	Endangered	No take anticipated
Puritan tiger beetle *Cicindela puritan*	Threatened	No take anticipated
Plants		
Braun's rock cress *Arabis perstellata*	Endangered	No take anticipated
Mead's milkweed *Asclepias meadii*	Threatened	No take anticipated
Pitcher's thistle *Cirsium pitcher*	Threatened	No take anticipated
(XN) = Experimental, nonessential Source: NiSource 2010a; Chapter 4		

The 42 species analyzed in the MSHCP differs from the original list of 76 species that was identified during the 2007 NEPA scoping period. NiSource provides its rationale for this reduction from 76 species to 42 species in Chapter 4 of its MSHCP. However, the Service is required to evaluate potential impacts to all federally listed species found within the Covered Land in our Section 7 consultation on this ITP. These "non-MSHCP" federally-listed species (hereafter "Non-MSHCP Species") -- an additional 46 based on current listing status -- are evaluated in this EIS and further evaluated for jeopardy in the associated BO.

2.3.2.4 Migratory Bird Conservation Measures

Consistent with Executive Order 13186 (66 FR 3853, January 17, 2001) on the protection of migratory birds, the Service recommends the following conservation measures to avoid and minimize impacts to migratory birds from Covered Activities. These include:

- conduct pre-activity bird surveys, where appropriate;
- complete activities outside of the primary nesting season (early April through mid-July), wherever practicable;
- implement temporal and spatial avoidance measures and species-specific buffers for active nests (non-raptors);
- mowing, grubbing, or scraping of suitable nesting habitat outside of the nesting season;
- time activities to begin in areas of greater biological importance if construction begins prior to the nesting season;
- direct activities to begin in areas of least biological importance (if construction begins during the nesting season);
- defer activities within nesting areas until young have fledged from nests (non-raptors); and
- conduct vegetation clearing outside the bird nesting season, where appropriate.

2.3.2.5 Covered Activities

NiSource is seeking an ITP for its INGT activities specific to (1) operation and maintenance (O&M); (2) safety-related repairs, replacements, and maintenance; and (3) construction and expansion. These activities will occur under all alternatives including the No Action alternative.

For the purpose of this Section, both Items 2 and 3 will be combined into one discussion topic, "Construction", as the underlying construction activities for these two items are identical.

Operation and Maintenance Activities

General O&M includes a variety of activities that include the physical operation and the required maintenance, monitoring, and inspection of the facilities. Natural gas flows through the NiSource system from producers to market areas and/or storage on a continual basis. Once facilities are installed and commissioned, O&M activities are routinely performed to keep NiSource's transportation and storage services operating. O&M activities also include vegetation management along ROWs and facility sites. Vegetation management includes mowing, tree-clearing and side trimming, and use of herbicides. For a complete description of NiSource O&M Activities see Appendix B.

New Construction Activities

Construction activities include construction on natural gas facilities such as pipelines, storage wells, compressor stations, access roads, and related ancillary facilities. Construction may take place in order to fabricate new, replace or upgrade existing, abandon existing, and/or internally inspect existing facilities. Construction includes activities such as mechanical land clearing and grading, installation of erosion and sediment control devices, trenching, well drilling, hydrostatic testing, and ROW stabilization and restoration. For a complete description of NiSource Construction Activities see Appendix B.

2.3.2.6 NiSource Conservation Strategy/Program

NiSource has stated that the goals of its Conservation Strategy of the MSHCP are threefold (NiSource 2010a; Chapter 5, page 1):

- Protect MSHCP species and their habitats through the implementation of an environmental compliance program that meets or exceeds federal, state, and local regulations and requirements;
- Enhance the conservation of MSHCP species through the application of rigorous planning, adaptive management, and sound scientific principles; and

- Maximize conservation benefits to MSHCP species and the ecosystems that support them.

NiSource intends to implement these goals through a mix of existing environmental practices, as well as new measures developed in negotiation with the Service.

2.3.2.7 NiSource Environmental Practices

NiSource follows standard practices to help avoid and minimize environmental impacts. NiSource states that its pre-construction planning and project implementation must comply with the following:

NiSource has in place three Environmental Construction Standards (ECS) documents for Columbia Gas, Columbia Gulf, and for projects within the State of Virginia, respectively (Appendix B of the NiSource MSHCP). These collective ECS provide company-wide requirements for construction, operation, and maintenance activities, including in environmentally sensitive-areas. NiSource states (NiSource 2010b) that these ECS were specifically developed to comply with FERC Plans and Procedures. The ECS provide standards for O&M and construction activities including, but not limited to, right-of-way width; clearing; grading; access roads; residential areas; trenching; backfilling; final grading, restoration, and stabilization; noise impact mitigation; hydrostatic testing; stream crossings; wetland crossings; spill prevention, containment, and control; maintenance; environmental inspections; environmental training; contractor's environmental compliance specialist; environmental construction management; and emergency construction.

NiSource has indicated that their Environmental, Health, and Safety Department, Natural Resources Permitting Group, utilize an internally produced Environmental Awareness Handbook to train NiSource personnel. NiSource intends to conduct compliance training specific to the MSHCP prior to implementation of the ITP, with training materials subject to review and approval by the Service.

2.3.2.8 Species Avoidance and Minimization Measures

The MSHCP states adverse effects of Covered Activities on all species included in the MSHCP will be avoided and/or minimized.

The MSHCP analyzed anticipated impacts to species using reasonable worst-case scenarios. NiSource contends that this approach has resulted in a greater requested take authorization than what will actually occur when Covered Activities are initiated. NiSource contends that in the majority of situations it will be able to avoid most take. Where take cannot be avoided, NiSource will minimize such take to the maximum extent practicable.

Chapter 6 and Appendix F of the MSHCP (also Appendix E of the EIS) provide a detailed discussion of proposed species-specific AMMs for MSHCP Species. Most of the AMMs are required to be implemented 100-percent of the time, though several are considered and labeled "non-mandatory" when NiSource determined it was impractical or not possible to implement in all cases. According to the MSHCP, NiSource's non-mandatory AMMs, not associated with water body crossings, will be applied as often as possible based on a case-by-case review of location, feasibility, effectiveness, impacts to other resources, and timing considerations.

In Section 5.2.1 of the MSHCP NiSource has established the following specifications for AMMs (other than waterbody crossings):

- In accordance with its current practice and corporate policy, NiSource will use a Project Environmental Information Form (PEIF) and Environmental Management & Construction Plan (EM&CP) – EZ form to gather data related to the potential project impacts.

- NiSource will follow all mandatory AMMs including potentially modifying the project activity and/or relocating the project footprint to avoid effects on listed species. NiSource will implement non-mandatory avoidance measures wherever practical. All relocations made to specifically avoid impacts on a MSHCP Species will be documented and reported.

- Each covered activity's potential to impact MSHCP Species will be evaluated and a clearance package prepared, through the development of an EM&CP with appropriate AMMs as identified in Chapter 6 and Appendix F of the MSHCP. Mandatory AMMs will be identified and included in the EM&CP. Non-mandatory AMMs will be selected and incorporated into the project where possible and feasible.

- The clearance package will contain reply forms that will be used to evaluate and track the implementation of AMMs and impacts to MSHCP Species for a particular project. The information gathered during the project implementation phase will be used to determine actual project impacts on MSHCP Species and help determine required mitigation.

Given the potential impacts to a number of MSHCP Species due to crossing water bodies, Section 5.2.1.1 of the MSHCP provides specific details regarding the process to be utilized when determining appropriate water body crossing techniques. NiSource utilizes five basic methods for waterbody crossings including two open-cut methods (dry-ditch and wet ditch), horizontal bore, HDD, and spanning. Depending upon the species present, a crossing method may be considered as a mandatory AMM or as a decision to be made on a site-specific basis. For those cases where it is situation-dependent, NiSource will complete a site-specific review of each individual crossing based on an engineering evaluation, an environmental evaluation, an economic evaluation, and any additional Federal state or local regulations that apply to determine which type of crossing will be selected.

Details regarding the suite of species-specific AMMs are provided in the species analyses included in Appendix E. **Table 2.3-2** provides an overview of AMMs found in the MSHCP. However, not every measure listed is appropriate for every species. The extent to which a particular measure will be implemented will vary temporally, spatially, and among species (e.g. time-of-year-restrictions). Chapter 6 of the MSHCP contains specific AMMs for each species.

Table 2.3-2: Species Avoidance & Minimization Measures (AMMs)

Habitat and Occupation Surveys
Determine habitat suitability for the species, or assume potential presence
Survey to determine presence/absence within identified suitable habitat
Measures to Avoid and Minimize Impacts to Species
Bait the species away from the project area
Trap and relocate species away from the project area
Species education for operators, employees, and contractors
Avoid activities involving long-term noise disturbance >75db within specified distance
Strict control of "bear attractants" such as use of "bear-proof" waste disposal containers
Designated critical habitat within ROW maintained to NGTS ECS env. sensitive area standards

Remove buildings during winter months, or after a survey year round
Prepare an Environmental Management & Construction Plan
Prepare an Environmental Management & Construction Plan for all species
Stream Bed Construction Methods
Consider HDD or other trenchless methods for installation or replacement across habitat
Install pipelines to a minimum depth at least 10 feet past the high water line in riparian areas
Do not install In-Channel repairs within occupied habitat
Work from a lay barge or temporary work bridge rather than operate heavy equipment in-stream
Remove equipment bridges as soon as practicable
Inspect for and correct bank destabilization associated with the pipeline within occupied habitat
Ensure that work within streams does not result in impacts to adjacent habitats or karst features
Avoid channelizing streams
Cross perennial streams only during specified periods
Stream Bank Conservation
Do not construct culverts or stone access roads across water body/riparian occupied habitat
Use sufficient fluming to minimize flow disruption in stream habitat
Ensure that upland work does not result in impacts to adjacent water habitats
Timing Restrictions
Comply with timing restrictions to minimize impact
Avoid construction activities after sunset in occupied habitat
Pipeline Abandonment
Pipeline abandonment specifications
Contaminants
Site staging areas location restrictions
Ensure that all imported fill material is free from contaminants
Use enhanced and redundant spill control for storage well activities in occupied habitat
Avoid use of fertilizers within a specified distance of occupied habitat
Avoid use of herbicides within a specified distance of occupied habitat
Follow standard policies and procedures for herbicide use in proximity to occupied habitat
Refuel equipment, check for leaks each day, and control contaminants as per the ECS
Use tanks rather than waste pits to store waste fluids
Withdrawal and Discharge of Water
Avoid discharging hydrostatic test water from new pipe directly into occupied habitat
Avoid drawing hydrostatic test water directly from occupied habitat
Discharge hydrostatic test water down gradient or >300 feet upland from occupied habitat
Use best available water withdrawal/discharge impact avoidance techniques (e.g., settling basins, sediment fencing)
Avoid discharging hydrostatic testing water from existing pipe directly into occupied habitat
Travel and Access Roads
Avoid driving across identified habitat
Route new access roads a specified distance from occupied habitats
With landowner consent, block access roads and ROWs leading to occupied habitat
Exotic Species
Thoroughly clean all equipment prior to use to avoid inadvertent introduction of exotics
Vegetation Management

Avoid stepping on hummocks and tussocks
Avoid pulling woody vegetation out by the roots in identified habitat
Comply with restrictions on mowing
Avoid dragging vegetation through occupied habitat
Avoid burning brush piles within a specified distance of occupied habitat
Re-vegetate disturbed habitat in accordance with the ECS
Leave piles of woody debris along edge of ROW if clearing vegetation
Avoid additional clearing of trees
No woody vegetation or spoil disposal within occupied habitat
Retain snags, dead/dying trees, and trees with exfoliating bark
Maintain a diversity of open, herbaceous habitat
Routing Criteria and Construction
Avoid constructing bell holes and trenches in habitat areas
Route new projects to avoid occupied or potential habitats
Soil and Geology Impacts
Employ silt fences around construction/soil disturbance areas within occupied habitat
Blasting within a specified area of occupied habitat must ensure karst integrity is maintained.
No HDD within the potential habitat zone
Clearly mark karst feature buffers until ground disturbing activities are completed
Use an inverted filter to bridge karst when filling new sinkholes
Trenches to be backfilled using native material
Minimize alteration of existing grade and hydrology of existing surface karst features

2.3.2.9 Incidental Take Requested

Take" is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

NiSource is requesting incidental take for 10 species. Detailed take calculations for each of the take species is provided in Section 6.2 of the MSHCP under "Calculation of Incidental Take".

Due to the ongoing nature of NiSource's pipeline maintenance and construction activities, the exact locations where future activities may occur is not known. However, these activities are routine, have been consistently implemented over many years, and evaluated by the Service many times over many years. Therefore, we are comfortable knowing the types and intensity of impacts to listed species without having detailed site-level information where impacts may occur. The species take analyses is based on the combined experience of NiSource personnel and Service biologists knowledgeable of the Covered Activities and potentially affected species.

Projections of the amount of incidental take included modeling and using reasonable worst case assumptions. The modeling was developed by the Service with input from NiSource. The type and amount of take requested (individuals and/or habitat) is summarized in **Table 2.3-3**.

Table 2.3-3: Summary of Incidental Take Requested Over the 50-Year Permit Duration

Species	Summary of Take Requested
Indiana bat	Incidental take is requested for 69,151 acres of summer and/or spring staging/fall swarming habitat that could support up to 2,637 Indiana bat individuals.
Bog turtle	Incidental take is requested for impacts to turtles and habitat at 25 sites
Madison Cave isopod	Incidental take is requested for two populations within 2,764.5 acres of Madison Cave isopod habitat
Clubshell mussel	Incidental take is requested for up to 166 acres of clubshell mussel habitat
Northern riffleshell mussel	Incidental take is requested for up to 165.3 acres of northern riffleshell mussel habitat
Fanshell mussel	Incidental take is requested for 283.2 acres of fanshell mussel habitat
James spinymussel	Incidental take is requested for up to 12.8 acres of James spinymussel habitat
Sheepnose mussel	Incidental take is requested for up to 250.4 acres of sheepnose mussel habitat
Nashville crayfish	Incidental take is requested for up to 4.0 acres of Nashville crayfish habitat
American burying beetle	Incidental take is requested for 4 American burying beetle individuals

2.3.2.10 Compensatory Mitigation

Mitigation is required when take is unavoidable. Species-specific mitigation measures, including the type and amount of mitigation, and the criteria for determining suitability, eligibility, and success, are detailed in Chapter 6 of the MSHCP. As described in Chapter 6 of the MSHCP, mitigation will occur throughout the duration of the permit. Mitigation will occur as take occurs, except for mitigation associated with future NiSource operations and maintenance activities. Mitigation for future NiSource operations and maintenance activities will be implemented within the first seven years after receiving the ITP. As take is known or predicted by preconstruction analysis, funds will be allocated to conduct mitigation projects. Mitigation projects will be developed and implemented consistent with the mitigation criteria identified for each species. Chapter 5 of the MSHCP outlines the criteria or methodology that must be utilized to compensate for take of species (NiSource 2010a).

- Mitigation must be completed within states crossed by the Covered Land area.
- NiSource will complete all mitigation for O&M related impacts within the first seven years of implementing the MSHCP.
- NiSource must provide specific funding assurances to guarantee implementation of mitigation activities and the MSHCP (MSHCP Chapter 8).
- Mitigation must fully compensate for the impact of the take and satisfy the mitigation criteria in Chapter 6 of the MSHCP.
- Mitigation must be initiated within two years after the take occurs, unless the Service agrees that a longer initiation period is advantageous in garnering the conservation benefit for the species.
- NiSource will ensure that any mitigation that occurs on lands owned by a third party will be consistent and compatible with those land use rights left to the existing landowner.
- It is likely that multiple activities will occur in the same location over the life of the MSHCP and ITP. Compensatory mitigation will be required for the first time a Covered Activity involving take is conducted in a specific geographic location. This take will be fully compensated for; thus once compensatory mitigation is provided for a specific location, additional mitigation will not be required for Covered Activities occurring within the footprint of the previously affected area. However, each time the Covered Activity is conducted within the footprint, the area will be fully restored.
- NiSource will maintain and annually provide to the Service a report describing the amount of mitigation performed, by species, along with any “credits” remaining. The report will contain details regarding mitigation projects that compensate for take for more than one species at the same time.

The following table (**Table 2.3-4**) summarizes NiSource’s planned compensatory mitigation associated with the requested level of take for each of the 10 listed species described earlier.

Table 2.3-4: Summary of Mitigation over the 50-Year Permit Duration

Species	Summary of Mitigation Proposed
Indiana bat	**Total Maximum Mitigation** Protect, restore and manage **252 acres** of spring staging/fall swarming habitat associated with 2 Indiana bat hibernacula. Protect, restore, and manage **10,708 acres** of suitable Indiana bat summer habitat (maternity). **Sum = 10,960 Acres over 50 years or 219 acres/year**
Bog turtle	Construction (Ground-Disturbance) Activities and Non-ground-Disturbing O&M at **20 Sites** For each site impacted by looping (estimate of 10), new construction (estimate of five) and/or conventional replacement methods (open trench) (estimate of five) (and all non-ground-disturbing O&M impacts), NiSource can either protect and restore a bog turtle site or protect an existing site with optimal bog turtle habitat. Non-ground-Disturbing O&M Activities at Five Additional Sites The mitigation for take associated with O&M activities at sites that also involve ground-disturbing activities is addressed above. Mitigation for take associated with O&M activities at sites that do not involve ground-disturbing activities is either: (1) habitat restoration/enhancement and long-term management agreement (life of the permit) within wetland that crosses ROW, or (2) off-site protection and restoration (same mitigation as described above).
Madison Cave Isopod	NiSource is anticipating take of individuals of two populations (Lime Kiln Cave and one unknown population). As mitigation for this, NiSource shall protect two key parcels (containing surface karst features) and restore surface karst features (if needed). Key parcels are defined as a parcel of land with either an important natural feature (cave or spring) and its immediate recharge area, or an average of five surface karst features and a 300-foot buffer around each feature.
Clubshell Mussel	Riparian and/or streambed restoration, enhancement, and protection in occupied and unoccupied (for possible relocation) habitat (750 ac maximum).
Northern Riffleshell Mussel	Riparian and/or streambed restoration, enhancement, and protection in occupied and unoccupied (for possible relocation) habitat (884 ac maximum). Propagate, augment, expand, re-introduce into suitable habitat.

Species	Summary of Mitigation Proposed
Fanshell Mussel	Riparian and/or streambed restoration, enhancement, and protection in occupied and unoccupied (for possible relocation) habitat (956 ac maximum).
James Spinymussel	Riparian and/or streambed restoration, enhancement, and protection in occupied and unoccupied (for possible relocation) habitat (77 ac maximum).
Sheepnose Mussel	Riparian and/or streambed restoration, enhancement, and protection in occupied and unoccupied (for possible relocation) habitat (973 ac maximum).
Nashville crayfish	Restore and/or protect riparian habitat (0.4 ac for aggregate take, 4 ac for new construction take)
American burying beetle	One-time payment to fund propagation, monitoring, and survey programs.

NiSource has established two methods for implementing mitigation under these guidelines. The first would be NiSource-initiated mitigation, and the second would be the funding of mitigation proposals by NiSource with the assistance of a NiSource-chaired technical advisory committee (Mitigation Panel).

NiSource Initiated Mitigation

NiSource has the option of initiating mitigation efforts before, during, or up to two years after undertaking Covered Activities for which there will be take; thus allowing for flexibility to pursue mitigation opportunities as they arise. Before pursuing any specific mitigation efforts, NiSource will consult with the Service to determine how much compensation credit the particular mitigation project would provide. If the mitigation project would more than compensate for impacts to a given Take Species, NiSource would receive a mitigation “credit” toward future impacts to that species. If the mitigation effort does not fully compensate for previous impacts to a given Take Species, NiSource would either pursue additional mitigation efforts or would utilize the NiSource Mitigation Fund.

NiSource Mitigation Fund

In addition to the NiSource-initiated mitigation approach, NiSource will establish a fund (MSHCP Fund) administered by the National Fish and Wildlife Foundation (NFWF). Monies will be

disbursed from the MSHCP Fund at NiSource's request, following discussion with the Service, to ensure consistency with the mitigation requirements of Chapter 6 of the MSHCP. NFWF is a private, nonprofit, tax-exempt organization chartered by Congress in 1984 that sustains, restores, and enhances the Nation's fish, wildlife, plants, and habitats through leadership conservation investments with public and private partners.

The MSHCP Fund will contain two separate but related sub-accounts. The first, referred to as the "Reserve Account," will consist of an initial payment of $100,000. The Reserve Fund will be maintained at this amount to finance any unanticipated obligations for mitigation, monitoring, adaptive management, or changed circumstances. It is possible that the $100,000 will never be used during the life of the permit, but this will provide a pool for NiSource to draw upon if an unexpected situation develops or an underestimate becomes evident. . Additionally, every five years, NiSource is required to deposit a sum of money into the Fund to account for inflation, as reflected by the consumer price index. The goal shall be to maintain a balance of $100,000 in 2013 dollars. Chapter 8 of the MSHCP identifies the process for drawing upon the Reserve Account.

The second sub-account, referred to as the "Mitigation Account," is intended to fund mitigation to compensate for the impact of the take species. Deposits into the Mitigation Account will vary from year to year, depending on anticipated take and the amount of mitigation required. Chapter 8 of the MSHCP identifies the various timeframes for deposits, depending on the type of covered activity being undertaken. It also obligates NiSource to make necessary and regular adjustments to ensure the Mitigation Account is fully funded.

The MSHCP Fund will be managed as a general account for all species and funds may be used as necessary for mitigation for any species as needed. NiSource is required to ensure, that there is adequate funding to compensate for all take of each species; mitigation must be completed within the established timeframes for each species. This information will be provided in the annual mitigation report described in Section 5.3.1 of the MSHCP.

If NiSource chooses not to directly undertake mitigation efforts, mitigation will be carried out with monies from the Mitigation Account of the MSHCP Fund. NiSource shall select the future mitigation projects from proposals solicited from third parties. Proposals will be solicited on a

rolling basis throughout the permit duration, consistent with NiSource's annual mitigation debt, if any. After evaluating proposals, NiSource will submit final written recommendations, including its reasoning and all supporting information to the Service, which will ultimately determine whether the proposed mitigation package is acceptable.

NiSource will convene a Mitigation Panel (Panel), which it will chair, to assist it in evaluating third-party mitigation proposals. The charter for the Panel describing its structure, membership, conflict of interest provisions, purpose, record-keeping and reporting is included in Appendix N of the MSHCP.

NiSource or the Panel may solicit proposals from various NGOs, states within the MSHCP area, tribes, federal agencies, academics, and others for projects to be funded by the Mitigation Fund. The proposals must conform to the mitigation requirements identified in Chapter 6 for the particular take species at issue. These proposals must also relate to the take species impacted by the MSHCP Covered Activities and must be conservation and science based.

2.3.2.11 Monitoring and Reporting

An MSHCP, per ESA Section 10 regulations, is required to monitor, report, and assess any species impacts due to take from implementation of Covered Activities. Moreover, the Service's 5-point policy outlines criteria that an MSHCP must follow. Namely, an HCP must evaluate compliance, determine if the biological goals and objectives outlined in the HCP are met, and provide information that will serve as a feedback loop for adaptive management.

The Service has determined that NiSource's monitoring methods will adequately document implementation of AMMs and mitigation measures, take of HCP Species, compliance with requirements of AMMs and mitigation, effectiveness of the conservation program, and implementation and effectiveness of adaptive management measures.

Adaptive management is defined by the Service in its June, 2000 addendum to its HCP Handbook (65 FR 35252) as "a method for examining alternative strategies for meeting measurable biological goals and objectives, and then if necessary, adjusting future conservation management actions according to what is learned." NiSource has identified uncertainty connected with AMMS and put in place methods to monitor these uncertainties. The monitoring

will document achievement of the conservation goals or direct implementation of alternative methods to achieve the identified goals.

Compliance Monitoring

NiSource indicates it will establish an MSHCP implementation team made up of members of NiSource's Natural Resource Permitting group and Corporate Environmental Services department. From this group, NiSource will designate an MSHCP coordinator who will be responsible for ensuring NiSource's overall compliance with the terms of the MSHCP, ITP, and IA.

Methods identified by NiSource for documenting the success of the AMM applications for routine projects include visual field survey of the affected area, review of completed restoration or revegetation growth in accordance with FERC Plans and Procedures (FERC 2003a and 2003b) (See Appendix C) for erosion control, revegetation, and river/stream crossings, or a biological survey. Species-specific specialists will be retained as needed based on NiSource identification of need and professionals possessing Service permits to handle endangered species to conduct pre-activity surveys as required for larger projects. This information, which will be maintained in a Geographic Information Systems (GIS) database, will be utilized to track species and habitat information during implementation and for compliance monitoring.

NiSource proposes to utilize the Service's Information, Planning, and Consultation System (IPaC), once available and operational, to support overall implementation of its MSHCP. The Service IPaC system will identify the most current biological information regarding species within and adjacent to NiSource's Covered Land footprint, and provide specific approved BMPs/AMMs that will be required for a specific activity in a specific area. NiSource will specify a project location and Covered Activity it wishes to implement, send this information to the IPaC system, and in IPaC will deliver specific information on required AMMs that apply to that activity in that location. The IPaC system will be designed to close the loop by providing tools that upload monitoring information and provide a report to ensure the MSHCP is implemented appropriately.

If the IPaC is not complete at the time of MSHCP implementation, NiSource utilize an internal system called ProjStat to inform and populate the required annual report (discussed below) until

IPAC is operational. ProjStat will maintain a running tally of species impacts and compensation over the life of the permit, information (overall and by activity type) on the number and percentage of Covered Activities for which AMMs were implemented (or not implemented in the case of non-mandatory AMMs), where MSHCP Species were identified and what AMMs were implemented at each worksite. This monitoring information will document whether NiSource, in practice, is meeting the requirements outlined in the MSHCP.

Effects and Effectiveness Monitoring

In addition to compliance monitoring, NiSource will document and examine the on-the-ground effects of those activities which require compensation. In particular, impacts that result in either temporary or permanent habitat loss will be reported, along with any direct take of species, to calculate compensation for that year's activities.

Effectiveness monitoring will be undertaken by those who have received funding for mitigation proposals by the Mitigation Fund or by the entity responsible for directly implementing a mitigation effort initiated by NiSource. Monitoring protocols as provided in Appendix L of the MSHCP will be followed and updated as required for the duration of the permit. NiSource maintains all responsibility for effectiveness monitoring and will report monitoring results to the Service. If monitoring reveals that any particular mitigation measures are not successful, additional measures, per the adaptive management strategy and changed circumstances strategy, will be implemented.

NiSource is responsible for evaluating the effectiveness of certain AMMs directly. Most AMMs are based on, or are the same as techniques NiSource has employed for many years. As such, the effectiveness of most AMMs is well established and will only need compliance monitoring. However, for those AMMs where there is some uncertainty associated with their effectiveness, or there is a risk to the species if the AMM is unsuccessful, the MSHCP (Chapter 7) outlines an adaptive management strategy that links effectiveness monitoring to adaptive management.

NiSource MSHCP responsibilities for integrating the monitoring and adaptive management include: (1) gathering monitoring data on the effectiveness of AMMs and mitigation and maintaining a database; (2) assessing results of AMM and mitigation monitoring to determine effects on the MSHCP Species; (3) if effects are not what was anticipated, implementing, in

coordination with the Service, the necessary changes to the conservation program to ensure minimization and mitigation consistent with what was required and anticipated; and (4) monitoring and evaluating the implementation and effectiveness of adaptive management strategies (NiSource 2010a; Chapter 7, Page 6).

2.3.2.12 Annual Reporting and Meetings

NiSource is required to submit an annual report that documents results of both its compliance and effectiveness monitoring. The report will include any mitigation or AMM effectiveness monitoring results conducted by entities responsible for implementing mitigation proposals as well as NiSource initiated efforts. The report will include, but is not limited to:

- Information and specifics regarding that past year's Covered Activities;
- Areas of disturbance;
- Take calculations for each species;
- Surveys conducted;
- AMMs that were implemented and rationale for those that were not;
- Assessment of AMM implementation success;
- Take calculations and compensatory mitigation calculations;
- Discussion of compliance with the previous year's compensation requirements;
- Summary of biological goal and objective status;
- Summary of those mitigation proposals that were approved; and
- An accounting of any credits NiSource had accrued from previous mitigation efforts.

With the annual reports as a guide, NiSource and the Service plan to hold meetings to review annual report(s) and address overall issues with MSHCP implementation, including potentials for streamlining, effectiveness of AMMs, consistency with effectiveness goals, and other issues as they arise. Meetings would include both key NiSource and Service staff (and other stakeholders as needed) and are proposed to occur on an as needed basis during year one, annually until the fifth year of implementation, and then at least every five years thereafter, unless the parties agree to meet on a more frequent basis. These meetings will provide a structured process for which to review AMMs, discuss adaptive management strategies, and, as

needed, modify conservation strategies for individual species in order to reach desired goals and outcomes for that species. In order to capture all relevant discussion regarding MSHCP implementation, NiSource will produce a summary report, which requires concurrence by the Service, of all issues addressed and specific conclusions or agreements made at the meeting. This summary report will provide another feedback mechanism for use and reference at the next scheduled meeting.

NiSource also plans to submit a Prior Notification Report to the Service annually to provide information on planned projects, both O&M and new construction, for the upcoming year. NiSource will identify Covered Activities that are anticipated to be conducted within an occupied site, with details regarding the planned Covered Activity and location, as well as anticipated take and the amount to be deposited in the mitigation fund.

2.3.2.13 Adaptive Management

The goal of the MSHCP is to achieve the biological goals and objectives for the Covered Species as outlined in Chapter 6 of the MSHCP; in attempting to achieve this there is often some uncertainty regarding how well certain strategies will achieve the intended results. The proposed adaptive management program contained in this MSHCP examines the effectiveness of mitigation strategies and AMMs employed in the implementation of the MSHCP. The adaptive management will be based primarily on results of monitoring and new information that becomes available regarding species, management techniques, and habitat conditions throughout the life of the permit. The goal of adaptive management is to identify needed change in response to acquired information, thus renewing the conservation program on a continual basis.

In order to develop bounds for what is acceptable for various AMMs, NiSource identifies in the MSHCP species-specific thresholds based on biologically relevant elements of the MSHCP that trigger adaptive management. In particular, the MSHCP outlines a range of species-specific adaptive management strategies that will be employed based on outcomes related to areas of uncertainty with species-specific AMMs (NiSource 2010a; Chapter 7).

An example of the proposed adaptive management program is that for the Nashville crayfish. NiSource states in its MSHCP that there is uncertainty associated with the mortality estimate for

moving Nashville crayfish outside of a stream crossing construction area. The hypothesis that has been developed relative to this topic is as follows: "*Nashville crayfish relocated outside of the construction area will not have more than 50 percent mortality within one month after relocation."* Adaptive management will be employed to evaluate achievement of the estimated 50 percent survival rate of individuals relocated to the first three relocation areas outside of the construction area and if needed address any shortcomings. NiSource must mark, recapture, or otherwise determine the fate of relocated crayfish at three time periods (one week, one month, and six months) after relocation as compared to a control group of animals in similar habitat that have not been relocated. NiSource must also mark and recapture (or otherwise document impacts) a sample of the Nashville crayfish already inhabiting the relocation site to ensure efforts are not merely replacing one group with another. These studies will be performed for the first three relocation activities that NiSource conducts. The results will be used to appropriately adjust any compensatory mitigation requirements.

If it is discovered that the survival rate at any point prior to six months after relocation is below 50-percent, or if loss of Nashville crayfish previously inhabiting the relocation site is greater than 10-percent of reference site during the same period, then alternative adaptive management measures will be evaluated and implemented as necessary. Alternatives to evaluate if survival trigger is exceeded include the following:

- Relocate Nashville crayfish to suitable habitat in an unoccupied section of the project stream if available;
- Relocate Nashville crayfish to another Service approved stream having suitable habitat and within the range of the Nashville crayfish; and
- Relocate Nashville crayfish to artificial ponds with suitable habitat (or other Service approved temporary habitat) as a temporary measure until more data are available to support successful relocation into stream habitat within the species' range (NiSource 2010a; Chapter 7, Page 10-11).

For a complete list of species-specific adaptive management strategies, refer to Chapter 7 of the MSHCP.

NiSource discusses the need to both identify and employ species-specific testable hypotheses as a cornerstone of adaptive management. The goal is to identify whether the monitoring completed on various species-specific AMMs and mitigation procedures actually demonstrates that the response of the MSHCP Species or its habitat is in line with expectations and model predictions, or whether there are unanticipated results.

NiSource has designed the adaptive management strategy in their MSHCP to keep their conservation program current and relevant. Annual reviews by the Service and updates to the MSHCP in response to monitoring and adaptive management will result in a living permit As strategies are employed to address indications of effectiveness, the specific AMM, mitigation, or other conservation measure that is the focus of the adaptive management strategy will become part of the adaptive management program, subject to effectiveness monitoring as well. Where an AMM fails to provide the anticipated protection, the MSHCP, and if necessary, the ITP may be amended in accordance with Chapter 9 of the MSHCP. Similarly, if there is evidence that AMMs perform better than expected, the compensatory mitigation requirements may be reevaluated and reduced by the Service, if appropriate.

No Surprises Rule

By definition, adaptive management anticipates that there will be changes over time which will require modification to the conservation program and how it is implemented in order to continue to meet biological goals and objectives. The entire MSHCP, including the adaptive management strategy, is also subject to the federal “No Surprises Rule”, 63 FR 8859 (Feb. 23, 1998) (codified at 50 CFR §§ 17.3, 17.22(b), 17.32(b)). The “No Surprises Rule” provides assurances to Section 10 permit holders that, as long as the permittee is properly implementing the MSHCP, the IA, and the ITP, no additional commitment of land, water, or financial compensation will be required with respect to Covered Species (i.e., “take species”), and no restrictions on the use of land, water, or other natural resources will be imposed beyond those specified in the MSHCP without the consent of the permittee. The “No Surprises” Rule has two major components: changed circumstances and unforeseen circumstances. In response to this rule, NiSource has prepared its MSHCP to respond to a variety of circumstances and is requesting regulatory assurances for all MSHCP Species (see MSHCP Chapter 10). Changed circumstances reasonably anticipated and planned for in the MSHCP include; (1) Climate

Change; (2) Droughts; (3) Floods; (4) Fires; (5) Tornados; (6) Disease; (7) Invasive Species; 8) Species Range Expansion/Contraction; and 9) Species Listing/Delisting.

Changed circumstances are defined in the "No Surprises" Rule as "changes in circumstances affecting a species or geographic area covered by [an MSHCP] that can reasonably be anticipated by [plan] developers and the Service and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events)." (50 C.F.R. § 17.3). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances, and such measures were provided for in the MSHCP, the permittee will be required to implement such measures. (50 C.F.R. §§ 17.22(b)(5)(i), 17.32(b)(5)(i)). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances, and such measures were not provided for in the HCP, the Service will not require any additional measures beyond those provided for in the HCP, without the consent of the permittee, provided the HCP is being properly implemented. (50 C.F.R. §§ 17.22(b)(5)(ii), 17.32(b)(5)(ii)).

Unforeseen circumstances are defined as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the negotiation and development of the plan and that result in a substantial and adverse change in the status of the Covered Species. (50 C.F.R. § 17.3).

The Service bears the burden of demonstrating that unforeseen circumstances exist using the best available scientific and commercial data available while considering certain factors. (50 C.F.R. §§ 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C)). In deciding whether unforeseen circumstances exist, the Service shall consider, but not be limited to, the following factors (50 C.F.R. §§ 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C)):

1. The size of the current range of the affected species;
2. The percentage of the range adversely affected by the Covered Activities;
3. The percentage of the range that has been conserved by the MSHCP;
4. The ecological significance of that portion of the range affected by the MSHCP;

5. The level of knowledge about the affected species and the degree of specificity of the conservation program for that species under the MSHCP; and
6. Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the species in the wild.

In negotiating unforeseen circumstances, the Service will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed upon for the species covered by the HCP without the consent of the permittee (50 C.F.R. §§ 17.22(b)(5)(iii)(A)). If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Service may require additional measures of the permittee where the HCP is being properly implemented only if such measures are limited to modifications within conserved habitat areas, if any, or to the HCP's operating conservation program for the affected species, and maintain the original terms of the plan to the maximum extent possible. (50 C.F.R. §§ 17.22(b)(5)(iii)(B) and 17.32(b)(5)(iii)(B)). Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan without the consent of the permittee. Notwithstanding these assurances, nothing in the "No Surprises" Rule "will be construed to limit or constrain the [Service], any Federal agency, or a private entity, from taking additional actions, at its own expense, to protect or conserve a species included in a conservation plan." (50 C.F.R. §§ 17.22(b)(6) and 17.32(b)(6)).

In a letter dated November 19, 2012, to the Service's Midwest Regional Director Tom Melius, NiSource agreed to a one-time waiver of the No Surprises Assurances. NiSource envisions that through the five-year review meeting that will occur at year 25, NiSource and the Service – with the input of other stakeholders – will evaluate the MSHCP to …"ensure that the implementation of the MSHCP is consistent with conservation needs of listed species". If needed, the MSHCP will be amended at that time to incorporate any additional commitments and/or needed restrictions.

2.3.2.14 Amendment Process

The MSHCP includes an amendment process that is consistent with the Service's permitting regulations and HCP handbook. The MSHCP (Chapter 9) describes three types of amendments that may be required over time: administrative, minor, and major. The Service is satisfied that appropriate mechanisms are in-place, including adaptive management and changed circumstances, to ensure the MSHCP remains protective of listed species over the 50-year duration of the ITP.

2.3.2.15 Permittee

NiSource is seeking an ITP for Covered Activities initiated by NiSource and its designated agents which include Columbia Gas Transmission, LLC, Columbia Gulf Transmission Company, Crossroads Pipeline Company, Central Kentucky Transmission Company, and NiSource Gas Transmission and Storage Company (referred collectively as "NiSource" throughout this EIS), as well as any master limited partnerships established by NiSource. The ITP, if granted, will not provide any ESA coverage for other individuals or entities, including landowners in the Covered Land. In addition, an ITP may be transferred in accordance with the Service's regulations, currently located at 50 CFR § 13.25.

2.3.3 Alternative 3 – Issuance of a 10-year ITP and Approval of the NiSource MSHCP

Alternative 3 considers issuance of a 10-year ITP and approval of the MSHCP. This Alternative involves the same issuance, approval, and acceptance actions detailed above in Alternative 2 except it considers a permit duration of 10-years, subject to renewal and amendments by NiSource.

Public input was received during scoping and the public review process with regard to the duration of the proposed ITP. Specifically, input was received suggesting that a 50-year ITP was too long. All of the associated comments suggested that the ITP term be shortened, but most did not include a suggestion for an alternative timeframe. One commenter did however recommend a 10-year permit term, and inter-agency discussions have raised the 10-year ITP timeframe as a potentially workable option based on prior MSHCP experience. To avoid evaluation of an unreasonable number of alternatives associated with different permit durations,

the decision was made to evaluate two alternative durations for the MSHCP and requested incidental take permit: a 50-year permit term and a 10-year permit term.

As earlier stated, the Service's Five-Point Policy for Habitat Conservation Plans (HCPs) directs the Service to consider the following factors when evaluating the proposed duration of an incidental take permit: the duration of the applicant's proposed activities; the possible positive and negative effects on Covered Species associated with the proposed duration, including the extent to which the conservation plan will enhance the habitat of listed species and increase the long-term survivability of such species; the extent of information underlying the HCP; the length of time necessary to implement and achieve the benefits of the operating conservation program; and the extent to which the program incorporates adaptive management strategies.

NiSource Covered Activities are on-going and expected to occur indefinitely into the future. Under Alternative 2, NiSource has committed to mitigate for all anticipated impacts resulting from operation and maintenance activities over a 50-year period within the first seven years of MSHCP implementation. Under this Alternative, NiSource would not mitigate all of their O&M impacts up-front, thus the conservation benefits to species would be significantly reduced to annual take during the permit duration.

NiSource has indicated that a 10-year permit duration will not ensure them that costs associated with the development of the MSHCP could be recovered. Streamlining benefits associated with ESA regulatory compliance for take species would not be realized over a sufficient period that the savings in implementation will be greater than the financial commitment to planning their MSHCP.

Issuing a 10-year ITP could allow for a formalized application review process to occur. The Service's permit regulations require that a renewal or amendment application be made available for public review and comment. An amendment or renewal request by NiSource could result in another 10-year term, or a longer permit term, since the nature of the request is the permit holder's prerogative. Similarly, the agency would need to evaluate the NEPA analysis completed to determine whether this EIS remained sufficient to analyze project impacts beyond the existing permit timeframe. This NEPA review would also be subject to public review concurrent with the permit renewal application. Under any Alternative, a public review process would occur in the event of an application to amend the permit, which is expected to occur.

2.4 Summary and Comparison of Alternatives Considered for Detailed Analysis

Table 2.4-1 provides an overview summary of each of the three alternatives by major feature, while **Table 2.4-2** provides a summary and comparison of the three alternatives considered for detailed analysis in Chapter 4.

Table 2.4-1: Alternative Comparison by Major Feature

Topic	No Action Alternative	Proposed Action	10-Year Duration Alternative
Permit Duration	No permit issued; NiSource would continue to operate status quo implementing their business without a comprehensive conservation plan for Threatened and Endangered Species.	50 years with possible renewal	10 years with possible renewal
Covered Lands	No constraints. Determined on a project by project basis	9.8 million acres	9.8 million acres
MSHCP Species	Listed species will be determined based on the action area of each project	See Table 2.3-1 for MSHCP Species; however additional listed species addressed as appropriate.	See Table 2.3-1 for MSHCP Species; however additional listed species addressed as appropriate.
Covered Activities	Same. See Appendix B.	Same. See Appendix B	Same. See Appendix B
Conservation Strategy	Determined independently for each project by each Field Office involved	Commitments to avoid, minimize, and mitigate for projected impacts, including take of MSHCP species; including all upfront O&M mitigation during the first 7 years of the permit allowing benefits to accrue to species for the remainder of the permit duration.	Commitments to avoid, minimize, and mitigate for projected impacts, including take of MSHCP species

Topic	No Action Alternative	Proposed Action	10-Year Duration Alternative
Monitoring and Reporting	Determined on a project by project basis	Compliance monitoring, effects and effectiveness monitoring, and annual reporting	Compliance monitoring, effects and effectiveness monitoring, and annual reporting
Adaptive Management	Determined on a project by project basis	Adaptive management program is based on results of monitoring and reporting; components of the conservation strategy may then be modified based on results of adaptive management.	Adaptive management program is based on results of monitoring and reporting Insufficient timeframe within which to gain and apply knowledge with subsequent monitoring to determine success.
No Surprises Rule	No Surprises not available through Section 7 consultation	Regulatory assurances for all MSHCP Species included for the following reasonably anticipated and planned changed circumstances: (1) Climate Change; (2) Droughts; (3) Floods; (4) Fires; (5) Tornados; (6) Disease; (7) Invasive Species; (8) Species Range Expansion/ Contraction; and (9) Species Listing/ Delisting.	Regulatory assurances for all MSHCP Species included for the following reasonably anticipated and planned changed circumstances: (1) Climate Change; (2) Droughts; (3) Floods; (4) Fires; (5) Tornados; (6) Disease; (7) Invasive Species; (8) Species Range Expansion/ Contraction; and (9) Species Listing/ Delisting.
Amendment Process	No MSHCP; nothing to amend	MSHCP, ITP, and IA can be amended via administrative, minor, or major amendment processes. NiSource would waive No Surprises Assurances at year 25.	MSHCP, ITP, and IA can be amended via administrative, minor, or major amendment processes.
Permittee	No permit issued	NiSource and its designated agents	NiSource and its designated agents

Table 2.4-2: Comparison of Alternatives Considered for Detailed Analysis

NiSource Goal	Streamline Future ESA and NEPA Compliance	Enhanced Conservation and Recovery of MSHCP Species	Develop and Coordinate Mitigation Opportunities	Foster Efficient Use of Time and Money
No Action Alternative	No opportunity	None	None	Advantages of efficiency and streamlining associated with Proposed Action would not be realized
Applicants Preferred Alternative	Yes	Yes, through conservation and mitigation programs, including upfront O&M mitigation for entire permit duration during first 7 years	Yes, through mitigation program using green infrastructure network.	Yes, through negating individual project reviews allowing reallocation of resources to other higher priority conservation activities for duration of the permit.
Reduced Duration Alternative	Yes, during the duration of the permit	Yes, through conservation and mitigation programs.	Yes through mitigation program during ten-year permit term using green infrastructure network.	Yes, negating individual project reviews allowing reallocation of resources to other higher priority conservation activities during ten-year permit term

Chapter 3 Affected Environment

3.1 Introduction

The affected environment is the area and its resources (i.e., physical, biological, social) potentially impacted by the Proposed Action and Alternatives. The purpose of describing the affected environment is to define the context in which the impacts will occur. To make an informed decision about what actions to implement, it is necessary to first understand what is being affected by the alternatives, and what the impacts are. The affected environment section of an EIS should provide the basis for this understanding.

The NiSource pipeline system includes approximately 15,562 miles of buried steel pipe ranging in diameter from 2 to 36 inches, 117 compressor stations with approximately 1.1 million in combined horsepower, and 6,236 measuring and regulating stations. NiSource also operates 36 storage fields comprised of approximately 3,600 individual storage wells in West Virginia, Ohio, Pennsylvania, and New York. The NiSource Covered Lands area includes roughly 9.8 million acres of land in the east-central United States, comprising portions of 14 states, ranging from Louisiana in the south to New York in the north, with the majority of the Covered Lands area located in the Ohio, West Virginia, and Pennsylvania. The Covered Land acreage by state is summarized in **Table 3.1-1**.

Table 3.1-1: Covered Land Acreage by State

State	Acres	State	Acres
Delaware	2,049	New York	185,422
Indiana	88,599	North Carolina	936
Kentucky	499,418	Ohio	3,219,472
Louisiana	485,622	Pennsylvania	1,694,423
Maryland	371,784	Tennessee	122,393
Mississippi	140,909	Virginia	446,248
New Jersey	43,335	West Virginia	2,475,988

The Covered Land includes almost every type of land use found in the eastern United States. From the swamps of the Mississippi delta, to the fields of the central plains, to the parklands of the central Appalachians, and into the heavily urbanized northeastern states, an immense variety of land forms and processes comprise the Covered Land area. Although site

descriptions of every distinct variation would not be feasible for the scope of this document, general patterns are identified and described.

3.2 Physical Resources

This section provides information on physical resources in the Covered Land and surrounding region that may be impacted by the alternatives, such as water, geology, and soils. Sub-sections include surface water, ground water, geology, topography, hazardous materials, and soils.

3.2.1 Surface Water

Surface water includes all forms of natural water found above the ground surface; such as lakes, ponds, rivers, streams, and springs. Semi-permanent manmade water features can also be included, such as reservoirs, retention ponds, ponds, canals, and regularly flooded ditches. Due to the multi-state extent of NiSource facilities, surface waters will be described as part of a system rather than as individual features. The Covered Land area will be described in terms of Hydrologic Units.

The United States is divided into a series of Hydrologic Units, often described as drainage areas or watersheds. Hydrologic units describe how a piece of land is drained in an ascending series of greater geographic generalization. The tiered system is made up of cataloging units, which describe part or all of a surface drainage basin, a combination of drainage basins, or a distinct large hydrologic feature. Multiple cataloging units are combined to form accounting units, which are further combined to make the more general hydrologic sub-regions. These sub-regions are then combined to form hydrologic regions. Each hydrologic unit is identified by a unique Hydrologic Unit Code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system (Seaber et al 1987).

The first tier of classification, hydrologic region, divides the United States into 21 major geographic areas. A hydrologic region geographically describes either the drainage area of a major river, such as the Missouri River of the Missouri Region, or the combined drainage areas of a series of linked rivers, such as the majority of rivers draining into the western Gulf of Mexico that form the Texas-Gulf Region. Eighteen of these regions form the conterminous United

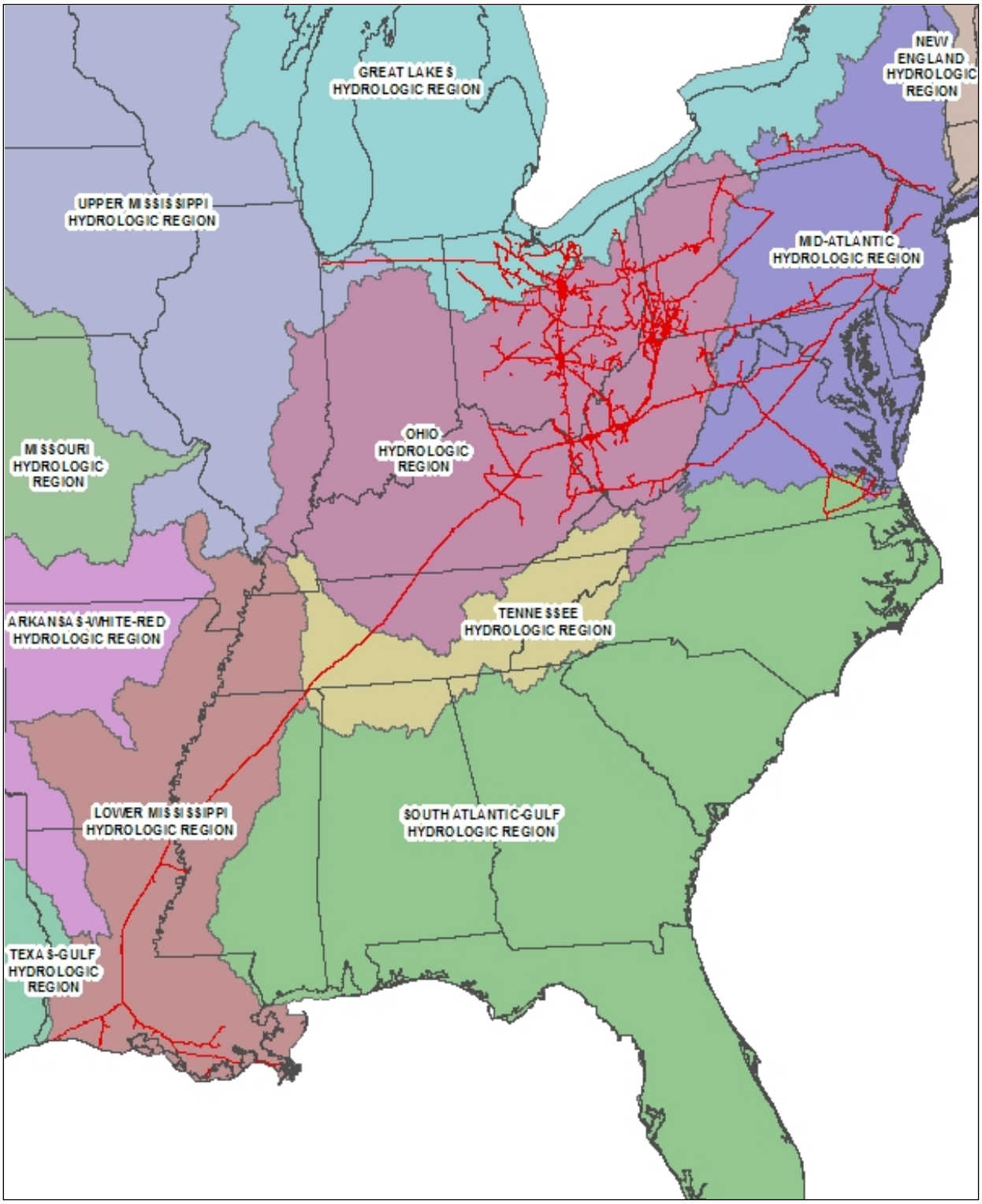
States (Seaber et al 1987). The Covered Land area falls within seven of these regions. The key regions include the Ohio (64-percent of the Covered Land area), Mid-Atlantic (21-percent of the Covered Land area), Great Lakes (7-percent of the Covered Land area), and Lower Mississippi (6-percent of the Covered Land area). See **Figure 3.2-1** for location of these regions. A list of regions crossed and the percent of the area they comprise can be found in **Table 3.2-1**.

The second tier of classification, hydrologic sub-region, divides the 21 regions into 221 sub-regions. A sub-region geographically describes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a coastal drainage area (Seaber et al 1987). The Covered Land area crosses 36 sub-regions within the seven regions (see **Table 3.2-1**).

Table 3.2-1: Regional and Sub-regional Watersheds within the Covered Land

Subregion HUC Code	Regional Watershed Name	Subregional Watershed Name	Acres by Subregional Watershed	Percent of Covered Land by Region
0202	Mid-Atlantic Region	Upper Hudson	13,450	20.45
0203		Lower Hudson-Long Island	38,527	
0204		Delaware	178,824	
0205		Susquehanna	736,436	
0206		Upper Chesapeake	38,519	
0207		Potomac	767,698	
0208		Lower Chesapeake	227,039	
0301	South Atlantic-Gulf Region	Chowan-Roanoke	99,904	1.02
0404	Great Lakes Region	Southwestern Lake Michigan	13,027	6.66
0405		Southeastern Lake Michigan	26,439	
0410		Western Lake Erie	441,240	
0411		Southern Lake Erie	148,546	
0413		Southwestern Lake Ontario	4,684	
0414		Southeastern Lake Ontario	17,667	
0501	Ohio Region	Allegheny	190,954	64.43
0502		Monongahela	784,125	
0503		Upper Ohio	1,795,906	
0504		Muskingum	1,314,812	
0505		Kanawha	761,206	
0506		Scioto	466,442	
0507		Big Sandy-Guyandotte	322,317	
0508		Great Miami	32,698	
0509		Middle Ohio	286,484	
0510		Kentucky-Licking	229,642	
0511		Green	69,150	
0513		Cumberland	50,043	
0604	Tennessee Region	Lower Tennessee	69,442	0.71
0712	Upper Mississippi Region	Upper Illinois	34,518	0.35
0801	Lower Mississippi Region	Lower Mississippi-Hatchie	20,350	6.37
0803		Lower Mississippi - Yazoo	123,369	
0804		Lower Red - Ouachita	40,896	
0805		Boeuf-Tensas	77,964	
0806		Lower Mississippi - Big Black	1,802	
0808		Louisiana Coastal	233,324	
0809		Lower Mississippi	125,757	
Source: U.S. Geological Survey (USGS) 1994				

Figure 3.2-1: Hydrological Units



Source: USGS 1994

Hydrology and Watershed Information

The Covered Land area includes portions of seven hydrologic regions, with 36 associated hydrologic sub-regions. This section contains a description of the hydrologic units and the properties, distribution, and the biological, recreational, and economic importance of the main water bodies within these units.

- **The Mid-Atlantic Region** is comprised of almost 72-million acres and contains a number of sensitive hydrologic features. The Delaware River estuary contains the largest world-wide population of horseshoe crabs and provides important habitat for migratory birds and spawning fish. It is also significant to regional economic, recreational, and cultural activities. The Barnegat, Peconic, Delaware Inland, and Maryland Coastal Bays, along with the New York/New Jersey Harbor are designated as Estuaries of National Significance and are significant to regional economies. Lake Champlain is a key regional recreational center. Additionally, the Catskill Watershed in the upper Delaware River Basin provides the fresh water supply for New York City (SCC 2007).

  The Mid-Atlantic Region comprises 21-percent of the Covered Land area. The region includes all of the areas that discharge into the Atlantic Ocean between New York and Virginia; the Long Island Sound south of the New York - Connecticut border; and the Riviere Richelieu. It covers all of Delaware, New Jersey, and District of Columbia along with portions of Connecticut, Maryland, Massachusetts, New York, Pennsylvania, Vermont, Virginia, and West Virginia (USGS 2007a).

  Portions of seven sub-regions of the Mid-Atlantic Region are within the Covered Land area. The Upper Hudson sub-region covers the Hudson River Basin to the Popolopen Brook Basin just upstream from the Bear Mountain Ridge. The Lower Hudson-Long Island sub-region covers the coastal drainage and associated waters from the Byram River Basin to the Manasquan River Basin. The Delaware sub-region covers the coastal drainage and associated hydrology from the Manasquam

River Basin to the Delaware River Basin. The Susquehanna sub-region covers the Susquehanna River Basin. The Upper Chesapeake sub-region covers the Chesapeake Bay and its tributaries north of the Maryland-Virginia boundary. The Potomac sub-region covers the Potomac River Basin. The Lower Chesapeake sub-region covers the Chesapeake Bay and its tributaries south of the Maryland-Virginia boundary (USGS 2007a).

- **The South Atlantic-Gulf Region** covers over 177-million acres with the largest abundance of surface waters in the contiguous U.S. as well as the longest coast of any regional watershed (SCC 2007).

  The South Atlantic-Gulf Region comprises 1-percent of the Covered Land area. The region encompasses all of the areas that discharge into the Atlantic Ocean between Virginia and Florida; the Gulf of Mexico between Florida and Louisiana; and all of the associated waters. It covers all of Florida and South Carolina along with portions of Alabama, Georgia, Louisiana, Mississippi, North Carolina, Tennessee, and Virginia (USGS 2007a).

  One South Atlantic-Gulf Region sub-region falls within the Covered Land area. The Chowan-Roanoke sub-region covers the coastal drainage and associated hydrology from the Back Bay drainage to the Oregon Inlet (USGS 2007a).

- **The Great Lakes Region** covers over 111-million acres. The region contains almost 6-quadrillion gallons of fresh surface water, approximately 95-percent of the U.S. supply or 20-percent of the world supply. The region consists of 4,500-miles of shoreline on the U.S. side, 300,000-acres of wetlands, 35,000 islands, 20-percent of U.S. forests, and 20-percent of U.S. manufacturing (SCC 2007).

  The Great Lakes Region covers seven percent of the Covered Land area. The region comprises all of the areas that discharge into the Great Lakes, along with the lake surfaces, and the St. Lawrence River to the Riviere Richelieu drainage

boundary. It covers portions of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin (USGS 2007a).

Portions of six Great Lakes Region sub-regions are within the Covered Land area. The Southwestern Lake Michigan sub-region covers the Lake Michigan drainage between the St. Joseph River Basin and the Milwaukee River Basin. The Southeastern Lake Michigan sub-region covers the Lake Michigan drainage between the St. Joseph River Basin and the Grand River Basin. The Western Lake Erie sub-region covers the Lake Erie drainage between the Huron River Basin and the Vermilion River Basin. The Southern Lake Erie sub-region covers the Lake Erie drainage between the Vermilion River Basin and the Ashtabula River Basin. The Southwestern Lake Ontario sub-region covers the Lake Ontario drainage between the Niagara River Basin and the Genesee River Basin. The Southeastern Lake Ontario sub-region covers the Lake Ontario drainage between Genesee River Basin and the Stony Creek Basin (USGS 2007a).

- **The Ohio Region** covers over 104 million acres. The region is primarily drained by tributaries, with less than five percent of the region draining directly into the Ohio River. The Allegheny and Monongahela merge at the border of the Mid-Atlantic Region to form the headwaters of the Ohio River, which flows 981 miles south and drains into the Mississippi River. The Ohio River provides drinking water for more than three million people, and approximately ten percent of the U.S. lives within the region. The river provides important habitat for numerous species along with providing recreation, power generation, and cargo transportation (SCC 2007).

  The Ohio Region covers the majority (64 percent) of the Covered Land area. The region comprises the drainage area of the Ohio River Basin, excluding the area of the Tennessee River Basin. It covers portions of Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia (USGS 2007a).

Portions of twelve Ohio Region sub-regions are within the Covered Land area. The Allegheny, Monongahela, Muskingum, Kanawha, Scioto, Great Miami, Green, and Cumberland sub-regions cover the river basins of the same name. The Upper Ohio sub-region covers the Ohio River basin between the confluence of the Allegheny and Monongahela basins and the confluence of the Kanawha River basin, excluding the Muskingum River basin. The Big Sandy-Guyandotte sub-region covers the Big Sandy and Guyandotte River basins. The Middle Ohio sub-region covers the Ohio River basin between Kanawha and Kentucky River basins, excluding the Big Sandy, Great Miami, Guyandotte, Kentucky, Licking and Scioto River basins. The Kentucky-Licking sub-region covers the Licking and Kentucky River basins (USGS 2007a).

- **The Tennessee Region** is one of the smallest in the country, covering slightly more than 26 million acres. The northern boundary of the region marks the southern boundary of historic glaciations from the last ice age. The aquatic species of the north meet those of the south in this region, forming one of the most diverse freshwater aquatic habitats on the planet (SCC 2007).

  The Tennessee Region comprises one percent of the Covered Land area. The region comprises all of the drainage area of the Tennessee River Basin. It covers portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia (USGS 2007a).

  One Tennessee Region sub-region falls within the Covered Land area. The Lower Tennessee sub-region covers the Tennessee River Basin below the Pickwick Dam (USGS 2007a).

- **The Upper Mississippi Region** covers over 121 million acres. The region begins in the forested lakes region of northern Minnesota and Wisconsin, stretching south to the St. Louis, Missouri area. It flows through a dense mosaic of residential, industrial, and rich agricultural lands. Demands on the river include use as habitat, recreation, water supply, and shipping (SCC 2007).

The Upper Mississippi Region comprises 0.4 percent of the Covered Land area. The region comprises all of the drainage area of the Mississippi River Basin above the confluence with the Ohio River, excluding the area of the Missouri River Basin. It covers portions of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, South Dakota, and Wisconsin (USGS 2007a).

One Upper Mississippi Region sub-region falls within the Covered Land area. The Upper Illinois sub-region covers the Illinois River Basin above the confluence of the Fox River Basin (USGS 2007a).

- **The Lower Mississippi Region** covers over 67 million acres. Major hydrologic features in the region, in addition to the Mississippi River, include the Lower Atchafalaya River, Wax Lake outlet, Atchafalaya Bay, Atchafalaya River and Bayou Chene, Boeuf, and Black navigation channels. The river is important for regional agriculture, commercial fishing, shipping, and is part of a primary avian migration path (SCC 2007).

  The Lower Mississippi Region covers six percent of the Covered Land area. The region comprises the drainage area of the Mississippi River below the confluence with the Ohio River, excluding the Arkansas, Red, and White River Basins above the high-backwater line. The region also includes the coastal streams that discharge into the Gulf of Mexico between the Pearl River Basin and Sabine River drainage boundaries. It covers portions of Arkansas, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee (USGS 2007a).

  Portions of seven Lower Mississippi Region sub-regions are within the Covered Land area. The Lower Mississippi-Hatchie sub-region covers the Mississippi River basin between the confluence of the Ohio River through the Horn Lake Creek basin, excluding the drainage west of the West-Bank Levee. The Lower Mississippi-Yazoo sub-region covers the Mississippi River basin between the Arkansas River basin and the Yazoo River basin, excluding the drainage west of the West-Bank Levee. The

Lower Red-Ouachita sub-region covers Red River basin below the Bayou Rigolette basin, excluding the Boeuf and Tensas River basins. The Boeuf-Tensas sub-region covers the Boeuf and Tensas River basins. The Lower Mississippi-Big Black sub-region covers the Mississippi River basin between the Yazoo River basin and the Lower Old River drainage boundary, excluding the drainage west of the West-Bank Levee. The Louisiana Coastal sub-region covers the Louisiana coastal drainage, including associated islands and waters, south of the Red River basin and west of the East-Bank Levee of the Atchafalaya basin floodway to the Sabine River and Lake drainage boundary. The Lower Mississippi sub-region covers the Mississippi River basin below the Bonnet Carre Floodway and Coastal drainage, from the Pearl River basin boundary and the Mississippi-Louisiana border to the East-Bank Levee of the Atchafalaya, excluding the drainage from the north into Lake Pontchartrain, east to the Tchefuncta River drainage boundary, and excluding the Lower Grand River basin (USGS 2007a).

Water Quality

Water quality is a critical component of all site descriptions and planning processes. This section generally describes water quality and potential water quality issues within each of the hydrologic regions described in **Section 3.2.1**.

- **The Mid-Atlantic Region's** water quality as recently as 20 years ago was seriously imperiled due to discharge of untreated sewage and wastes into regional waters. Since that time, water quality has improved due to required industrial waste treatment and upgrades in sewage treatment facilities. However, pollution is still a large problem in the region, especially from agriculture, urban runoff, and abandoned mine drainage. Key issues in the region include the following (SCC 2007):
    - **Water Quality and Toxic Contaminants**: The Delaware Estuary, a critical biological, recreational, commercial, and cultural area, has

continuing problems with water clarity and contaminants associated with urbanization and industrialization. The region has one of the highest levels of chemical contaminants in fish and shellfish populations in the country. Although clean-up efforts are underway, much progress is still needed.

- **Development and Urbanization**: Many of the regional bays and harbors are experiencing continued growth with associated increases in water pollution as a result of runoff and sewage. Although many of these bays are among the least degraded within the region, they are increasingly threatened by urbanization. Nutrient enrichment from agricultural runoff is a problem, resulting in low dissolved oxygen levels that negatively impact aquatic organisms.
- **Protection of the Lake Champlain Basin**: Lake Champlain was designated as a resource of national significance in 1990. This designation led to the planning and implementation of pollution prevention, pollution control, and restoration measures to this important part of the regional hydrology.
- **Wetlands Protection**: Wetlands protection is an important issue in the region, and many wetlands areas are recognized as being internationally important. Wetland loss and fragmentation are ongoing concerns in the region.

- **The South Atlantic-Gulf Region** contains the greatest quantity of surface water and shoreline of any region in the contiguous U.S. Given the quantity and variety of hydrology in the region, water quality is of concern of the region. Key issues in the region include (SCC 2007):

- **Industry and Shipping**: The region boasts the highest abundance of major industrial permittees and the largest quantity of water-borne trade in the U.S., highlighting the potential for large quantities of industrial and transportation related pollution.
- **Population Growth**: Regional population growth in recent years has focused in the potentially sensitive coastal regions.
- **Urbanization and Water Projects**: Urban expansion and related construction projects are leading causes of regional water quality impairment in the form of nutrient over-enrichment, sedimentation, and pathogen loading. Increases in impervious surfaces, along with channelization of streams, large dams, and introduced exotic vegetation are producing major changes to the natural hydrology.
- **Changing Weather Patterns**: Southern portions of the region have suffered from a five-year drought in recent years. In contrast, the northern coast has seen unprecedented flooding due to hurricanes. Changes in weather patterns, if continued over long periods, will lead to an alteration of regional water resources.

- **The Great Lakes Region** boasts one of the largest concentrations of open fresh water worldwide, but the region also hosts a large portion of the U.S. population and industry, leading to potential conflicts regarding water quality. The following key issues have been identified for the region (SCC 2007):
  - **Toxic Chemical Contamination**: All of the Great Lakes have multiple fish consumption advisories due to toxic chemical contamination. Contaminated sediments and air deposition from regional and global sources introduce pollutants to the lakes. In addition, many regional

beaches are periodically closed due to pollution from storm events and overflows/leaks from the region's outdated sewage systems.

- **Invasive Species**: Upwards of 160 non-native invasive species have been introduced to the Great Lakes ecosystem, disrupting regional food-webs. These species can have severe economic impacts as well as impacts to recreational and commercial aquatic opportunities in the region.
- **Habitat Loss**: Urbanization and urban sprawl continue to threaten regional ecosystems.

- **The Ohio Region** serves a large population that uses the Ohio River as a potable water source. Additionally, large quantities of regional agriculture, power generation, and barge transportation depend upon the Ohio River. Concerns related to nonpoint source pollution from urban runoff, agricultural activities, and abandoned mines are growing in the region. Identified key issues include (SCC 2007):
  - **Dioxin**: The upper two-thirds of the Ohio River have been studied extensively for dioxin contamination, with concentrations exceeding standards in the Pittsburgh, Pennsylvania; Marietta, Ohio; and Kanawha River junction areas.
  - **Combined Sewer Overflows**: In older cities in the region with combined storm and sanitary sewers, large storm events have been shown to overload the system, leading to overflows of both storm water and untreated human and industrial waste, which results in direct discharges to regional hydrology.
  - **Acid Mine Drainage**: Abandoned coal mines in the Three Rivers Area / Monongahela River Watershed are a leading cause of regional water degradation due to high acid and metal drainage from the historic mines.

- **Growth and Urbanization**: Expansion of regional development has led to increased sedimentation, turbidity, nutrient levels, and urban runoff. Thermal pollution in regional industrial discharges has also been identified as a potential problem for aquatic communities and water quality.

- **The Tennessee Region** has one of the highest freshwater aquatic diversities in the world, making water quality an extremely important regional issue. Key regional issues include the following (SCC 2007):

  - **Hydroelectric Dams**: The TVA manages multiple dams in the region, providing one of the most profound impacts to regional watersheds and communities, with heavy development around the resulting reservoirs. However, the TVA balances this by operating one of the largest federal watershed assistance and management programs in the country.

  - **Mining**: Both historic and present-day mining has led to water quality impacts related to sediment and polluted runoff and debris loading in lowland stream areas.

  - **Urban and Suburban Sprawl:** Due to population growth, urbanization is increasing at an alarming rate in the region, resulting in increases to impervious surfaces, run-off, and sewage loads.

  - **Water Quality Impairment**: Studies have identified nutrient enrichment, sedimentation, and pathogens as the leading causes of water quality impairment in the region.

- **Upper Mississippi Region** water quality is relatively pristine in the northern headwater areas but quickly becomes polluted by the time it reaches the southern limit of the region in St. Louis, Missouri. The following key issues have been identified for the region (SCC 2007):

- **Polluted Runoff**: Pollution due to runoff comes from municipal, industrial, and agricultural sources. Chemicals, sediments, and fertilizer introductions degrade regional water quality. . Excessive nutrient inputs from this region contribute to hypoxia in the Gulf of Mexico.
- **Industrial and Municipal Pollution**: Point source pollution from regional municipalities and industry is also a growing problem.
- **Wetlands Loss**: Loss of regional wetlands, which naturally filter runoff waters before they are introduced into the river system, is also leading to a general lowering of regional water quality
- **Lock and Dam System**: In addition to impacting regional wildlife communities, impoundments result in permanent flooding of historic wetlands and further contribute to the loss of wetlands in the area.
- **Organic Waste**: Impoundments not only flood historic wetlands, but they also trap sediments and municipal/industrial pollutants, which build up over time in these stagnant pools leading to both high pollutant loads and oxygen deficiencies.
- **Floodplain**: The Upper Mississippi has largely been channelized and levied to allow for agriculture in historic floodplains. Without these floodplains, natural sediment loads in the river are not given the opportunity to settle out in backwaters, leading to higher sediment loads in the main channel.

- **The Lower Mississippi Region** is an area of significant concern regarding surface and ground water quality according to the Environmental Protection Agency (EPA). Key issues for the region include the following (SCC 2007):

- **Nonpoint Pollution**: Abundant rainfall, finely textured alluvial soils, and intensive cultivation in the region have contributed to serious nonpoint pollution problems. The region loses an estimated 12-45 tons of soil per acre annually in the region, leading to increased turbidity, siltation, pesticide run-off, toxicity to wildlife, oxygen depletion, and eutrophication in regional waters. High pathogen levels are evident in coastal shellfish populations, resulting in multiple closures of shellfish grounds.

- **Deforestation**: Historically the region was heavily forested, but forest clearing for agriculture has reduced soil stabilization in the region, allowing for increased siltation.

- **Flood Control**: The Lower Mississippi River has largely been channelized and levied to allow for agriculture in historic floodplains. Without these floodplains, natural sediment loads in the river are not given the opportunity to settle out in backwaters, leading to higher sediment loads in the main channel and an expansion of the hypoxic zone in the Gulf of Mexico.

- **Coastal Land Loss**: The region has the highest rate of coastal land loss in the nation, upwards of 40 square miles a year. This land loss leads to further sedimentation of the Gulf of Mexico and the loss of coastal wetlands.

3.2.2 Ground Water

Groundwater is a significant source of drinking water in many areas crossed by the Covered Land, along with providing a source for agricultural and residential irrigation, and industrial uses. While depth to the groundwater is variable across the Covered Land, it is often found near to the ground surface, or with man-made or natural pathways of access (e.g. water wells, seep crevices), presenting a potential for Project activities to encounter and possibly impact groundwater resources.

Major aquifers crossed by portions of the Covered Land include (NAUS 2003):

- Pennsylvanian
- Mississippian
- Valley and Ridge
- Silurian-Devonian
- Coastal Lowlands
- Valley and Ridge Carbonate-Rock
- Piedmont and Blue Ridge Crystalline-Rock
- Northern Atlantic Coastal Plain
- Mississippi River Valley Alluvial
- Early Mesozoic Basin
- Piedmont and Blue Ridge Carbonate-Rock
- Ordovician
- Southeastern Coastal Plain
- Mississippi Embayment
- New York and New England Carbonate-Rock

The aquifers underlying the Covered Land are generally found in geological units composed of sandstone, sandstone and carbonate-rock, unconsolidated sand and gravel, semi consolidated sand, carbonate-rock, and igneous and metamorphic rock. Additional information on the aquifers that are found within the Covered Land, along with sole-source aquifers, water supply wells and springs, and wellhead protection areas are presented below.

Aquifer Systems

Sandstone aquifers underlie over 4.1-million acres of the Covered Land, with portions of the Pennsylvanian and Early Mesozoic aquifers represented, found in the states of Kentucky, Maryland, New Jersey, New York, Ohio, Pennsylvania, Virginia, and West Virginia. Sandstone aquifers are commonly interbedded with siltstone or shale, laid down during sedimentary cycles. They are level or gently dip, and generally contain water under confined conditions. Groundwater movement is generally along bedding planes, though joints and fractures allow for some vertical movement between beds. These aquifers are highly productive in many areas, providing large volumes of mineral heavy water. The Pennsylvanian aquifer is generally poorly permeable, with yield primarily from shallow fracture systems and interbedded, cleated coals.

The Early Mesozoic basin occupied titled grabens or half-grabens, are often interbedded with fine-grained sediments and intruded traprock, and generally only yield small quantities of water (Miller 1999).

Sandstone and carbonate-rock aquifers underlie over 3.1-million acres of the Covered Land, with portions of the Mississippian, Valley and Ridge, and Valley and Ridge Carbonate-Rock aquifer systems represented, found in the states of Kentucky, Maryland, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. These aquifers are formed of sandstone interbedded with carbonate rocks, with primary water yield from the carbonate rocks, and lesser yields from the sandstones. Water within the aquifer is found in both confined and unconfined states, with water yield largely dependent on localized bed make-up (Miller 1999).

Unconsolidated sand and gravel aquifers underlie over 995,000-acres of the Covered Land with portions of the Mississippi River Valley Alluvial aquifer system represented, found in the states of Louisiana and Mississippi. The unconsolidated sand and gravel aquifers of this region are of the blanket sand and gravel type. It was formed by alluvial deposits of the Mississippi River floodplain of medium to coarse sand and gravel. Water in this aquifer is found under unconfined, or water-table type conditions (Miller 1999).

Semi-consolidated sand aquifers underlie over 652,000-acres of the Covered Land, with portions of the Coastal Lowlands, Northern Atlantic Coastal Plain, Southeastern Coastal Plain, and Mississippi Embayment aquifer systems represented, found in the states of Louisiana, Mississippi, New Jersey, North Carolina, Tennessee, and Virginia. The aquifer is formed of sediments, primarily consisting of semi-consolidated sand, silt, and clay, interbedded with some carbonate rocks. They are primarily coastal in nature, found along the Atlantic and Gulf of Mexico coasts, with a wedge form that thickens seaward, formed by a series of transgressions and regressions of the sea, and vary widely by area. Aquifer recharge is from upland precipitation, with the water generally becoming increasingly confined as it approaches the coast (Miller 1999).

Carbonate-Rock aquifers underlie over 616,000-acres of the Covered Land, with portions of the Silurian-Devonian, Piedmont and Blue Ridge Carbonate-Rock, Ordovician, and New York and New England Carbonate-Rock aquifer systems represented, found in the states of Indiana,

Kentucky, Maryland, New Jersey, New York, Ohio, Pennsylvania, and Tennessee. These aquifers are generally formed of limestone, though some are formed of dolomite and marble, with the rock formed during the Precambrian to Miocene age. Karst topography is common within this aquifer (Miller 1999).

Finally, Igneous and Metamorphic Rock aquifers underlie over 276,000 acres of the Covered Land, with portions of the Piedmont and Blue Ridge Crystalline-Rock aquifer system represented, found in the states of Delaware, Maryland, New Jersey, Pennsylvania, and Virginia. This aquifer is formed of crystalline rocks with insignificant porosity, thus it is only permeable through secondary openings such as fractures, thus water yields tend to be small (Miller 1999).

Sole-Source Aquifers

The EPA defines a sole (or principal) source aquifer (SSA) as an aquifer that supplies at least 50-percent of the drinking water for the overlying area. The guidelines further stipulate that such areas cannot have an alternate source of drinking water that could physically, legally, or economically supply the population that is dependent upon the aquifer (EPA 2010b). The Covered Land covers portions of 15 EPA designated sole-source aquifers in nine states (EPA 2009). See **Table 3.2-2** for a list of sole-source aquifers crossed, the state and county in which they were crossed, the approximate acreage of the crossing, and FR references that can be used if further information on the sole-source aquifer is required.

Table 3.2-2: Sole-Source Aquifers Crossed by the Project

State	County	SSA Name	FR ID	Acres
DE	New Castle	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	73,020
LA	Acadia	Chicot Aquifer System SSA	53 FR 20893 (1988)	1,333,756
	Avoyelles	Chicot Aquifer System SSA	53 FR 20893 (1988)	105,418
	Calcasieu	Chicot Aquifer System SSA	53 FR 20893 (1988)	20,791
	Cameron	Chicot Aquifer System SSA	53 FR 20893 (1988)	2,404,857
	Evangeline	Chicot Aquifer System SSA	53 FR 20893 (1988)	653,348
	Iberia	Chicot Aquifer System SSA	53 FR 20893 (1988)	677,884
	Jefferson Davis	Chicot Aquifer System SSA	53 FR 20893 (1988)	658,564
	Lafayette	Chicot Aquifer System SSA	53 FR 20893 (1988)	443,606
	Rapides	Chicot Aquifer System SSA	53 FR 20893 (1988)	418,616
	St. Landry	Chicot Aquifer System SSA	53 FR 20893 (1988)	147,073
	St. Mary	Chicot Aquifer System SSA	53 FR 20893 (1988)	1,027,724
	Vermilion	Chicot Aquifer System SSA	53 FR 20893 (1988)	994,664
MD	Montgomery	Piedmont (Maryland Piedmont) Aquifer SSA	45 FR 57165 (1980)	193,210
	Montgomery	Poolesville Area Aquifer Extension of the Maryland Piedmont Aquifer SSA	63 FR 6176 (1998)	205,659
MS	Warren	Southern Hills Regional Aquifer System SSA	53 FR 25538 (1988)	24,958
NJ	Gloucester	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	58,377
	Gloucester	New Jersey Coastal Plain Aquifer System SSA	53 FR 23791 (1988)	437,252
	Hunterdon	New Jersey Fifteen Basin Aquifers SSA	53 FR 23685 (1988)	488,914
	Morris	Buried Valley Aquifers, Central Basin SSA	45 FR 30537 (1980)	196,485
	Morris	New Jersey Fifteen Basin Aquifers SSA	53 FR 23685 (1988)	423,849
	Morris	Upper Rockaway River Basin SSA	49 FR 2946 (1984)	93,214
	Salem	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	10,333
NJ (cont.)	Salem	New Jersey Coastal Plain Aquifer System SSA	53 FR 23791 (1988)	9,538
	Warren	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	40,728
	Warren	New Jersey Fifteen Basin Aquifers SSA	53 FR 23685 (1988)	66,650
NY	Broome	Clinton Street-Ballpark Valley Aquifer SSA	50 FR 2025 (1985)	773,394
	Chemung	Clinton Street-Ballpark Valley Aquifer SSA	50 FR 2025 (1985)	111
	Delaware	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	324,342
	Orange	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	55,913
	Orange	Highlands Aquifer System Passaic SSA	52 FR 37213 (1987)	54,597

State	County	SSA Name	FR ID	Acres
	Orange	New Jersey Fifteen Basin Aquifers SSA	53 FR 23685 (1988)	272,979
	Orange	Ramapo River Basin Aquifer Systems SSA	57 FR 39201 (1992)	166,292
	Rockland	Ramapo River Basin Aquifer Systems SSA	57 FR 39201 (1992)	205,155
	Sullivan	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	301,605
	Tioga	Clinton Street-Ballpark Valley Aquifer SSA	50 FR 2025 (1985)	641,729
OH	Butler	Greater Miami Buried Aquifer & OKI Extension (Southern Portion) SSA	57 FR 2567 and 15876 (1988)	11,860
	Champaign	Greater Miami Buried Aquifer & OKI Extension (Southern Portion) SSA	57 FR 2567 and 15876 (1988)	182,721
	Clark	Greater Miami Buried Aquifer & OKI Extension (Southern Portion) SSA	57 FR 2567 and 15876 (1988)	196,419
	Greene	Greater Miami Buried Aquifer & OKI Extension (Southern Portion) SSA	57 FR 2567 and 15876 (1988)	61,971
	Guernsey	Pleasant City Aquifer, Ohio SSA	52 FR 32342 (1987)	28,132
PA	Delaware	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	21,240
	Monroe	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	121,838
	Northampton	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	85,784
	Northampton	New Jersey Fifteen Basin Aquifers SSA	53 FR 23685 (1988)	492
	Pike	Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA	53 FR 23791 (1988)	149,083
	York	Seven Valleys Aquifer, York County SSA	50 FR 9126 (1985)	268,138
VA	Loudoun	Poolesville Area Aquifer Extension of the Maryland Piedmont Aquifer SSA	63 FR 6176 (1998)	287
Source: EPA 2009				

Water Supply Wells and Springs

Due to the wide spatial extent of the Covered Land, the presence of both public and private water supply wells and/or springs is likely within, or directly adjacent to the Covered Land. The availability of water supply information over large areas is limited, due to the potentially sensitive nature of the information, thus a complete analysis and listing of water supply wells/springs found within the Covered Land is not possible here. As such, the environmental consequences examined in Chapter 4 are somewhat general. We have, therefore, prescribed criteria for further NEPA tiering to examine site specific conditions when they are known.

Wellhead Protection Areas

Wellhead Protection Areas (WHPA) are those areas, both surface and subsurface, that surround a public water supply well and recharge the aquifer that contributes water to the well. They are established to prevent or control the potential for contaminants to move toward and reach a water well, and as such, are regulated to protect the water supply of a well. Due to the wide spatial extent of the Covered Land, the presence of WHPAs is likely within, or directly adjacent to the Covered Land. The availability of water supply information over large areas is limited, due to the potentially sensitive nature of the information, thus a complete analysis and listing of water supply wells/springs within the Covered Land is not possible here. As such, the environmental consequences examined in Chapter 4 are somewhat general. We have, therefore, prescribed criteria for further NEPA tiering to examine site specific conditions when they are known.

3.2.3 Geology

Geologic resources consist of surface and subsurface materials and their inherent properties, including topography, seismic characteristics, and soil stability. Geology of the Covered Land area varies greatly from the Mississippi delta region in the south through the coastal plains, central plains, Appalachians and Adirondacks, and back into the coastal plains. A short description of the three primary geologic areas of the Covered Land, the coastal plain, Appalachian orogenic belt, and Appalachians proper, are included below and adapted from *Earth: Portrait of a Planet* (Marshak 2001).

The coastal plain area extends from the southern tip of Texas across the Gulf of Mexico coastal region into the Mississippi embayment and northeast through the Mid-Atlantic states. A classic passive continental margin, the plain consists of a deep clastic wedge of sediment eroded from the platform and mountain belts. The region first formed during the Jurassic and Cretaceous periods through the opening of the Atlantic Ocean and Gulf of Mexico.

The Appalachian orogenic belt extends from Mississippi and Alabama north into the New England region. The Ouachita Mountains of Arkansas and the Marathon uplift of Texas are also part of this area. The belt formed in the Alleghenian orogeny, which took place when Pangea assembled in the late Paleozoic period. Although the region was characterized by high peaks

and mountainous areas, it has experienced heavy weathering since the opening of the Atlantic Ocean in the Jurassic and Cretaceous periods.

The Appalachian Mountain Range proper is composed of deformed sedimentary rocks cut through by numerous thrust faults. Similar to the western cordillera, the Appalachians went through several orogenies during the Paleozoic period, making interpretation of the region's geologic history difficult.

The Middle Paleozoic (Silurian, Devonian, and Mississippian) sedimentary rocks are the most abundant geologic member occurring within the Covered Land area (see **Table 3.2-3**). These sedimentary rocks include the following rock types:

- Silurian dolomites, limestones, and shales;
- Devonian shales and limestones; and
- Mississippian shales, sandstones, and limestones.

The Upper Paleozoic (Pennsylvanian, Permian) sedimentary rocks are the second most abundant geologic member occurring within the Covered Land area. These sedimentary rocks include the following rock types:

- Pennsylvanian sandstones, shales, and carbonates; and
- Permian shales and limestones.

Table 3.2-3: Geology of the Covered Land Area

Geology	Acreage of Covered Land	Percent of Covered Land	States Crossed	Acreage by State
Middle Paleozoic (Silurian, Devonian, and Mississippian) sedimentary rocks	4,067,129	41.65	Indiana	88,599
			Kentucky	169,218
			Maryland	225,055
			New York	158,459
			Ohio	2,393,303
			Pennsylvania	658,777
			Tennessee	54,393
			Virginia	50,836
			West Virginia	268,489
Upper Paleozoic (Pennsylvanian and Permian) sedimentary rocks	4,008,407	41.05	Kentucky	207,879
			Maryland	75,730
			Ohio	807,748
			Pennsylvania	709,483
			Tennessee	67
			West Virginia	2,207,499
Quaternary deposits	595,062	6.09	Louisiana	441,660
			Mississippi	53,116
			Virginia	100,286
Lower Paleozoic (Cambrian and Ordovician) sedimentary rocks	499,001	5.11	Kentucky	122,321
			Maryland	20,187
			New Jersey	8,035
			New York	16,778
			Ohio	17,110
			Pennsylvania	186,327
			Tennessee	56,068
			Virginia	72,175
Late Proterozoic and lower Paleozoic sedimentary rocks	104,331	1.07	Delaware	1,209
			Maryland	46,441
			New Jersey	1,122
			Pennsylvania	37,640
			Virginia	17,917
Lower Mesozoic (Triassic and Jurassic) sedimentary rocks	101,923	1.04	Maryland	3,655
			New Jersey	2,249
			New York	894
			Pennsylvania	59,753
			Virginia	35,372
Paleogene sedimentary rocks	88,886	0.91	Louisiana	34,892
			Mississippi	53,993

Geology	Acreage of Covered Land	Percent of Covered Land	States Crossed	Acreage by State
Middle Proterozoic gneiss	77,034	0.79	New Jersey	21,883
			New York	9,291
			Pennsylvania	17,490
			Virginia	28,370
Neogene sedimentary rocks	59,520	0.61	North Carolina	936
			Virginia	58,585
Cretaceous sedimentary rocks	55,711	0.57	Mississippi	33,800
			New Jersey	10,046
			Tennessee	11,865
Late Proterozoic sedimentary rocks	49,310	0.50	Virginia	49,310
Lower Mesozoic mafic rocks	24,301	0.25	Pennsylvania	16,362
			Virginia	7,939
Upper Paleozoic granitic rocks	18,386	0.19	Virginia	18,386
Late Proterozoic volcanic rocks	15,185	0.16	Pennsylvania	8,241
			Virginia	6,944
Late Proterozoic and lower Paleozoic mafic rocks	368	0.00	Maryland	368
Water body	273	0.00	Louisiana	273
Source: USGS 2005				

Topography

The Covered Land area stretches from the coastal lowlands of the Gulf of Mexico in the south through the central plains and into the Appalachian Mountains and rocky coastal plains of the northeastern states, encompassing the majority of land forms found east of the Mississippi River. The southern section of the area is predominantly just below sea level and comprised of flat coastal plains and the Mississippi alluvial valley. The central sections, forming the majority of the Covered Land area, range in elevation from 300-1,300-feet above sea level (asl) and are predominantly composed of irregular glaciated plains and rolling hills. In the Appalachians, rugged plateaus and foothills rise from 1,500-feet asl to rounded mountains of 5,000-feet asl. The coastal plains in the northeastern portion of the area range from 0-1,000-feet asl (Griffith 2007).

Geologic Hazards

The presence of geologic hazards such as volcanoes, earthquakes, active faults, and landslides can potentially threaten the integrity of the Covered Land area. Any spills or leaks caused by these geologic hazards could affect the surrounding environment. Fortunately, the eastern portion of the United States is relatively geologically stable compared to the western U.S. The eastern U.S. does not have any active volcanoes, and the faults that are active are relatively quiet in comparison to the west. In the following sections, an overview of some of the potential geologic hazards that could occur will be discussed with respect to the Covered Land area.

Earthquakes

An earthquake is the result of a sudden release of energy in the earth's crust, which creates seismic waves. Earthquakes are mainly caused by ruptures of geological faults but can also be caused by events such as volcanic activity, landslides, mine blasts, and nuclear experiments.

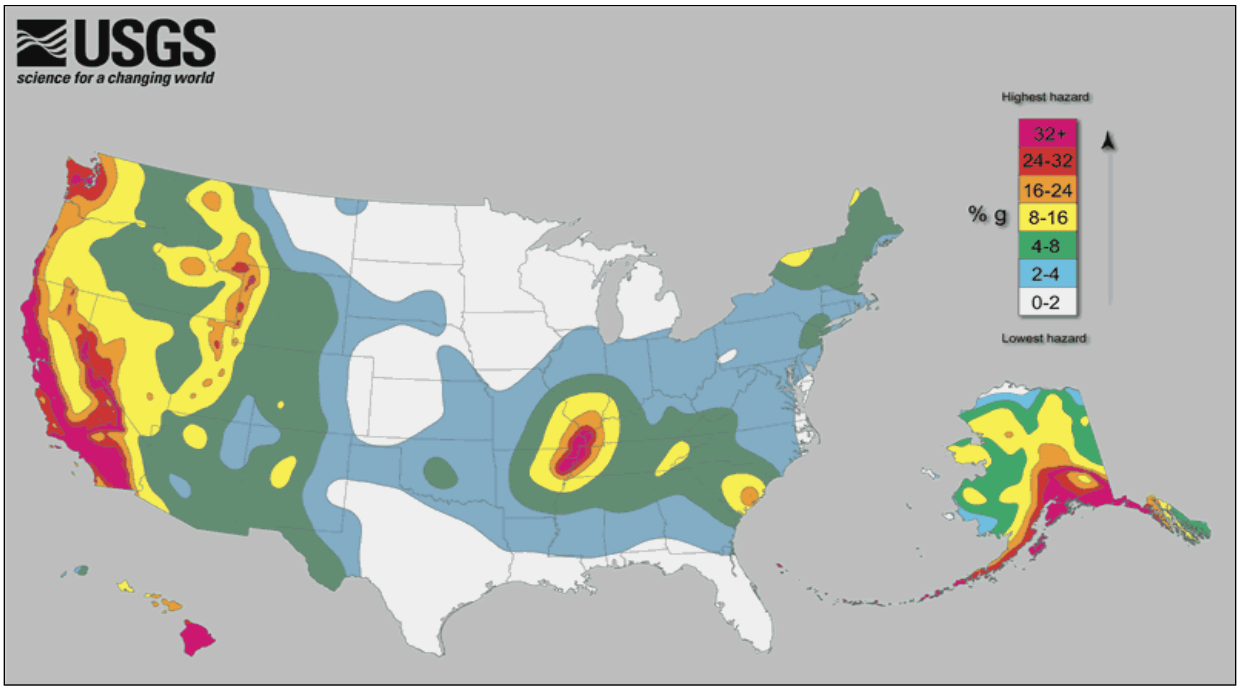
The Mercalli scale is commonly used in the U.S. by seismologists seeking information from personal reports on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I at the low end and XII at the high end.

The Peak Ground Acceleration (PGA), which is measured by instruments, shows how hard the earth shakes in a given geographic area and generally correlates well with the Mercalli scale. The hazard value ratings for ground acceleration are on a scale from 0 to 124+ as shown in **Table 3.2-4** and in **Figure 3.2-2**. The Modified Mercalli (MM) scale and correlated ground acceleration values are described in detail in **Table 3.2-4** below.

Table 3.2-4: Modified Mercalli Scale of Earthquake Intensity with Acceleration Percent Gravity

MM Intensity	Accel. %g	Description of Intensity Level
I	<0.17	Not felt except by a very few under especially favorable circumstances.
II	0.17-1.4	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	0.17-1.4	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV	1.4-3.9	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	3.9-9.2	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	9.2-18	Felt by all; many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	18-34	Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII	34-65	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	65-124	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	124	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	>124	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	-	Damage total. Lines of sight and level distorted. Objects thrown into the air.
Source: Qamar and Ludwin 2008		

Figure 3.2-2: Peak Ground Acceleration Values for the US



Source: USGS 2007b

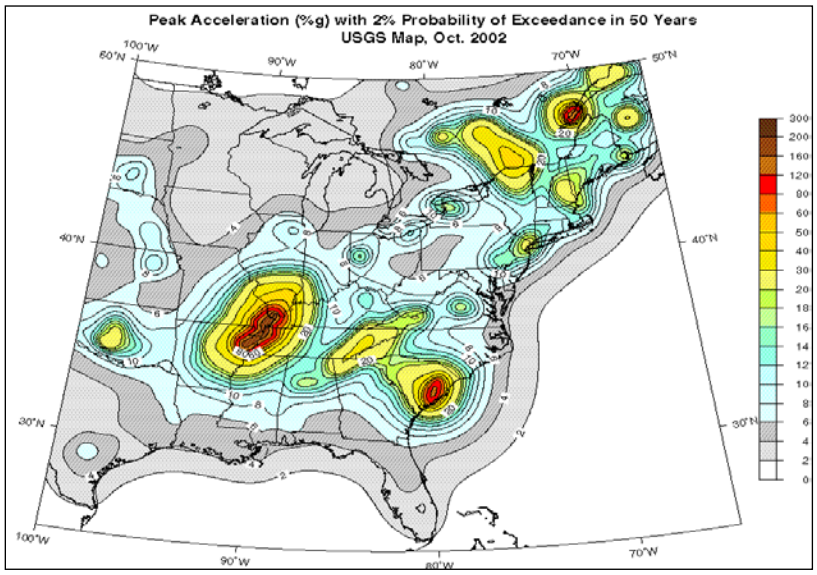
Ground shaking is perceptible to humans if the acceleration exceeds 1/10th of 1%g. Structural damage in buildings not designed to be resistant usually occurs at 10%g. Accelerations caused by earthquakes have been recorded exceeding 100%g. Factors other than acceleration must also be considered in evaluating the causes of damage such as the oscillation frequency and the total duration of shaking. For example, tall buildings are most affected by low frequency ground motions while typical family residences are most affected by high frequency motions.

During an earthquake, the ground acceleration varies with time and the force on any building is proportional to ground acceleration. The acceleration values shown in **Figure 3.2-2** are the peak or maximum values expected during the earthquake. "G" is a common value of acceleration equal to 9.8-meters/second/second (the acceleration due to gravity at the surface of the earth). 30%g is the acceleration one would experience in a car that takes nine-seconds to brake from 60 miles per hour to a complete stop.

As shown in **Figure 3.2-3**, a "2-percent probability of exceedance in 50-years" refers to the fact that earthquakes are somewhat random in occurrence. One cannot predict exactly whether an earthquake of a given size will or will not occur in the next 50-years. The map takes the random

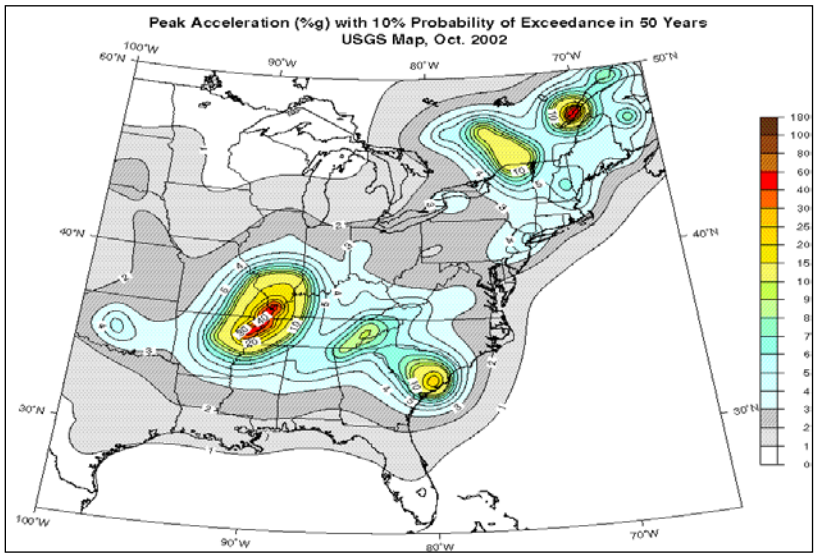
nature of earthquakes into account. It was constructed so that there is a two percent chance that the ground acceleration values shown will be exceeded in a 50-year time period. **Figure 3.2-4** shows a ten-percent chance that values shown will be exceeded in a 50-year time period (USGS 2007b).

Figure 3.2-3: Peak Acceleration with a 2% Probability of Exceedance in 50 Years



Source: USGS 2007b

Figure 3.2-4: Peak Acceleration with a 10% Probability of Exceedance in 50 Years



Source: USGS 2007b

The Covered Land area has only one recorded earthquake; a 1776 earthquake occurred near the Muskingum River in Ohio with an intensity of 6 on the MM scale (NAUS 2005e). The state acceleration values within the Covered Land area are shown below in **Table 3.2-5**, with the highest values showing a 6%g in the states of New Jersey and West Virginia. A reading of 6%g is a fairly low ground acceleration hazard reading.

Table 3.2-5: Modified Acceleration Values within the Covered Land Area

State	Acceleration Value	Acres of Covered Land	Percent of Covered Land by State
Delaware	4	2,049	100.00
Indiana	1	1,093	1.23
	2	87,506	98.77
Kentucky	3	211,475	42.34
	4	270,345	54.13
	5	17,598	3.52
Louisiana	1	390,907	80.71
	2	93,418	19.29
Maryland	2	350,639	94.31
	3	21,145	5.69
Mississippi	2	8,742	6.20
	3	51,033	36.22
	4	46,675	33.12
	5	34,459	24.45
New Jersey	4	18,368	42.39
	5	23,383	53.96
	6	1,584	3.65
New York	2	103,996	56.09
	3	42,228	22.77
	4	19,352	10.44
	5	19,846	10.70
North Carolina	2	936	100.00
Ohio	2	2,954,202	91.76
	3	265,270	8.24
Pennsylvania	2	1,522,879	89.88
	3	50,319	2.97
	4	121,226	7.15
Tennessee	3	1,296	1.06
	4	68,115	55.65
	5	52,982	43.29
Virginia	1	7,802	1.75
	2	207,618	46.54
	3	186,547	41.81
	4	43,944	9.85
	5	227	0.05
West Virginia	2	1,494,397	60.36
	3	829,779	33.51
	4	76,660	3.10
	5	74,912	3.03
	6	240	0.01
Source: NAUS 2002			

Faults

A fault is a planar rock fracture that shows evidence of relative movement. Large faults within the Earth's crust are the result of shear motion, and active fault zones are the cause of most earthquakes. Earthquakes are caused by energy release during rapid slippage along faults. The largest examples are at the tectonic plate boundaries, but many faults occur far from active plate boundaries. Given that faults do not usually consist of a single clean fracture, the term fault zone is used when referring to the zone of complex deformation that is associated with the fault plane.

Quaternary active faults are those that have slipped in Quaternary time (the last 1.8-million years). Geologists think that these faults are the most likely source of future great earthquakes. The Covered Land area has five states with active Quaternary faults present. These States include Kentucky, Louisiana, Mississippi, Virginia, and West Virginia; with Louisiana containing the largest amount of Quaternary fault acres within the Covered Land at 485,622-acres (see **Table 3.2-6**).

Table 3.2-6: Quaternary Active Faults within the Covered Land Area

State	Fault Name	Fault Age	Rate of Motion (mm/yr.)	Acres of Covered Land
Kentucky	Kentucky River fault system (Class B)	<1,600,000 years	> 0.2	5,338
Louisiana	Gulf Coast normal faults, LA and AR (Class B)	<1,600,000 years	> 0.2	455,240
	Monroe uplift (Class B)	<15,000 years	> 0.2	29,580
	Gulf Coast normal faults, MS (Class B)	<1,600,000 years	> 0.2	802
Mississippi	Monroe uplift (Class B)	<15,000 years	> 0.2	6,659
	Gulf Coast normal faults, MS (Class B)	<1,600,000 years	> 0.2	5,250
Virginia	Pembroke faults (Class B)	<1,600,000 years	unknown	227
West Virginia	Pembroke faults (Class B)	<1,600,000 years	unknown	14,201
Source: NAUS 2005c				

Karst Feature

Karst topography is a landscape shaped by the dissolution of a layer or layers of soluble bedrock; usually carbonate rock such as limestone or dolomite. Due to subterranean drainage, there may be very limited surface water rivers and lakes may be absent. Many karst regions display distinctive surface features, with dolines or sinkholes being the most common. However, distinctive karst surface features may be completely absent where the soluble rock is mantled, such as by glacial debris, or confined by a superimposed non-soluble rock stratum. Some karst regions include thousands of explored caves; though evidence of caves that are big enough for human exploration is not a required characteristic of a karst.

The karst topography itself also poses some difficulties for human inhabitants. Sinkholes can develop gradually as surface openings enlarge, but quite often progressive erosion is unseen and the roof of an underground cavern suddenly collapses. Such events have swallowed homes, cattle, cars, and farm machinery.

The Covered Land area contains 1,179,322-acres of karst topography, with Pennsylvania containing the majority at 663,943-acres, followed by Ohio with 451,877-acres (see **Table 3.2-7**). Over a third of the Covered Land area in the states of Maryland, Pennsylvania, and Tennessee is underlain by karst topography.

Table 3.2-7: Karst Topography within the Covered Land Area

State	Description	Acres of Covered Land	Percent of Covered Land by State
Indiana	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	8,963	10.12
Kentucky	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock	60,027	12.02
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	35,553	7.12
	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	8,190	1.64

Table 3.2-7: Karst Topography within the Covered Land Area

State	Description	Acres of Covered Land	Percent of Covered Land by State
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	7,301	1.46
Louisiana	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	10,841	2.23
Maryland	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in moderately to steeply dipping beds of carbonate rock	101,425	27.28
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	29,658	7.98
Maryland (cont.)	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in metamorphosed limestone, dolostone, and marble	3,821	1.03
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	154	0.04
Mississippi	Fissures, tubes, and caves generally absent; where present in small isolated areas, less than 50 ft. long; less than 50 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock	13,334	9.46
New Jersey	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	9,837	22.70
New York	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	13,661	7.37
Ohio	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	419,204	13.02
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	32,673	1.01
Pennsylvania	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in moderately to steeply dipping beds of carbonate rock	280,895	16.58
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	258,830	15.28
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	67,502	3.98

Table 3.2-7: Karst Topography within the Covered Land Area

State	Description	Acres of Covered Land	Percent of Covered Land by State
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in metamorphosed limestone, dolostone, and marble	47,063	2.78
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	6,050	0.36
	Fissures, tubes, and caves generally absent; where present in small isolated areas, less than 50 ft. long; less than 50 ft. vertical extent; in moderately to steeply dipping beds of carbonate rock	2,873	0.17
	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock	731	0.04
Tennessee	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock	78,554	64.18
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	6,649	5.43
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	5,688	4.65
Virginia	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in moderately to steeply dipping beds of carbonate rock	55,735	12.49
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in metamorphosed limestone, dolostone, and marble	11,743	2.63
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	8,088	1.81
West Virginia	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock	126,880	5.12
West Virginia (cont.)	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in gently dipping to flat-lying beds of carbonate rock	57,641	2.33
	Fissures, tubes, and caves over 1,000 ft. long; 50 ft. to over 250 ft. vertical extent; in moderately to steeply dipping beds of carbonate rock	27,900	1.13
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft. to 200 ft. thick	9,841	0.40
	Fissures, tubes and caves generally less than 1,000 ft. long; 50 ft. or less vertical extent; in moderately to steeply dipping beds of carbonate rock	2,017	0.08
Source: NAUS 2005a			

Landslide Potential

A landslide is a geological phenomenon that includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Landslides are caused when the stability of a slope changes from a stable to an unstable condition. Although the action of gravity on an over-steepened slope is the primary reason for a landslide, several factors contribute to the original slope stability.

Natural Causes:

- Groundwater pressure.
- Loss or absence of vertical vegetative structure, soil nutrients, and soil structure.
- Erosion of the toe of a slope by rivers or ocean waves.
- Weakening of a slope through saturation by snowmelt, glaciers melting, or heavy rains.
- Earthquakes adding loads to barely-stable slopes.
- Earthquake-caused liquefaction.
- Volcanic eruptions.

Human Causes:

- Vibrations from machinery or traffic.
- Blasting.
- Earthwork that alters the shape of a slope or imposes new loads on an existing slope
- In shallow soils, the removal of deep-rooted vegetation that binds colluvium to bedrock.
- Construction, agricultural, or forestry activities that change the amount of water that infiltrates into the soil.

The Covered Land area does have landslide susceptibility and incidence within its footprint as shown in **Table 3.2-8**. Susceptibility and incidence rates are categorized as low, moderate, or high.

Table 3.2-8: Landslide Susceptibility and Incidence within the Covered Land Area

State	Susceptibility	Acres of Covered Land	Percent of Covered Land by State
Delaware	Moderate susceptibility to landsliding and low incidence.	1,217	59.42
	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	831	40.58
Indiana	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	85,197	96.16
	Moderate susceptibility to landsliding and low incidence.	3,401	3.84
Kentucky	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	204,462	40.94
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	183,787	36.80
	Moderate susceptibility to landsliding and low incidence.	46,120	9.23
	High susceptibility to landsliding and moderate incidence.	41,014	8.21
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	24,034	4.81
Louisiana	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	300,782	62.10
	Moderate susceptibility to landsliding and low incidence.	160,804	33.20
	High susceptibility to landsliding and low incidence.	17,637	3.64
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	5,104	1.05
Maryland	High susceptibility to landsliding and moderate incidence.	288,768	77.67
	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	83,016	22.33
Mississippi	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	127,922	90.78
	High susceptibility to landsliding and moderate incidence.	7,920	5.62
	High susceptibility to landsliding and low incidence.	5,067	3.60
New Jersey	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	37,787	87.20
	Moderate susceptibility to landsliding and low incidence.	5,548	12.80
New York	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	130,219	70.23
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	36,422	19.64
	Moderate susceptibility to landsliding and low incidence.	11,837	6.38
	High susceptibility to landsliding and moderate incidence.	6,008	3.24
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	936	0.50
North Carolina	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	936	100.00

Table 3.2-8: Landslide Susceptibility and Incidence within the Covered Land Area

State	Susceptibility	Acres of Covered Land	Percent of Covered Land by State
Ohio	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	2,407,546	74.78
	High susceptibility to landsliding and low incidence.	409,887	12.73
	High susceptibility to landsliding and moderate incidence.	185,594	5.76
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	126,554	3.93
	Moderate susceptibility to landsliding and low incidence.	65,490	2.03
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	24,356	0.76
	No data exist for these areas.	46	0.00
Pennsylvania	High susceptibility to landsliding and moderate incidence.	723,535	42.70
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	431,855	25.49
	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	377,487	22.28
	High susceptibility to landsliding and low incidence.	65,924	3.89
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	57,451	3.39
	Moderate susceptibility to landsliding and low incidence.	38,171	2.25
Tennessee	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	116,135	94.89
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	6,258	5.11
Virginia	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	253,790	56.89
	High susceptibility to landsliding and moderate incidence.	104,633	23.45
	Moderate susceptibility to landsliding and low incidence.	53,996	12.10
	High landslide incidence (more than 15 percent of the area is involved in landsliding).	26,630	5.97
	Moderate landslide incidence (1.5 - 15 percent of the area is involved in landsliding).	7,091	1.59
West Virginia	High landslide incidence (more than 15 percent of the area is involved in landsliding).	2,111,066	85.26
West Virginia (cont.)	High susceptibility to landsliding and moderate incidence.	191,047	7.72
	Low landslide incidence (less than 1.5 percent of the area is involved in landsliding).	165,475	6.68
	High susceptibility to landsliding and low incidence.	7,527	0.30
	Moderate susceptibility to landsliding and low incidence.	873	0.04
Source: NAUS 2001b			

3.2.4 Soils

The soils in the Covered Land area are very diverse due to the variety of climates, parent material, vegetation, landforms, and age of surface materials.

Soils are classified into 12 different soil orders based on a classification system developed by the Natural Resources Conservation Service (NRCS) for soil taxonomy. Throughout the 14 states, six of the 12 soil orders are encountered within the Covered Land area. These soil orders are Ultisols, Alfisols, Inceptisols, Entisols, Mollisols, and Histosols.

Inceptisols are the most abundant soil order within the area, underlying 51-percent of the Covered Land Area, as shown in **Table 3.2-9**. They show minimal horizon development and are widely distributed, occurring within a wide range of environments. They are predominantly found on steep slopes, young geomorphic surfaces, and on resistant parent materials. A large percentage of Inceptisols are found in mountainous areas with typical uses being forestry, recreation, and watersheds (University of Idaho 2007).

Alfisols are the second most abundant soil order within the area, underlying 32-percent of the Covered Land area. They are generally well developed soils containing a subsurface horizon in which clays have accumulated. They are predominantly found in temperate humid and sub-humid regions and are productive soils typically used for agricultural and silvicultural activities (University of Idaho 2007).

Table 3.2-9: Soils of the Covered Land Area

Soil Order	Soil Description	States Crossed	Acreage by State	Acreage of Covered Land Area	Percent of Covered Land Area
Alfisols	A layer of clay minerals and other constituents leached from a surface layer into the subsoil. Is usually formed under forest or savanna vegetation.	Indiana	67,015	3,087,139	31.62
		Kentucky	165,719		
		Louisiana	194,022		
		Maryland	491		
		Mississippi	32,172		
		New Jersey	8		
		New York	1,766		
		Ohio	2,361,204		
		Pennsylvania	174,712		
		Tennessee	38,332		
		Virginia	43,244		
		West Virginia	8,454		
Entisols	Young soils with little or no development of diagnostic soil horizons. Found in young alluvium, sands, and soils on steep slopes and in basins of arid and semiarid environments.	Indiana	1,835	1,835	0.02
Histosols	Soils that are composed mainly of organic materials. They contain at least 20-30 percent organic matter by weight and are more than 40 cm thick. These soils are often referred to as peats and mucks and have physical properties that restrict their use for engineering purposes.	Louisiana	111,261	119,140	1.22
		Virginia	7,879		
Inceptisols	Soil occurs in a wide variety of climates and generally exhibits only moderate degrees of soil weathering and development.	Kentucky	220,341	5,016,926	51.39
		Louisiana	62,535		
		Maryland	300,786		
		Mississippi	36,310		
		New Jersey	6,845		
		New York	183,656		
		Ohio	848,240		
		Pennsylvania	1,010,595		
		Virginia	52,739		
		West Virginia	2,294,880		
Mollisols	Have a very dark brown to black surface horizon, mostly formed under grass or savanna vegetation. Soils can be developed on basalt and loess parent material.	Indiana	19,750	94,929	0.97
		Louisiana	75,180		

Soil Order	Soil Description	States Crossed	Acreage by State	Acreage of Covered Land Area	Percent of Covered Land Area
Ultisols	Show intensive leaching of clay minerals and other constituents, resulting in a clay-enriched subsoil dominated by quartz, kaolinite, and iron oxides.	Delaware	1,860	1,443,110	14.78
		Kentucky	113,358		
		Louisiana	29,441		
		Maryland	70,507		
		Mississippi	72,427		
		New Jersey	36,482		
		North Carolina	936		
		Ohio	10,022		
		Pennsylvania	509,117		
		Tennessee	84,061		
		Virginia	342,245		
		West Virginia	172,654		
Source: NRCS 2006, University of Idaho 2007					

3.2.5 Climate

Climate can vary substantially across the Covered Land area and is influenced by variations in elevation, topographic features, latitude, and proximity to the ocean. The National Climatic Data Center (NCDC) identifies four climatic regions that occur within the area: the Southern Region, the Southeast Region, the Midwest Region, and the Northeast Region.

The Southern Region includes Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. The region shows significant variations in climate with the semi-tropical Gulf Coastal region, the windswept plains of Texas and Oklahoma, and the hot, humid region of the Mississippi Delta. Summers are typically hot and humid and primarily sunny with precipitation coming in the form of fast, heavy showers. Winters are typically mild with cool nights and minor showers in the Gulf area and generally drier to the north with limited snow in the far northern regions (SRCC 2008).

The Southeast Region includes Alabama, Georgia, Florida, North Carolina, South Carolina, and Virginia. The region shows significant variations in climate due to latitude, including the semi-tropical Gulf Coastal region and the mid-latitude sub-tropical climate of Virginia. Hurricanes and heavy rains are common in the area, although much of the region is currently suffering from a multi-year drought. Summers are typically hot and humid and primarily sunny with precipitation coming in the form of fast, heavy showers. Winters are typically mild with cool

nights and cloudy skies with rain showers from Nor'easters common and some snow in the far northern portions (SERCC 2008).

The Midwest Region includes Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Regional climate is relatively uniform in comparison to other regions, with similar weather patterns across the area and variations based on latitude and proximity to the Great Lakes. Summers are typically warm and humid with regular showers. Winters are typically fairly cold and dry, with the majority of the precipitation coming in the form of snow throughout the region and lake effect snows in the Great Lakes areas (MRCC 2008).

The Northeast Region includes Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. Regional climate is generally severe mid-latitude, humid continental. Summers are typically warm and humid and primarily sunny with precipitation coming in the form of fast, heavy showers. Winters are typically fairly cold with long, light snow storms and frequent Nor'easter rain/snow storms (NRCC 2008).

Ecoregion descriptions, as developed by the Commission for Environmental Cooperation (CEC), can be used for a finer level of discussion of climate trends across the Covered Land area. Ecoregions are areas within which the type, quality and quantity of environmental resources (such as vegetation, wildlife, soils, geology, climate, hydrology, land use, and land form) are generally similar. A further description of the ecoregion concept, along with detailed descriptions of the ecoregions crossed by the Covered Land area can be found in Section 3.3.1. (See **Table 3.2-10**) for descriptions of regional climates, included to show the range of climate types in the Covered Land.

Table 3.2-10: Climates of the Covered Land Area

Level III Ecoregions	Crossed States	Acres of Covered Land	General Description	Summers	Winters	Mean Temp. (°F)	Frost Free Period (days)	Annual Mean Precip.	Annual Precip. Range
Western Allegheny Plateau	KY,OH, PA,WV	3,106,096	SMLHC	Warm to Hot	Cold	46-55	130-200	42"	34-45"
Erie Drift Plain	OH,PA	1,261,659	SMLHC	Warm	Cold	45-50	140-200	40"	34-50"
Ridge and Valley	MD,PA, VA,WV	1,225,969	SMLHC	Hot, Humid	Cold	46-61	125-235	45"	35-53"
Central Appalachians	KY,PA, WV	1,175,161	SMLHC	Warm	Snowy, Cold	37-46	120-160	43"	33-50"
Eastern Corn Belt Plains	IN,OH	756,426	SMLHC	Hot	Cold	48-55	160-200	39"	34-45"
Northern Piedmont	MD,NJ, VA	351,249	Transitional	Hot	Mild to Cold	52	160-230	43"	37-49"
Interior Plateau	KY,TN	336,750	MMLHS	Hot	Mild	54-61	160-220	50"	40-58"
Mississippi Alluvial Plain	LA,MS	298,883	MMLHS	Hot, Humid	Mild	57-70	200-355	55"	45-69"
Huron/Erie Lake Plain	OH	192,847	SMLHC	Hot	Severe	46-52	150-200	32"	28-36"
Southeastern Plains	MS,NC, TN,WV	184,265	MMLHS	Hot, Humid	Mild	55-66	200-300	53"	45-60"
North Central Appalachians	NY,PA	174,081	SMLHC	Warm	Snowy, Cold	37-46	120-160	43"	33-50"
Western Gulf Coastal Plain	LA	173,466	MMLHS	Hot	Mild	68-77	270-365	42"	23-64"
Northern Allegheny Plateau	NY	89,359	SMLHC	Warm	Severe	45	120-170	38"	35-47"
Middle Atlantic Coastal Plain	DE,NJ, VA	79,708	MMLHS	Hot, Humid	Mild	57-63	190-300	48"	40-56"
Northeastern Highlands	NJ,NY, PA	64,945	SMLHC	Warm	Snowy, Cold	34-46	100-180	47"	33-79"
South Central Plains	LA	58,897	MMLHS	Hot	Mild	63-68	220-290	50"	41-67"
Southern Michigan/Northern Indiana Drift Plains	IN	56,741	SMLHC	Warm to Hot	Severe	45-50	140-200	34"	30-39"
Piedmont	VA	55,522	MMLHS	Hot, Humid	Mild, Dry	55-63	170-250	48"	43-65"
Eastern Great Lakes Lowlands	NY	54,122	SMLHC	Warm	Snowy, Cold	41-48	120-170	38"	28-47"
Blue Ridge	PA,VA	32,755	SMLHC	Hot	Cold to Mild	45-57	130-210	56"	43-98"
Central Corn Belt Plains	IN	22,994	SMLHC	Hot	Severe	46-54	160-190	37"	34-41"
Mississippi Valley Loess Plains	MS	9,919	MMLHS	Hot	Mild	57-68	200-290	56"	45-65"
Atlantic Coastal Pine Barrens	NJ	3,983	SMLHC	Hot	Cold	52	190-225	45"	---

SMLHC – Severe Mid-Latitude Humid Continental MMLHS – Mild Mid-Latitude Humid Subtropical Source: Griffith 2007

Global Climate Change

Climate change is the subject of extensive study and increasing concern. According to the EPA (USEPA 2011), our climate is changing due to the emission of greenhouse gases, which prevent heat from escaping to space. As the concentrations of these gases have increased, global mean temperatures have increased 1.2 to 1.4^{o}F in the last 100 years, with most of the warming occurring in recent decades. Due to this warming, aspects of the world's climate that are changing include rainfall patterns, snow and ice cover, and sea level. Climate models predict warming of the Earth's surface from 3.2 to 7.2^{o}F above 1990 levels by the end of this century. Human activities are the cause of this acceleration in global mean temperature. While scientists are certain of this cause, they remain uncertain of the rate at which this change will occur.

Climate change has the potential to affect the human environment in a number of ways. With respect to this EIS, the Covered Land, and Covered Species, the potential for effects on the environment include species life history, range shifts, vegetation changes, flooding frequency, fire, and other changes that influence the site-specific planning processes. However, a complete analysis of site-specific climatic characteristics of the Covered Land is not possible at the scale of this EIS. As such, the environmental consequences examined in Chapter 4 are somewhat general in nature. In addition, the baseline is expected to change over the 50-year timeframe of this project. We have, therefore, prescribed criteria for further NEPA tiering (see Chapter 1 of this EIS) to examine site specific conditions when they are known.

3.2.6 Air Quality

This section discusses an overview of national air quality standards with a focus on the Covered Land area. Air quality can be influenced by meteorological and climatic factors such as wind direction. The eastern United States has prevailing wind directions from west to east.

Air Quality Standards

The ambient air quality in an area can be characterized in terms of compliance with the primary and secondary National Ambient Air Quality Standards (NAAQS). The Clean Air Act (CAA), as amended, requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS are provided for seven criteria pollutants:

- Carbon monoxide (CO);
- Lead (Pb);
- Nitrogen dioxide (NO_2);
- Ozone (O_3);
- Particulate matter with an aerodynamic size less than or equal to 10 microns (PM_{10});
- Particulate matter with an aerodynamic size less than or equal to 2.5 microns ($PM_{2.5}$); and
- Sulfur dioxide (SO_2).

Criteria pollutants are relatively common throughout the U.S. They are believed to be detrimental to public health and the environment and are known to cause property damage. NAAQS for criteria pollutants are shown in **Table 3.2-11** (EPA 2010a).

Table 3.2-11: National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[1]	None
	35 ppm (40 mg/m^3)	1-hour[1]	
Lead	0.15 μg/m^3 [2]	Rolling 3-month Ave.	Same as Primary
	1.5 μg/m^3	Quarterly Average	
Nitrogen Dioxide	53 ppb [3]	Annual (Arith. Ave.)	Same as Primary
	100 ppb	1-hour [4]	None
Particulate Matter (PM_{10})	150 μg/m^3	24-hour [5]	Same as Primary
Particulate Matter ($PM_{2.5}$)	15.0 μg/m^3	Annual [6] (Arith. Ave.)	Same as Primary
	35 μg/m^3	24-hour [7]	
Ozone	0.075 ppm (2008 std)	8-hour [8]	Same as Primary
	0.08 ppm (1997 std)	8-hour [9]	Same as Primary
	0.12 ppm	1-hour [10]	
Sulfur Oxides	0.03 ppm	Annual (Arith. Ave.)	0.5 ppm - 3-hour [1]
	0.14 ppm	24-hour [1]	
	75 ppb [11]	1-hour	None

Pollutant	Primary Standards	Averaging Times	Secondary Standards

[1] Not to be exceeded more than once per year.

[2] Final rule signed October 15, 2008.

[3] The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

[4] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

[5] Not to be exceeded more than once per year on average over 3 years.

[6] To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

[7] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

[8] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).

[9] (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

(c) EPA is in the process of reconsidering these standards (set in March 2008)..

[10] (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1.

[11] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Source: EPA 2010a

Nonattainment and Maintenance Areas

The CAA and Amendments of 1990 define a "nonattainment area" as any locality that persistently exceeds or fails to meet (or contributes to ambient air quality in a nearby area that fails to meet) the NAAQS. Designating an area as nonattainment is a formal rulemaking process, and EPA normally takes this action only after air quality standards have been exceeded for several consecutive years. Nonattainment areas are given a classification based on the severity of the violation and the type of air quality standard they exceed.

EPA designations of nonattainment areas are based on violations of NAAQS for CO, Pb, O_3, PM_{10}, $PM_{2.5}$, and SO_2. Currently, no nonattainment listings exist for NO_2. See **Table 3.2-12** for more information on nonattainment and maintenance areas within the Covered Land area.

Table 3.2-12: Nonattainment and Maintenance Areas within the Covered Land Area

State	Area Name	Pollutant	Status	Acres of Covered Land	Percent of Covered Land by State
Delaware	Philadelphia-Wilmington, PA-NY-DE	$PM_{2.5}$	Nonattainment	1,176	57.39
	Philadelphia-Wilmington-Atlantic City, PA-NY-MD-DE	O_3	Nonattainment	2,049	100.00
Indiana	Chicago-Gary-Lake County, IL-IN	O_3	Nonattainment	17,827	20.12
Indiana (cont.)		$PM_{2.5}$	Nonattainment	17,827	20.12
	Lake County, IN	SO_x	Maintenance	4,608	5.20
	LaPorte, IN	O_3	Nonattainment	13,478	15.21
	South Bend-Elkhart, IN	O_3	Nonattainment	22,024	24.86
Kentucky	Boyd County (part), KY	SO_x	Nonattainment	15,751	3.15
	Cincinnati-Hamilton, OH-KY-IN	O_3	Nonattainment	678	0.14
	Cincinnati-Hamilton, OH-KY-IN	$PM_{2.5}$	Nonattainment	678	0.14
	Huntington-Ashland, WV-KY	O_3	Nonattainment	23,181	4.64
	Huntington-Ashland, WV-KY-OH	$PM_{2.5}$	Nonattainment	26,318	5.27
Maryland	Baltimore, MD	O_3	Nonattainment	40,486	10.89
		$PM_{2.5}$	Nonattainment	40,486	10.89
	Martinsburg, WV-Hagerstown, MD	$PM_{2.5}$	Nonattainment	4,785	1.29
	Philadelphia-Wilmington-Atlantic City, PA-NY-MD-DE	O_3	Nonattainment	2,474	0.67
	Washington County (Hagerstown), MD	O_3	EAC	4,785	1.29
	Washington, DC-MD-VA	CO	Maintenance	4,608	1.24
		O_3	Nonattainment	27,562	7.41
	Washington, DC-MD-VA	$PM_{2.5}$	Nonattainment	27,562	7.41
New Jersey	New York-N. New Jersey-Long Island, NY-NJ-CT	$PM_{2.5}$	Nonattainment	17,644	40.71
		O_3	Nonattainment	32,167	74.23
	Philadelphia-Wilmington, PA-NY-DE	$PM_{2.5}$	Nonattainment	10,806	24.94
	Philadelphia-Wilmington-Atlantic City, PA-NY-MD-DE	O_3	Nonattainment	11,168	25.77
New York	New York-N. New Jersey-Long Island, NY-NJ-CT	$PM_{2.5}$	Nonattainment	34,951	18.85
		O_3	Nonattainment	7,179	3.87
	Poughkeepsie, NY	O_3	Nonattainment	27,772	14.98
Ohio	Addison Township (Gallia County), OH	SO_x	Maintenance	4,313	0.13
	Canton-Massillon, OH	O_3	Nonattainment	30,515	0.95
		$PM_{2.5}$	Nonattainment	30,515	0.95
	Cincinnati-Hamilton, OH-KY-IN	O_3	Nonattainment	8,599	0.27
		$PM_{2.5}$	Nonattainment	5,450	0.17
	Cleveland, OH	CO	Maintenance	6,640	0.21
	Cleveland-Akron-Lorain, OH	O_3	Nonattainment	138,466	4.30
		$PM_{2.5}$	Nonattainment	128,565	3.99

Table 3.2-12: Nonattainment and Maintenance Areas within the Covered Land Area

State	Area Name	Pollutant	Status	Acres of Covered Land	Percent of Covered Land by State
	Columbus, OH	O_3	Nonattainment	787,014	24.45
		$PM_{2.5}$	Nonattainment	424,770	13.19
	Cuyahoga County, OH	PM_{10}	Maintenance	6,640	0.21
	Dayton-Springfield, OH	O_3	Nonattainment	52,827	1.64
		$PM_{2.5}$	Nonattainment	52,827	1.64
	Franklin Township (Coshocton County), OH	SO_x	Maintenance	4,759	0.15
Ohio (cont.)	Huntington-Ashland, WV-KY-OH	$PM_{2.5}$	Nonattainment	48,200	1.50
	Jefferson County, OH	PM_{10}	Maintenance	1,257	0.04
	Lima, OH	O_3	Nonattainment	17,162	0.53
	Lorain County, OH	SO_x	Maintenance	450	0.01
	Lucas County, OH	SO_x	Maintenance	1,760	0.05
	Parkersburg-Marietta, WV-OH	O_3	Nonattainment	58,717	1.82
		$PM_{2.5}$	Nonattainment	58,717	1.82
	Steubenville & Mingo Junction, OH	SO_x	Maintenance	15,405	0.48
	Steubenville-Weirton, OH-WV	O_3	Nonattainment	32,013	0.99
		$PM_{2.5}$	Nonattainment	32,013	0.99
	Toledo, OH	O_3	Nonattainment	51,776	1.61
	Waterford Township (Washington County), OH	SO_x	Maintenance	3,823	0.12
	Wheeling, WV-OH	O_3	Nonattainment	49,135	1.53
		$PM_{2.5}$	Nonattainment	49,135	1.53
	Youngstown-Warren-Sharon, OH-PA	O_3	Nonattainment	125,306	3.89
Pennsylvania	Allentown-Bethlehem-Easton, PA	O_3	Nonattainment	24,421	1.44
	Altoona, PA	O_3	Nonattainment	30	0.00
	Armstrong County, PA	SO_x	Nonattainment	14,302	0.84
	Clearfield and Indiana Counties, PA	O_3	Nonattainment	57,440	3.39
	Franklin County, PA	O_3	Nonattainment	39,083	2.31
	Greene County, PA	O_3	Nonattainment	138,682	8.18
	Harrisburg-Lebanon-Carlisle, PA	O_3	Nonattainment	2,967	0.18
		$PM_{2.5}$	Nonattainment	2,967	0.18
	Johnstown, PA	O_3	Nonattainment	280	0.02
		$PM_{2.5}$	Nonattainment	3,650	0.22
	Lancaster, PA	O_3	Nonattainment	34,898	2.06
		$PM_{2.5}$	Nonattainment	34,898	2.06
	Philadelphia-Wilmington, PA-NY-DE	$PM_{2.5}$	Nonattainment	64,546	3.81

Table 3.2-12: Nonattainment and Maintenance Areas within the Covered Land Area

State	Area Name	Pollutant	Status	Acres of Covered Land	Percent of Covered Land by State
	Philadelphia-Wilmington-Atlantic City, PA-NY-MD-DE	O_3	Nonattainment	64,551	3.81
	Pittsburgh-Beaver Valley, PA	O_3	Nonattainment	353,975	20.89
		$PM_{2.5}$	Nonattainment	289,046	17.06
	Scranton-Wilkes Barre, PA	O_3	Nonattainment	8,412	0.50
	State College, PA	O_3	Nonattainment	8,884	0.52
	York, PA	O_3	Nonattainment	83,371	4.92
		$PM_{2.5}$	Nonattainment	35,445	2.09
Tennessee	Nashville, TN	O_3	EAC	41,315	33.76
Virginia	Frederick County, VA	O_3	EAC	141	0.03
Virginia (cont.)	Norfolk-Virginia Beach-Newport News, VA	O_3	Nonattainment	46,923	10.51
	Richmond-Petersburg, VA	O_3	Nonattainment	57,720	12.93
	Roanoke, VA	O_3	EAC	9,163	2.05
	Washington, DC-MD-VA	O_3	Nonattainment	44,556	9.98
		$PM_{2.5}$	Nonattainment	44,556	9.98
West Virginia	Charleston, WV	O_3	Nonattainment	609,421	24.61
		$PM_{2.5}$	Nonattainment	609,421	24.61
	Follansbee, WV	PM_{10}	Maintenance	917	0.04
	Huntington-Ashland, WV-KY	O_3	Nonattainment	101,310	4.09
	Huntington-Ashland, WV-KY-OH	$PM_{2.5}$	Nonattainment	101,310	4.09
	New Manchester-Grant Magisterial District (Hancock County), WV	SO_x	Maintenance	10,906	0.44
	Parkersburg-Marietta, WV-OH	O_3	Nonattainment	5,532	0.22
		$PM_{2.5}$	Nonattainment	5,532	0.22
	Steubenville-Weirton, OH-WV	O_3	Nonattainment	41,017	1.66
		$PM_{2.5}$	Nonattainment	41,017	1.66
	Weirton, WV	PM_{10}	Nonattainment	4,623	0.19
		SO_x	Maintenance	6,742	0.27
	Wheeling, WV-OH	O_3	Nonattainment	219,336	8.86
	Wheeling, WV-OH	$PM_{2.5}$	Nonattainment	219,336	8.86

EAC – Early Action Component
Source: RITABTS 2006a-g

Maintenance areas are those geographic areas that have had a history of nonattainment but are now consistently meeting the NAAQS. Maintenance areas have been re-designated by the EPA from "nonattainment" to "attainment with a maintenance plan".

Ohio has the highest amount of nonattainment and maintenance classification areas within the Covered Land at 2,226,770 acres, followed closely by West Virginia and Pennsylvania at 1,976,419 acres and 1,261,848 acres, respectively.

If a project came with a current or future nonattainment or maintenance area, the federal agency responsible would need to perform a general Conformity Applicability Determination to evaluate whether the project conforms with the respective state implementation plan.

3.3 Biological Resources

Covering almost 9.8 million acres, the Covered Land area includes portions of 14 states, stretching from coastal Louisiana to upstate New York. The area crosses portions of all types of habitat found in the continental United States east of the Mississippi river; from the Mississippi delta swamps, to the southeastern and central plains, the Great Lakes region, the Appalachians, and the northeastern coast. These habitats provide a diverse flora and fauna. This section describes the variety of vegetation, land cover, wetlands, wildlife, and sensitive species encountered in the area.

3.3.1 Vegetation and Land Cover Descriptions by Ecoregion

The Covered Land area encompasses a wide variety of vegetation types including coastal plains, oak-hickory-pine forest, Appalachian plateaus, and elm-ash swamps and sand dunes. In addition to these natural habitats, the Covered Land area includes various anthropogenic cover types including portions in the corn and wheat belts, pasture lands, managed forests, mines, and developed areas ranging from the smallest rural community to some of the largest urban complexes in the country.

Each land cover class encountered within the area is unique, with variations in species diversity and structure based on such factors as climate, elevation, soil type, and human influence. The CEC developed a generalized representation termed “ecoregions” to describe the vegetation and land cover characteristics over large areas. These are designed to provide a spatial

framework for environmental planning and resource management decision making over large areas. Ecoregions are areas within which the type, quality, and quantity of environmental resources (such as vegetation, wildlife, soils, geology, climate, hydrology, land use, and land form) are generally similar. Based on ecoregions originally developed by Omernik (Omernik 1987), the ecoregions developed by the CEC are a collection of four nested levels. Level I ecoregions are the coarsest, with 15 classes covering the North American continent. Level II ecoregions further subdivide the continent into 52 classes. Level III ecoregions divide the continental U.S. into 84 regions, 23 of which cover portions of the Covered Land area. Finally, Level IV ecoregions subdivide the Level III regions, providing the finest description of site resources. The following map depicts the Covered Land within the Level IV ecoregions (EPA 2010). The 23 Level III Ecoregions incorporated in the Covered Land Area (see **Figure 3.3-1**) include:

- Atlantic Coastal Pine Barrens
- Blue Ridge
- Central Appalachians
- Central Corn Belt Plains
- Eastern Corn Belt Plains
- Eastern Great Lakes Lowlands
- Erie Drift Plain
- Huron/Erie Lake Plains
- Interior Plateau
- Middle Atlantic Coastal Plain
- Mississippi Alluvial Plain
- Mississippi Valley Loess Plains
- North Central Appalachians
- Northeastern Highlands
- Northern Allegheny Plateau
- Northern Piedmont
- Piedmont
- Ridge and Valley
- South Central Plains
- Southeastern Plains
- Southern Michigan/Northern Indiana Drift Plains
- Western Allegheny Plateau
- Western Gulf Coastal Plain

Figure 3.3-1: Ecoregions Overview

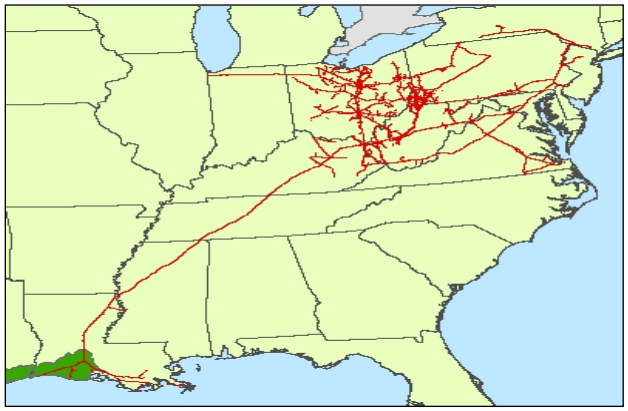
Source:
CEC/EPA 2010

Descriptions for each of these ecoregions are provided in the following subsections. These descriptions are adapted from the original Level III descriptions developed by the EPA (EPA 2002) and the revised descriptions developed by Griffith for the CEC (Griffith 2007) based on further studies. In addition to descriptions of the ecoregions from the EPA and CEC, additional information on the regions based on the National Land Cover Database (NLCD) and various other state and federal data sources are included in each section to further described the Covered Land portion of the ecoregion. Ecoregions are listed in the order that they are encountered by the Covered Land area as it traverses northeast from Louisiana.

Western Gulf Coastal Plain

The Western Gulf Coastal Plain ecoregion includes the southwestern region of Louisiana and coastal Texas (see **Figure 3.3-2)**. The ecoregion is distinct from surrounding regions by being flatter and less forested, along with more wide spread conversion to agriculture, than in inland regions to the north (EPA 2002). The Covered Land area stretches over 682-miles of this ecoregion, with an overall footprint of 173,469-acres covering portions of the Covered Land area in Louisiana.

Figure 3.3-2: Western Gulf Coastal Plain Ecoregion



Source: CEC 2006

Regional terrain is a combination of flat coastal plains, barrier islands, dunes, beaches, bays, estuaries, and tidal marshes. Soils are primarily composed of Pleistocene marine sands, silts, and clays. Hydrologically, the land consists of low gradient intermittent and perennial streams and coastal lakes. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Vegetation of the ecoregion varies based upon latitude and land form. Native vegetation in northern portions of the region is tallgrass prairies typified by little and big bluestem, yellow indiangrass, and brown-seed paspalum mixed with hundreds of other herbaceous species. Central portions of the region have similar vegetation along with tall dropseed, silver bluestem, common curly-mesquite, and plains bristlegrass. Coastal marshes consist of cordgrass, saltgrass, needlerush, and saltmarsh bulrush; and barrier islands are comprised of seacoast bluestem, gulfdune paspalum, and sea oats (Griffith 2007).

The NLCD classes for the Western Gulf Coastal Plain portion of the Covered Land area indicate that the area is primarily covered by Cultivated Crops, Emergent Herbaceous Wetlands, and Pasture/Hay (see **Table 3.3-1**).

Table 3.3-1: NLCD within the Western Gulf Coastal Plain Ecoregion

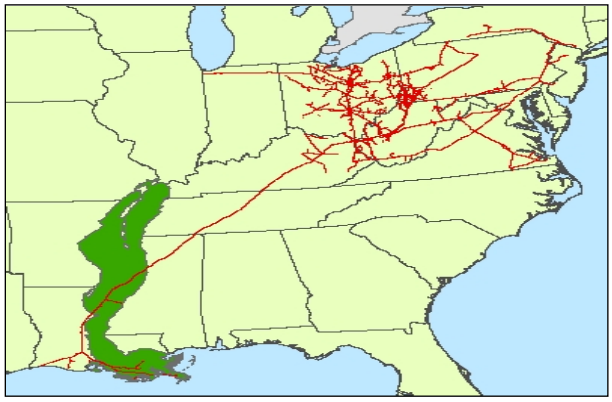
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	17,025	9.81	Mixed Forest	12	0.01
Developed, Open Space	412	0.24	Scrub/Shrub	383	0.22
Developed, Low Intensity	8,067	4.65	Grassland/Herbaceous	1,846	1.06
Developed, Medium Intensity	720	0.42	Pasture/Hay	19,331	11.14
Developed, High Intensity	373	0.21	Cultivated Crops	84,880	48.93
Barren Land	76	0.04	Woody Wetlands	10,763	6.20 t
Deciduous Forest	32	0.02	Emergent Herbaceous Wetland	29,521	17.02
Evergreen Forest	26	0.01			
Source: USGS 2003					

The coastal prairie and marsh natural communities that once covered 2.5-million acres of this area have been reduced to just 600 acres (LADWF 2005). Much of the area has been converted to cropland, with typical crops including rice, soybeans, sugarcane, cotton, corn, grain sorghum, wheat, hay, and pastureland. In the southern portion of the ecoregion, vegetables, melons, citrus, and rangeland for livestock grazing is also common. Onshore oil and gas production is also a significant land use in the region, with such high production fields as Grand Lake and Pecan Lake located in proximity to the Covered Land area, along with refinement and transportation facilities for offshore fields (LADNR 2010). Also, urbanization and industrialization have become common in this area in recent years, with 16 of Louisiana's large cities growing in this region (Griffith 2007).

Mississippi Alluvial Plain

The Mississippi Alluvial Plain ecoregion stretches from the confluence of the Ohio and Mississippi Rivers in Illinois to the south through Kentucky, Missouri, Tennessee, Arkansas, Mississippi, and Louisiana and terminates in the Gulf of Mexico (see **Figure 3.3-3**). The ecoregion is distinct from surrounding regions due to the poorly drained, fine textured soils typical in this region as compared to surrounding upland ecoregions (EPA 2002). The Covered Land area extends over 860-miles of the region, with an overall footprint of 298,734-acres covering portions of the Covered Land area in Louisiana and Mississippi.

Figure 3.3-3: Mississippi Alluvial Plain Ecoregion



Source: CEC 2006

Regional terrain is dominated by the Mississippi Valley, a broad, flat alluvial plain with associated terraces, swales, and levees. Soils are primarily composed of Pleistocene to Holocene sandy to clayey alluvium and are typically finer in texture and more poorly drained than in surrounding regions. Hydrologically, the Mississippi River watershed drains approximately 13-percent of the land area of North America. Historically, the region contained one of the largest wetland complexes in North America, with many marshes, oxbow lakes, and ponds along with the river and its side channels, though much of it has been modified through channelization, navigation, and flood control measures. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Pre-colonization, bottomland hardwood forests almost completely dominated the Mississippi Alluvial Plain ecoregion. Regular flooding of the region, both from headwater and backwater flood events, maintained these natural communities with hydroperiod determining localized tree species varieties (MSDWFP 2005). The river swamp forests are the wettest communities and

are dominated by bald cypress and water-tupelo. The hardwood swamp forests are typified by water hickory, red maple, green ash, and river birch. Finally, the higher, seasonally flooded areas are composed of sweetgum, sycamore, laurel oak, Nuttall's oak, and willow oak (Griffith 2007).

The NLCD classes for the Mississippi Alluvial Plain portion of the Covered Land area indicate that the area is now primarily covered by Cultivated Crops, Woody Wetlands, Emergent Herbaceous Wetlands, and Open Water (see **Table 3.3-2**).

Table 3.3-2: NLCD within the Mississippi Alluvial Plain Ecoregion

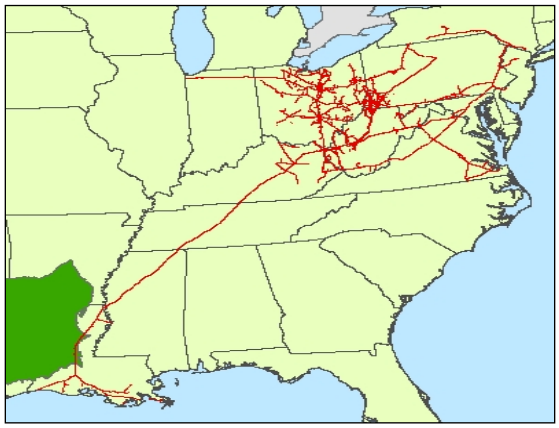
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	30,009	10.05	Mixed Forest	2,076	0.70
Developed, Open Space	6,882	2.30	Scrub/Shrub	992	0.33
Developed, Low Intensity	8,394	2.81	Grassland/Herbaceous	483	0.16
Developed, Medium Intensity	895	0.30	Pasture/Hay	8,115	2.72
Developed, High Intensity	622	0.21	Cultivated Crops	121,888	40.81
Barren Land	871	0.29	Woody Wetlands	61,380	20.55
Deciduous Forest	1,474	0.49	Emergent Herbaceous Wetland	54,482	18.24
Evergreen Forest	112	0.04			
Source: USGS 2003					

Since settlement, the area has been almost completely converted to cropland through plowing, herbicide application, and flood control engineering. Primary crops in the area are soybeans, cotton, corn, rice, wheat, and sugarcane. Commercial production of catfish and crawfish in regional ponds is also common. Multiple large municipalities occur in the region along the Mississippi River (Griffith 2007).

South Central Plains

The South Central Plains ecoregion covers a large portion of western Louisiana, eastern Texas, and lesser portions of Arkansas and Oklahoma (see **Figure 3.3-4**). Unlike other ecoregions in the area, about one-sixth of the South Central Plains ecoregion is covered by cropland, whereas two-thirds of the ecoregion is covered by forests (EPA 2002). The Covered Land area stretches over 256-miles of the region, with an overall footprint of 58,897-acres covering portions of the Covered Land area in Louisiana.

Figure 3.3-4: South Central Plains Ecoregion



Source: CEC 2006

Regional terrain is more rolling than surrounding regions, dominated by rolling plains broken by fluvial terraces, bottomlands, sandy low hills, and low cuestas. Soils are primarily poorly-consolidated Tertiary coastal plain deposits in the form of acidic sandy loams, silt loams, sands, and sandy loams. Hydrologically, the region has a high density of perennial streams but largely lacks natural lakes; however, a number of large reservoirs have been constructed in the area. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Native upland vegetation in the ecoregion is dominated by shortleaf pine/hardwood forests in the north and longleaf pine and savannas in the south. Southern upland forests are typified by southern red oak, post oak, white oak, hickory and loblolly pine, along with patches of American beech and magnolia. Southern floodplain forests are dominated by water oak, willow oak, swamp chestnut oak, sweetgum, blackgum, red maple, bald cypress, and water-tupelo (Griffith 2007).

The NLCD classes for the South Central Plains portion of the Covered Land area indicate that the area is now primarily covered by Evergreen Forest, Woody Wetlands, Cultivated Crops, and Scrub/Shrub (see **Table 3.3-3**).

Table 3.3-3: NLCD within the South Central Plains Ecoregion

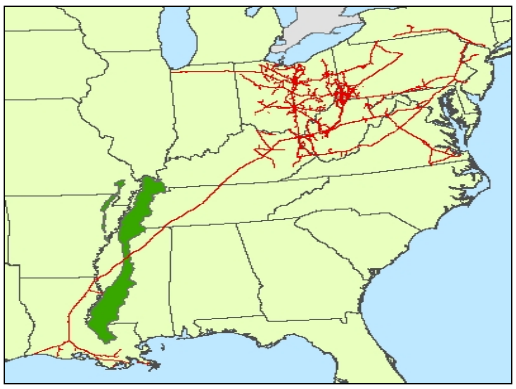
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	389	0.70	Mixed Forest	1,967	3.55
Developed, Open Space	1,562	2.82	Scrub/Shrub	8,202	14.79
Developed, Low Intensity	858	1.55	Grassland/Herbaceous	282	0.51
Developed, Medium Intensity	78	0.14	Pasture/Hay	2,267	4.09
Developed, High Intensity	15	0.03	Cultivated Crops	8,334	15.03
Barren Land	56	0.10	Woody Wetlands	13,181	23.76
Deciduous Forest	862	1.55	Emergent Herbaceous Wetland	480	0.86
Evergreen Forest	16,931	30.53			
Source: USGS 2003					

Shortleaf pine-oak-hickory forests once dominated much of this region, but the majority of the shortleaf pine was logged upon settlement and, aside from remnant patches, has been largely replaced by loblolly pine plantations (LADWF 2005). Commercial pine plantations are extensive in this region, and timber production, along with livestock grazing and oil/gas production, form the majority of commercial land use in this region. Areas cleared for cultivation make up 15-20-percent of the region and are primarily planted with cotton, corn, soybeans, rice, and pasture (Griffith 2007).

Mississippi Valley Loess Plains

The Mississippi Valley Loess Plains ecoregion stretches from the Ohio River in western Kentucky to the south through Missouri, Tennessee, Arkansas, Mississippi, and Louisiana, largely east of the Mississippi River, although a small portion of the ecoregion occurs west of the Mississippi River outside of the Covered Land area (see **Figure 3.3-5**). The ecoregion is distinct from surrounding regions by being generally flatter, with lower gradient streams and thicker loess soils than in surrounding regions (EPA 2002). The Covered Land area stretches over 44 miles of this ecoregion, with an overall footprint of 9,919 acres covering portions of the Covered Land area in Mississippi.

Figure 3.3-5: Mississippi Valley Loess Plains Ecoregion



Source: CEC 2006

Regional terrain is formed of irregular plains of rolling hills, dissected hills, ridges, and bluffs near the Mississippi River. Soils in the form of thick deposits of Quaternary loess are one of the region's distinguishing characteristics, with underlying tertiary deposits of sand, silt, and clay. Hydrologically, the area has a network of low-moderate gradient perennial and intermittent streams, and it contains almost no lakes. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Oak-hickory-pine forests form the natural vegetation throughout the eastern uplands. Representative species include a variety of oaks, hickories, and a combination of loblolly and shortleaf pines (Griffith 2007).

The NLCD classes for the Mississippi Valley Loess Plains portion of the Covered Land area show the area is primarily covered by Pasture/Hay, Cultivated Crops, Deciduous Forest, and Woody Wetlands (see **Table 3.3-4**).

Table 3.3-4: NLCD within the Mississippi Valley Loess Plains Ecoregion

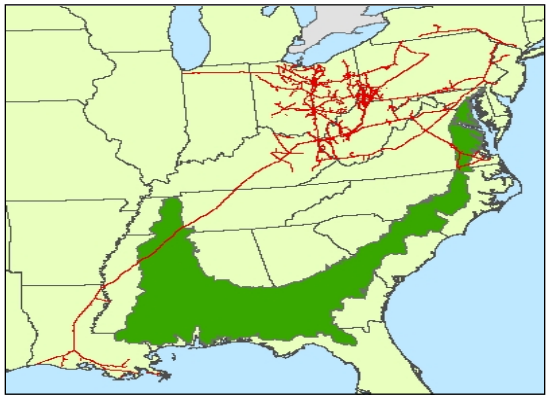
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	86	0.87	Mixed Forest	143	1.44
Developed, Open Space	610	6.15	Scrub/Shrub	777	7.83
Developed, Low Intensity	89	0.90	Grassland/Herbaceous	1	0.01
Developed, Medium Intensity	6	0.06	Pasture/Hay	2,866	28.90
Developed, High Intensity	2	0.02	Cultivated Crops	2,023	20.40
Barren Land	0	0.00	Woody Wetlands	1,039	10.48
Deciduous Forest	1,814	18.29	Emergent Herbaceous Wetland	83	0.84
Evergreen Forest	381	3.84			
Source: USGS 2003					

The oak-hickory-pine forests that historically dominated the region have been fragmented by pine plantations, pasture, and cropland. Typical crops include soybeans, cotton, corn, wheat, and hay. Some oil and gas production also occurs in the region. Multiple large municipalities are also common in the region near the Mississippi River valley (Griffith 2007).

Southeastern Plains

The Southeastern Plains ecoregion stretches from just north of the Gulf of Mexico to Maryland and covers portions of Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Tennessee, and Louisiana and forms one of the largest ecoregions in the eastern U.S. (see **Figure 3.3-6**). The ecoregion is distinct from surrounding regions by being younger geologically than regions to the north and west, and more rugged than in regions to the south and east (EPA 2002). The Covered Land area stretches over 627 miles of this ecoregion, with an overall footprint of 184,265 acres encompassing portions of the Covered Land area in Mississippi, Tennessee, Virginia, and North Carolina.

Figure 3.3-6: Southeastern Plains Ecoregion



Source: CEC 2006

Regional terrain is formed of dissected, rolling to smooth plains. Regional soils are a combination of Cretaceous and Tertiary-age sands, silts, and clays. Hydrologically, the area is dissected by a moderate to dense network of perennial streams and rivers but largely lacks natural lakes, although a number of large reservoirs have been constructed in the area. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

The predominant natural vegetation type of the ecoregion is longleaf pine with patches of oak-hickory-pine forest. Southern portions of the ecoregion have stands of American beech,

sweetgum, southern magnolia, laurel, and live oak along with various pines. Floodplain areas are comprised of bottomland oaks, red maple, green ash, sweetgum, and American elm with patches of bald cypress, pond cypress, and water-tupelo (Griffith 2007).

The NLCD classes for the Southeastern Plains portion of the Covered Land area show the area is primarily covered by Deciduous Forest, Evergreen Forest, Cultivated Crops, and Pasture/Hay (see **Table 3.3-5**).

Table 3.3-5: NLCD within the Southeastern Plains Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	1,225	0.69	Mixed Forest	7,258	4.11
Developed, Open Space	9,504	5.38	Scrub/Shrub	11,582	6.56
Developed, Low Intensity	4,324	2.45	Grassland/Herbaceous	371	0.21
Developed, Medium Intensity	1,253	0.71	Pasture/Hay	23,580	13.35
Developed, High Intensity	640	0.36	Cultivated Crops	28,834	16.32
Barren Land	1,566	0.89	Woody Wetlands	13,676	7.74
Deciduous Forest	41,585	23.54	Emergent Herbaceous Wetland	1,442	0.82
Evergreen Forest	29,803	16.87			
Source: USGS 2003					

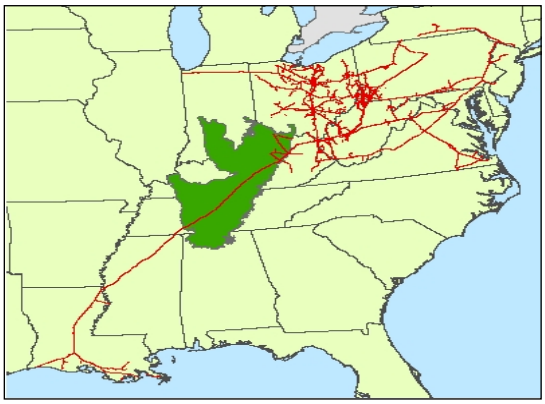
This ecoregion, once a large swath of mixed forest, is now a mosaic of crops, pasture, woodland, and remnant mixed forests. Large pine plantations and successional pine and hardwood woodlots are common in the region. Areas converted to cropland are typically planted with corn, cotton, soybeans, peanuts, onions, sweet potatoes, melons, and tobacco. Poultry and hog farms are also common. In addition, numerous large cities occur in this region (Griffith 2007). In the southern portion of the region, coniferous stands increasing as native deciduous forests are converted to pine plantations (MSDWFP 2005). In the northern portion of the region, deciduous stands are increasing due to frequent fires and preferential cutting of pine. Additionally, the northern section has seen a rapid expansion of urbanization and residential development within commuting distance of the Beltway (Woods et al 1999).

Interior Plateau

The Interior Plateau is a diverse ecoregion covering large portions of Tennessee and Kentucky, with additional areas in Indiana, Ohio, and Alabama (see **Figure 3.3-7**). Regional soils and geology are distinctly different from the sediments and alluvium typical in regions to the west, and elevations are considerably lower than in regions to the east (EPA 2002). The Covered

Land area extends over 1,260 miles, with an overall footprint of 336,750 acres covering portions of the Covered Land area in Tennessee, Kentucky, and Ohio.

Figure 3.3-7: Interior Plateau Ecoregion



Source: CEC 2006

Regional terrain is primarily composed of rolling and irregular plains combined with a variety of karst plains, dissected plateaus and tablelands, open hills, broad ridges, steep slopes, and ravines. The region is primarily underlain with Mississippian and Ordovician-age limestone, chert, sandstone, siltstone, and shale overlain by Ultisols and Alfisols. Hydrologically, the Kentucky, Green, Cumberland, Duck, Elk, and Tennessee River systems are found within the region along with a variety of perennial and intermittent streams, springs, and reservoirs. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

The dominant natural plant community is oak-hickory forest with patches of bluestem prairie, cedar glades, and mixed mesophytic forest. Typical species include white oak, northern red oak, black oak, hickories, yellow poplar, red maple, and eastern red-cedar (Griffith 2007). The NLCD classes for the Interior Plateau portion of the Covered Land area indicate that the area is primarily covered by Pasture/Hay and Deciduous Forest (see **Table 3.3-6**).

Table 3.3-6: NLCD within the Interior Plateau Ecoregion

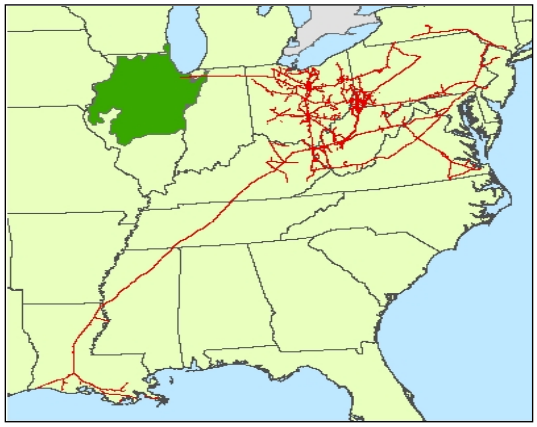
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	4,268	1.28	Mixed Forest	5,109	1.53
Developed, Open Space	19,283	5.78	Scrub/Shrub	2,507	0.75
Developed, Low Intensity	6,551	1.96	Grassland/Herbaceous	7,305	2.19
Developed, Medium Intensity	2,352	0.71	Pasture/Hay	142,317	42.68
Developed, High Intensity	839	0.25	Cultivated Crops	11,339	3.40
Barren Land	214	0.06	Woody Wetlands	247	0.07
Deciduous Forest	121,331	36.39	Emergent Herbaceous Wetland	38	0.01
Evergreen Forest	9,734	2.92			
Source: USGS 2003					

The Interior Plateau ecoregion has become a mosaic of forest, woodlots, pasture, and cropland. Primary agricultural products of the region are hay, cattle, cotton, corn, small grains, soybeans, and tobacco. Expanding urbanization is common, with the majority of the large cities of Tennessee and Kentucky occurring in this ecoregion (Griffith 2007).

Central Corn Belt Plains

The Central Corn Belt Plains ecoregion covers the majority of Illinois and extends into Indiana and Wisconsin (see **Figure 3.3-8**). The ecoregion is distinct from the more heavily forested ecoregions to the east and the mostly treeless plains ecoregions to the west (EPA 2002). The Covered Land area stretches over 35 miles, with an overall footprint of 22,994 acres encompassing portions of the Covered Land area in Indiana.

Figure 3.3-8: Central Corn Belt Plains Ecoregion



Source: CEC 2006

Topography within the ecoregion has been heavily modified through historic glaciations (EPA 2002). Regional terrain is primarily composed of flat to rolling plains with patches of sand dunes

and lake plains. Soils of the eastern portion of the regions are largely dark, fertile and deep, derived from drift material, overlaying Paleozoic shale, siltstone and limestone. Hydrologically, the area naturally is covered by a low density of intermittent and perennial streams, though many areas have been tiled, ditched, and tied into the existing drainage systems to support agriculture. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Although the majority of the natural vegetation communities of the region have been replaced by agriculture, remnant patches still exist. Mesic prairie communities are dominated by big bluestem, Indiangrass, prairie dropseed, and switchgrass. Dry upland prairies are typified by little bluestem and sideoats grama. Woodlands primarily contain white oak, black oak, and shagbark hickory, along with some sugar maple and American elm on more mesic sites (Griffith 2007).

The NLCD classes for the Central Corn Belt Plains portion of the Covered Land area show the area is primarily covered by Cultivated Crops, Deciduous Forest, and Low Intensity Development (see **Table 3.3-7**).

Table 3.3-7: NLCD within the Central Corn Belt Plains Ecoregion

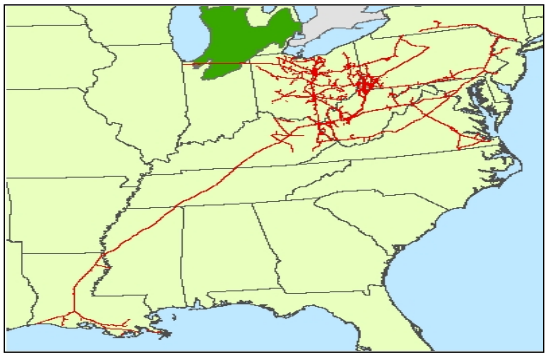
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	164	0.71	Mixed Forest	1	0.00
Developed, Open Space	1,638	7.12	Scrub/Shrub	137	0.60
Developed, Low Intensity	2,874	12.50	Grassland/Herbaceous	1,468	6.38
Developed, Medium Intensity	815	3.54	Pasture/Hay	877	3.81
Developed, High Intensity	181	0.79	Cultivated Crops	10,407	45.26
Barren Land	0	0.00	Woody Wetlands	458	1.99
Deciduous Forest	3,861	16.79	Emergent Herbaceous Wetland	28	0.12
Evergreen Forest	85	0.37			
Source: USGS 2003					

The ecoregion saw a gradual replacement of natural vegetation by managed agriculture starting in the nineteenth century. Farms now dominate the region, primarily producing corn, soybeans, cattle, sheep, poultry, and hogs. Development is also common as the Chicago metropolitan area and most other major cities in Illinois are found within this ecoregion (Griffith 2007).

Southern Michigan/Northern Indiana Drift Plains

The Southern Michigan/Northern Indiana Drift Plains ecoregion covers much of the area between Lake Michigan and Lakes Huron/Erie including the majority of southern Michigan and portions of northern Indiana and Ohio (see **Figure 3.3-9**). The ecoregion is distinct from surrounding regions due to better drainage and more lakes than the regions to the east, less agriculture than the regions to the south, and more nutrient rich soils than the regions to the north (EPA 2002). The Covered Land stretch over 89 miles of this ecoregion with an overall footprint of 56,741 acres encompassing portions of the Covered Land area in Indiana.

Figure 3.3-9: Southern Michigan/Northern Indiana Drift Plains Ecoregion



Source: CEC 2006

Regional terrain, formed by historic glaciations, is primarily composed of a broad till plain formed by a complex of drift deposits, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, melt water channels, and kettles. Soils are a mix of Alfisols, Histosols, and Mollisols over deeply buried bedrock composed of sandstone and shale. Hydrologically, the region has numerous perennial streams, small- and medium-sized lakes, and an abundance of groundwater. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation communities of the area include oak-hickory forests, northern swamp forests, and beech forests. Common species for the region include white oak, northern red oak, black oak, bitternut hickory, shagbark hickory, sugar maple, and American beech (Griffith 2007).

The NLCD classes for the Southern Michigan/Northern Indiana Drift Plains portion of the Covered Land area indicate the area is primarily covered by Cultivated Crops and Deciduous Forest (see **Table 3.3-8**).

Table 3.3-8: NLCD within the Southern Michigan/Northern Indiana Plains Ecoregion

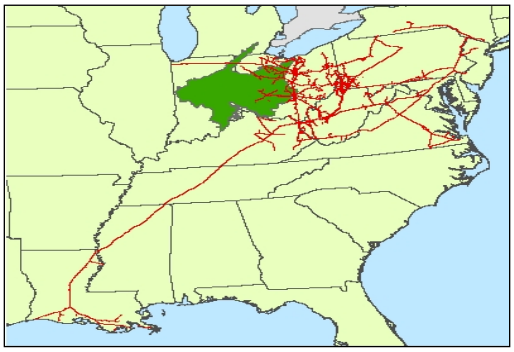
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	223	0.42	Mixed Forest	0	0.00
Developed, Open Space	2,541	4.82	Scrub/Shrub	61	0.12
Developed, Low Intensity	561	1.06	Grassland/Herbaceous	421	0.80
Developed, Medium Intensity	63	0.12	Pasture/Hay	3,343	6.34
Developed, High Intensity	41	0.08	Cultivated Crops	39,079	74.16
Barren Land	1	0.00	Woody Wetlands	578	1.10
Deciduous Forest	5,470	10.38	Emergent Herbaceous Wetland	259	0.49
Evergreen Forest	57	0.11			
Source: USGS 2003					

This ecoregion, once primarily forested, is now largely a mix of agricultural, pasture, urban, suburban and rural lands with patches of woodland and native forests. Primary agricultural products include corn and other feed grains, hay for dairy cattle and other livestock, along with winter wheat, dry beans, and some fruits and vegetables (Griffith 2007). Recreational and residential development near lake fronts, along with gravel quarries are also common in the region (EPA 1998).

Eastern Corn Belt Plains

The Eastern Corn Belt Plains ecoregion covers large portions of Indiana and Ohio and a small portion of Michigan (see **Figure 3.3-10**). The ecoregion is distinct from surrounding ecoregions due to more trees and lighter soils than regions to the west, loamier and better drained soils than regions to the north, and richer soils than those to the east (EPA 2002). The Covered Land area extends over 1,123 miles of the region, with an overall footprint of 756,426 acres covering portions of the Covered Land area in Ohio and Indiana.

Figure 3.3-10: Eastern Corn Belt Plains Ecoregion



Source: CEC 2006

Regional terrain, formed by historic glaciations, is primarily a rolling till plain with local end moraines. Soils are a mix of Wisconsinan age glacial deposits, till, outwash and thin loess overlying Paleozoic carbonates, shale, and sandstone. Hydrologically, the region has numerous perennial and intermittent streams, wetlands, lakes, and reservoirs along with an abundance of groundwater. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation communities for the ecoregion include beech forests and elm-ash swamps in wetter areas (Griffith 2007). Common species in these communities include American beech, American elm, white ash, black ash, red maple, and silver maple (Sampson 1930). Pin oak swamps and white oak woodlands are also common (EPA 1998).

The NLCD classes for the Eastern Corn Belt Plains portion of the Covered Land area show the area is primarily covered by Cultivated Crops and Deciduous Forest (see **Table 3.3-9**).

Table 3.3-9: NLCD within the Eastern Corn Belt Plains Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	5,135	0.68	Mixed Forest	1,370	0.18
Developed, Open Space	59,923	7.92	Scrub/Shrub	1,161	0.15
Developed, Low Intensity	28,572	3.78	Grassland/Herbaceous	5,182	0.68
Developed, Medium Intensity	8,152	1.08	Pasture/Hay	67,366	8.91
Developed, High Intensity	3,316	0.44	Cultivated Crops	483,680	63.94
Barren Land	661	0.09	Woody Wetlands	2,373	0.31
Deciduous Forest	87,788	11.61	Emergent Herbaceous Wetland	583	0.08
Evergreen Forest	1,164	0.15			
Source: USGS 2003					

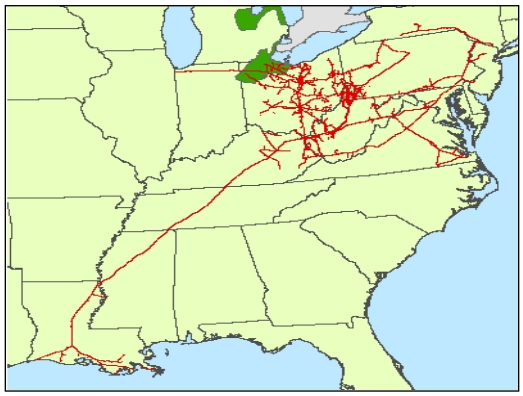
This ecoregion has principally been converted to agricultural uses, with primary products including corn, soybeans, wheat, dairy, and livestock. Additional land uses include urban, suburban, industrial, and rural residential. Many of the largest cities in Ohio and Indiana occur in the Eastern Corn Belt Plains, including Columbus, Dayton, Indianapolis, and Fort Wayne (Griffith 2007).

Huron/Erie Lake Plain

The Huron/Erie Lake Plain ecoregion covers the coastal areas of Lakes Huron and Erie in Michigan and Ohio, with an interior extension across northern Ohio into Indiana (see **Figure 3.3-11**). The ecoregion is distinct from the surrounding Eastern Corn Belt Plains, which is

loamier and better drained (EPA 2002). The Covered Land area extends over 339 miles of the region, with an overall footprint of 192,840 acres encompassing the Covered Land area in Ohio.

Figure 3.3-11: Huron/Erie Lake Plain Ecoregion



Source: CEC 2006

Regional terrain is a broad, nearly flat plain with relic areas of sand dunes, beach ridges, and end moraines. Soils are a combination of fine lacustrine sediments and coarser moraine material overlaying a bedrock layer mostly formed of Silurian, Devonian and Mississippian limestone, dolomite, and shale. Hydrologically, the region has numerous perennial streams. This region was composed of extensive swamps and marshes but most have been drained for agriculture. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation for the ecoregion is dominated by elm-ash swamps and beech forests along with patches of mixed oak forests. Oak savannas occur in well-drained sandy areas. Common species include red maple, white ash, American basswood, aspen, white oak, northern red oak, black oak, bitternut hickory, and shagbark hickory. The majority of the natural vegetation has been cleared for agriculture and only exists in remnant patches (Griffith 2007).

The NLCD classes for the Huron/Erie Lake Plain portion of the Covered Land area indicate the area is primarily covered by Cultivated Crops (see **Table 3.3-10**).

Table 3.3-10: NLCD within the Huron/Erie Lake Plain Ecoregion

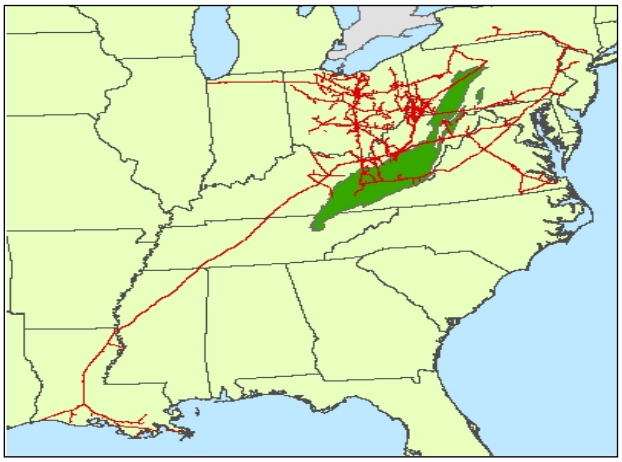
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	1,562	0.81	Mixed Forest	1	0.00
Developed, Open Space	15,540	8.06	Scrub/Shrub	0	0.00
Developed, Low Intensity	8,224	4.26	Grassland/Herbaceous	2,222	1.15
Developed, Medium Intensity	2,189	1.13	Pasture/Hay	2,205	1.14
Developed, High Intensity	1,194	0.62	Cultivated Crops	145,846	75.63
Barren Land	803	0.42	Woody Wetlands	612	0.32
Deciduous Forest	9,422	4.89	Emergent Herbaceous Wetland	2,999	1.56
Evergreen Forest	20	0.01			
Source: USGS 2003					

Through extensive drainage projects, much of this region has been converted from marshy forests to highly productive agricultural lands. Principal agricultural products include corn, soybeans, winter wheat, hay, livestock, and vegetables. Urban and industrial areas are also common in this ecoregion, including the Detroit metropolitan area and the city of Toledo (Griffith 2007).

Central Appalachians

The Central Appalachians ecoregion, encompassing a large portion of the Appalachian Mountains, stretches from Tennessee through portions of Kentucky, Virginia, West Virginia, Maryland, and into central Pennsylvania (see **Figure 3.3-12**). The ecoregion is distinct from regions to the west based on higher elevation, cooler temperatures, steeper slopes, and higher levels of ruggedness and forestation (Griffith 2007). It is distinct from regions to the north due to less severe climate and lower forest densities and is separated from regions to the east by a sandstone escarpment (Woods et al 1999). The Covered Land area extends over 1,051 miles of the region, with an overall footprint of 1,175,161 acres covering portions of the Covered Land area in West Virginia, Kentucky, Pennsylvania, Maryland, and Virginia.

Figure 3.3-12: Central Appalachians Ecoregion



Source: CEC 2006

Regional terrain is primarily a highly dissected, rugged plateau along with areas of high hills, low mountains, steep narrow ridges, narrow winding valleys, and deep coves with large variations in site elevation. Soils are primarily Inceptisols and Ultisols overlaying Pennsylvanian-age sandstone, shale, conglomerate, and coal. Hydrologically, the region has a high density of perennial streams, along with some waterfalls and reservoirs but few natural lakes. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation for the ecoregion is primarily mixed mesophytic forest, historically dominated by American chestnut. Several tree species co-occur including chestnut oak, red maple, white oak, black oak, American beech, yellow poplar, sugar maple, ash, American basswood, buckeye, and eastern hemlock. Additionally, there are some areas of Appalachian oak forest and northern hardwood forests with maple, American beech, birch, and eastern hemlock. Areas of red spruce and eastern hemlock occur at the highest elevations in the north-central portion of the region (Griffith 2007).

The NLCD classes for the Central Appalachians portion of the Covered Land area indicate the area is primarily covered by Deciduous Forest (see **Table 3.3-11**).

Table 3.3-11: NLCD within the Central Appalachians Ecoregion

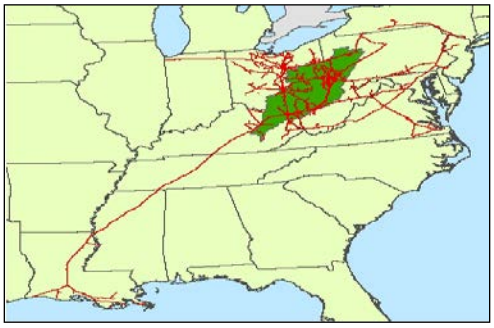
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	6,770	0.58	Mixed Forest	11,818	1.01
Developed, Open Space	63,124	5.38	Scrub/Shrub	290	0.02
Developed, Low Intensity	15,852	1.35	Grassland/Herbaceous	29,726	2.53
Developed, Medium Intensity	6,843	0.58	Pasture/Hay	73,682	6.28
Developed, High Intensity	1,014	0.09	Cultivated Crops	18,014	1.53
Barren Land	10,223	0.87	Woody Wetlands	641	0.05
Deciduous Forest	912,996	77.79	Emergent Herbaceous Wetland	494	0.04
Evergreen Forest	22,197	1.89			
Source: USGS 2003					

Most of the forests of the region were logged by the 1900s; however, remnant patches of virgin forest still remain in park areas (WVDNR 2005). This ecoregion's rugged topography make most areas incompatible with agriculture, and most areas have remained or have returned to forest. As a result commercial forestry is common. Additionally, both surface and underground bituminous coal mines are common in the region (Griffith 2007). In lower areas with less rugged terrain, small dairy, livestock and pasture lands are interspersed with woodlands. Gas wells and Christmas tree plantations are also common (Woods et al 1999).

Western Allegheny Plateau

The Western Allegheny Plateau ecoregion covers portions of Kentucky, Ohio, West Virginia, and Pennsylvania (see **Figure 3.3-13**). The ecoregion is distinct from surrounding regions by being more rugged than the agricultural till plains to the north and west but less rugged and less forested than the regions to the east and south (EPA 2002). The Covered Land area stretches over 4,425 miles of this ecoregion, with an overall footprint of 3,106,096 acres covering portions of the Covered Land area in West Virginia, Ohio, Pennsylvania, and Kentucky.

Figure 3.3-13: Western Allegheny Plateau Ecoregion



Source: CEC 2006

Regional terrain is an unglaciated, dissected plateau with areas of rugged hills. Soils are a combination of Alfisols, Ultisols, and Inceptisols underlain by horizontally bedded, often carboniferous, sedimentary rock. Hydrologically, the region has a high density of perennial streams and a number of man-made reservoirs, and natural lakes are largely absent. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation is predominantly mixed mesophytic forest with areas of Appalachian oak forest. Common species include chestnut oak, red maple, white oak, black oak, American beech, yellow poplar, sugar maple, ash, American basswood, buckeye, and eastern hemlock (Griffith 2007). The NLCD classes for the Western Allegheny Plateau portion of the Covered Land area indicate the area is primarily covered by Deciduous Forest and Pasture/Hay (see **Table 3.3-12**).

Table 3.3-12: NLCD within the Western Allegheny Plateau Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	36,672	1.19	Mixed Forest	7,647	0.25
Developed, Open Space	224,897	7.27	Scrub/Shrub	4,250	0.14
Developed, Low Intensity	70,438	2.28	Grassland/Herbaceous	43,872	1.42
Developed, Medium Intensity	27,943	0.90	Pasture/Hay	375,647	12.14
Developed, High Intensity	9,710	0.31	Cultivated Crops	123,343	3.99
Barren Land	4,310	0.14	Woody Wetlands	1,511	0.05
Deciduous Forest	2,120,789	68.53	Emergent Herbaceous Wetland	301	0.01
Evergreen Forest	43,326	1.40			

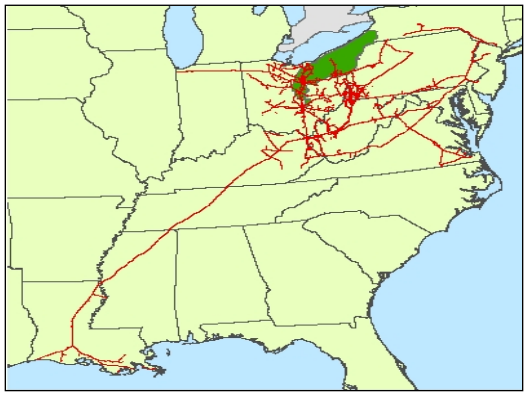
Source: USGS 2003

The region is still largely forested with some logging and public national forest lands. Some areas have been converted to livestock and dairy farming. Regional areas of cropland primarily produce hay, corn, small grains, and tobacco. Surface and underground coal mining is common in the area (Griffith 2007). Additionally, urban and industrial activity is common in the major river valleys with many medium and large settlements found in the ecoregion, including the Pittsburgh metropolitan area (Woods et al 1999). Oil and gas wells are also common in the region (EPA 1998).

Erie Drift Plain

The Erie Drift Plain ecoregion covers the land southeast of Lake Erie including portions of Ohio, Pennsylvania, and New York (see **Figure 3.3-14**). The region is distinct from surrounding regions by being more rugged and less fertile than regions to the west and is composed of a glaciated terrain unlike regions to the south and east (EPA 2002). The Covered Land area extends over 1,589 miles of this ecoregion, with an overall footprint of 1,261,659 acres covering portions of the Covered Land area in Ohio and Pennsylvania.

Figure 3.3-14: Erie Drift Plain Ecoregion



Source: CEC 2006

Regional terrain is predominantly a gently to strongly rolling dissected plateau with low rounded hills, scattered end moraines, kettles, and marshy lowlands as a result of heavy glaciation. Soils are a combination of glacial outwash and till overlying Paleozoic sandstone and shale. Hydrologically, the region has a network of perennial and intermittent streams with numerous wetlands, sphagnum bogs, and lakes. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Native vegetation is composed of beech-maple forests, mixed oak forests, and mixed mesophytic forests. Common species include northern red oak, white oak, shagbark hickory, sugar maple, yellow birch, American beech, and eastern hemlock (Griffith 2007). Elm-ash swamp forests and sphagnum peat bogs are also common in the lowlands (EPA 1998). Common species in the elm-ash swamps include American elm, white ash, and black ash (Sampson 1930). Common species in the sphagnum peat bogs include sphagnum peat moss, sedges, sundew, tamarack, and eastern hemlock (Woods et al 1999).

The NLCD classes for the Erie Drift Plain portion of the Covered Land area indicate that the area is primarily covered by Cultivated Crops, Deciduous Forest, and Pasture/Hay (see **Table 3.3-13**).

Table 3.3-13: NLCD within the Erie Drift Plain Ecoregion

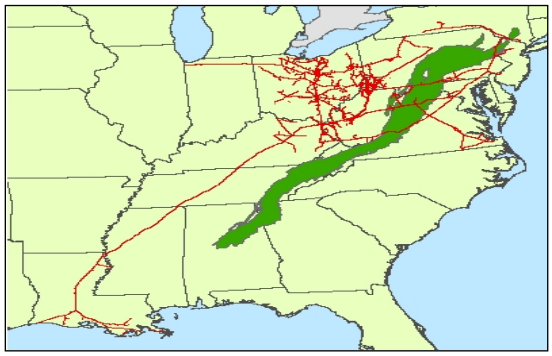
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	9,743	0.77	Mixed Forest	153	0.01
Developed, Open Space	95,152	7.54	Scrub/Shrub	2,704	0.21
Developed, Low Intensity	34,097	2.70	Grassland/Herbaceous	11,771	0.93
Developed, Medium Intensity	9,291	0.74	Pasture/Hay	217,239	17.22
Developed, High Intensity	3,777	0.30	Cultivated Crops	461,824	36.60
Barren Land	116	0.01	Woody Wetlands	16,538	1.31
Deciduous Forest	390,172	30.93	Emergent Herbaceous Wetland	277	0.02
Evergreen Forest	8,803	0.70			
Source: USGS 2003					

Much of the ecoregion has been converted to agriculture, primarily in the form of dairy operations. Local croplands are primarily used for feed grains and forage crops. Timber operations are also common in the area, providing saw logs for construction, firewood, and specialty wood products. Urban development and industrial activities are also found locally (Griffith 2007). Vegetable and fruit farms, natural gas wells, recreational development on public lands, and gravel mining are also common land uses in the region (EPA 1998).

Ridge and Valley

The Ridge and Valley ecoregion covers a long, narrow stretch of land from Alabama in the south through portions of Georgia, Tennessee, Virginia, West Virginia, Maryland, Pennsylvania, New Jersey, and New York (see **Figure 3.3-15**). It is distinct from surrounding ecoregions by being relatively lower, less rugged, and less forested (EPA 2002). The Covered Land area stretches over 872 miles of the ecoregion, with an overall footprint of 1,225,969 acres covering portions of the Covered Land area in Pennsylvania, Maryland, West Virginia, Virginia, New York, and New Jersey.

Figure 3.3-15: Ridge and Valley Ecoregion



Source: CEC 2006

Regional terrain is northeast-southwest trending having relatively low-lying rolling valleys with ridges and low irregular hills. Soils are a combination of Ultisols and Inceptisols overlying a variety of limestone, dolomite, shale, siltstone, sandstone, chert, mudstone, and marble. Hydrologically, the regional drainage is in a trellised pattern with smaller streams on the slopes draining into meandering streams in the valley, combined with natural springs and some large reservoirs to make a diverse aquatic system. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Natural vegetation for the region is dominated by Appalachian oak forest communities in the north and oak-hickory-pine forest communities in the south (Griffith 2007). Appalachian oak forest areas are dominated by white oak and northern red oak. Oak-hickory-pine forests are dominated by hickory, longleaf pine, shortleaf pine, loblolly pine, white oak, and post oak. White pine, American beech, and other hardwoods are also common in the area (Woods et al 1999).

The NLCD classes for the Ridge and Valley portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest and Pasture/Hay (see **Table 3.3-14**).

Table 3.3-14: NLCD within the Ridge and Valley Ecoregion

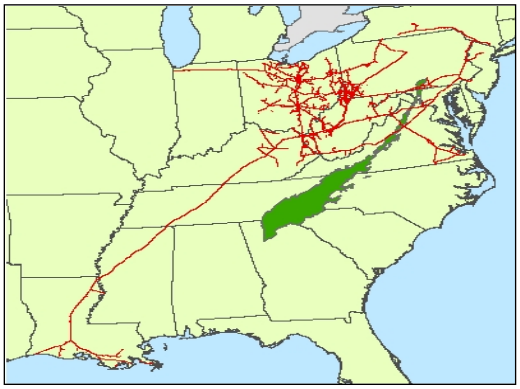
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	7,739	0.63	Mixed Forest	24,083	1.96
Developed, Open Space	69,310	5.65	Scrub/Shrub	225	0.02
Developed, Low Intensity	21,529	1.76	Grassland/Herbaceous	63	0.01
Developed, Medium Intensity	5,385	0.44	Pasture/Hay	192,547	15.71
Developed, High Intensity	1,756	0.14	Cultivated Crops	80,787	6.59
Barren Land	1,189	0.10	Woody Wetlands	1,955	0.16
Deciduous Forest	784,862	64.02	Emergent Herbaceous Wetland	500	0.04
Evergreen Forest	34,041	2.78			
Source: USGS 2003					

The region is currently a mix of forested ridges with agricultural development in the valleys (Woods et al 1999). Land uses in the region consist of pine plantations, pasture, and cropland with areas of rural residential, urban, and industrial. Regional agricultural products include hay, pasture and grain for beef and dairy cattle, corn, soybeans, tobacco, and cotton. Numerous large and medium cities are found throughout the region (Griffith 2007). Anthracite coal mining and poultry operations are also regionally significant (Woods et al 1999).

Blue Ridge

The Blue Ridge ecoregion covers a long, narrow stretch of land from Georgia in the south through portions of South Carolina, North Carolina, Tennessee, Virginia, Maryland, and Pennsylvania (see **Figure 3.3-16**). It is distinct from surrounding ecoregions by being generally more rugged and forested than surrounding regions (EPA 2002). The Covered Land area extends over 64 miles of this ecoregion, with an overall footprint of 32,755 acres covering portions of the Covered Land area in Virginia and Pennsylvania.

Figure 3.3-16: Blue Ridge Ecoregion



Source: CEC 2006

Regional terrain is generally rugged, varying from narrow ridges to hilly plateaus with areas of massive mountains and high peaks, including Mount Mitchell, the highest point in the U.S. east of the Mississippi River. Soils are a combination of Inceptisols and Ultisols overlying primarily metamorphic bedrock in the form of gneiss, schist, and quartzite along with areas of igneous and sedimentary rock. Hydrologically, the region has a high density of cool, clear perennial streams along with a few large reservoirs, and natural lakes are largely absent. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

This ecoregion's temperate broadleaf forests are some of the most floristically diverse forests in the world. Vegetation communities found in the region are a combination of Appalachian oak forests along with a variety of oak, hemlock, cove hardwoods, and pine communities. American chestnut, a species of high ecologic and economic importance, once dominated forests in the region but was largely wiped out by Chestnut blight by the 1930's. The chestnut was principally replaced by yellow poplar, chestnut oak, white oak, black locust, red maple, and various species of pine. Higher elevation forests are dominated by northern hardwoods such as American beech, yellow birch, yellow buckeye, and maples. The highest elevations are covered by Southeastern spruce-fir forests, with Fraser fir, red spruce, yellow birch, and rhododendrons (Griffith 2007).

The NLCD classes for the Blue Ridge portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest (see **Table 3.3-15**).

Table 3.3-15: NLCD within the Blue Ridge Ecoregion

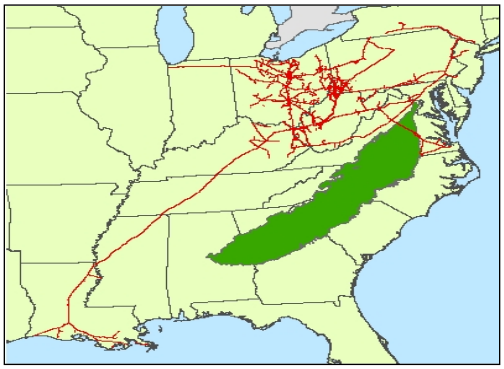
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	17	0.05	Mixed Forest	1,139	3.48
Developed, Open Space	1,763	5.38	Scrub/Shrub	0	0.00
Developed, Low Intensity	177	0.54	Grassland/Herbaceous	0	0.00
Developed, Medium Intensity	18	0.05	Pasture/Hay	1,826	5.58
Developed, High Intensity	2	0.01	Cultivated Crops	273	0.83
Barren Land	10	0.03	Woody Wetlands	46	0.14
Deciduous Forest	26,002	79.38	Emergent Herbaceous Wetland	5	0.02
Evergreen Forest	1,478	4.51			
Source: USGS 2003					

Much of the region remains forested, so land uses are primarily forest-related such as timber and Christmas tree farms. Agricultural uses such as pasture and hay production and apple orchards are also common. The region contains a number of large public lands including national forests and parks where recreation, tourism, and hunting play a major factor in land use design. Development is not as common as in surrounding regions, but a number of large settlements occur in the region (Griffith 2007).

Piedmont

The Piedmont ecoregion forms the transitional area between the Appalachians and the eastern coastal plains, stretching from Alabama in the south through portions of Georgia, South Carolina, North Carolina, and Virginia (see **Figure 3.3-17**). The region is considered by physiography's to be the non-mountainous portion of the old Appalachians Highland. The region is distinct from surrounding ecoregions by being lower in elevation and less rugged than the Appalachian regions to the northwest and higher and more rugged with finer-textured soils than the coastal plains regions to the southeast (EPA 2002). The Covered Land area stretches over 187 miles of this ecoregion, with an overall footprint of 55,522 acres covering portions of the Covered Land area in Virginia.

Figure 3.3-17: Piedmont Ecoregion



Source: CEC 2006

Regional terrain is an erosional terrain of moderately dissected irregular plains between areas of hills. Soils are primarily Ultisols with a mosaic of Precambrian and Paleozoic metamorphic and igneous rocks covered by a thick mantle of saprolite. Hydrologically, the region has a moderate to high density of perennial streams along with numerous large reservoirs, though the area largely lacks lakes. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Natural vegetation in the region is dominated by the oak-hickory-pine forest community. Typical species include white oak, southern red oak, post oak, and hickory, with areas of shortleaf pine and loblolly pine (Griffith 2007). Chestnut oak and Virginia pine are also common in the region (Woods et al 1999).

The NLCD classes for the Piedmont portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest, Pasture/Hay, Developed Open Space, and Evergreen Forest (see **Table 3.3-16**).

Table 3.3-16: NLCD within the Piedmont Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	420	0.83	Mixed Forest	765	1.51
Developed, Open Space	7,192	14.18	Scrub/Shrub	210	0.41
Developed, Low Intensity	2,504	4.94	Grassland/Herbaceous	296	0.58
Developed, Medium Intensity	823	1.62	Pasture/Hay	8,858	17.46
Developed, High Intensity	187	0.37	Cultivated Crops	2,144	4.23
Barren Land	411	0.81	Woody Wetlands	1,112	2.19
Deciduous Forest	19,566	38.57	Emergent Herbaceous Wetland	64	0.13
Evergreen Forest	6,182	12.19			
Source: USGS 2003					

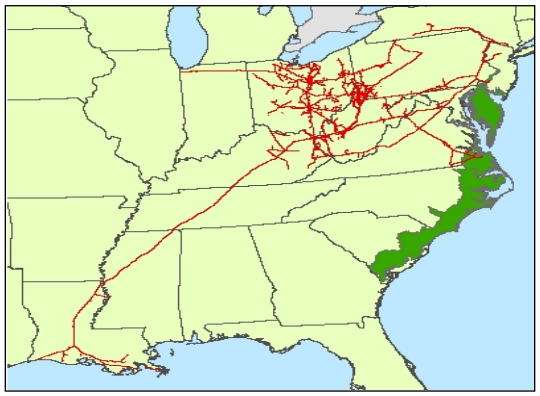
The region became an important farming area in the 19th century, but due to problems with soil erosion, declining soil fertility, costs associated with boll weevil management, and competition with other regions, farmland returned to forest during each economic downturn beginning with the Civil War (Napton 2007). Recently, urban and suburban development has spread widely into the region. Historic and remnant agricultural products included cotton, corn, tobacco, and wheat. Large portions of the region are now covered in commercially planted pine or have reverted to successional pine and hardwood forests intermixed with areas of pasture and development. Large developed areas in the region include the Atlanta metropolitan area, portions of the outer Beltway in northern Virginia, and the majority of North Carolina's large cities (Griffith 2007).

Middle Atlantic Coastal Plain

The Middle Atlantic Coastal Plain ecoregion covers a large portion of the southeastern Atlantic coast, stretching from South Carolina through portions of North Carolina, Virginia, Maryland, Delaware, New Jersey, and Pennsylvania (see **Figure 3.3-18**). The ecoregion is distinct from surrounding regions with finer soils and different vegetation than regions to the south and lower, flatter, and more poorly drained than regions to the west (EPA 2002). The Covered Land area

extends over 201 miles of this ecoregion, with an overall footprint of 79,609 acres covering portions of the Covered Land area in Virginia New Jersey, Delaware, and Pennsylvania.

Figure 3.3-18: Middle Atlantic Coastal Plain Ecoregion



Source: CEC 2006

Regional terrain is a combination of flat plains, low terraces, dunes, barrier islands, and beaches. Soils are generally poorly drained and coarse to finer in texture, formed of a combination of Ultisols, Entisols and Histosols, and generally underlain by unconsolidated sediments. Hydrologically, the region has a mix of streams, rivers, swamps, marshes, estuaries, and a few large lakes with a number of bays and pocosins in some areas. Regional climate is described as mild mid-latitude humid subtropical (Griffith 2007).

Native vegetation in the region includes longleaf pine with areas of oak-hickory-pine forest in the northern areas. Much of the region is covered by loblolly pine and shortleaf pine with patches of oak, gum, and cypress in major riparian areas. The southern barrier islands are primarily covered by maritime forests of live oak, laurel oak, and loblolly pine. Coastal marshes are primarily covered by cordgrass, saltgrass, and rushes. Dunes are covered by beach grass and sea oats (Griffith 2007).

The NLCD classes for the Middle Atlantic Coastal Plain portion of the Covered Land area indicate that the area is primarily covered by Cultivated Crops, Deciduous Forest, Evergreen Forest, Woody Wetlands, and Pasture/Hay (see **Table 3.3-17**).

Table 3.3-17: NLCD within the Middle Atlantic Coastal Plain Ecoregion

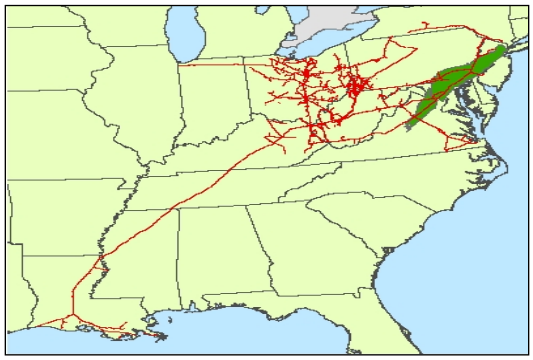
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	2,292	2.88	Mixed Forest	1,817	2.28
Developed, Open Space	2,459	3.09	Scrub/Shrub	0	0.00
Developed, Low Intensity	2,500	3.14	Grassland/Herbaceous	0	0.00
Developed, Medium Intensity	1,387	1.74	Pasture/Hay	8,262	10.38
Developed, High Intensity	814	1.02	Cultivated Crops	17,801	22.36
Barren Land	1,172	1.47	Woody Wetlands	10,063	12.64
Deciduous Forest	17,552	22.05	Emergent Herbaceous Wetland	2,557	3.21
Evergreen Forest	10,932	13.73			
Source: USGS 2003					

The region is a mix of pine plantations used for pulp and lumber, agriculture in the north and central areas, and extensive urban and suburban development. Agricultural products for the region include wheat, corn, soybeans, potatoes, cotton, blueberries, peanuts, chicken, turkey, and hogs. Large portions of the coastal areas are developed for recreation and tourism. All major port towns in Virginia and North Carolina and their associated industry and infrastructure are located within this region (Griffith 2007).

Northern Piedmont

The Northern Piedmont ecoregion, much like the Piedmont ecoregion to the south, forms the transitional area between the Appalachians and the eastern coastal plains, stretching from Virginia in the south through portions of Maryland, Delaware, Pennsylvania, and New Jersey (see **Figure 3.3-19**). The ecoregion is distinct from surrounding regions by being lower and less rugged than regions to the north and west but hillier than regions to the east, and is covered by a different forest system historically and more cropland currently than regions to the south (EPA 2002). The Covered Land area extends over 758 miles of the ecoregion, with an overall footprint of 351,249 acres covering portions of the Covered Land area in Pennsylvania, Virginia, Maryland, New Jersey, and Delaware.

Figure 3.3-19: Northern Piedmont Ecoregion



Source: CEC 2006

Regional terrain is a transition between the mountains to the west and coastal plains to the east and is composed of low rounded hills, irregular plains, open valleys, and areas of intrusive dikes and sills forming sharp low ridges. Soils are a combination of Alfisols, Inceptisols, and Ultisols underlain by a mix of metamorphic, igneous, and sedimentary rocks. Hydrologically, the region hosts numerous perennial streams and springs. Regional climate is described as transitional between mild mid-latitude humid subtropical and severe mid-latitude (Griffith 2007).

Much of the natural vegetation of the ecoregion is composed of Appalachian oak forest, although most forests have been cleared. Representative species include chestnut oak, white oak, northern red oak, hickory, ash, American elm, and yellow poplar. Eastern red-cedar is also common on abandoned farmland (Griffith 2007). Other species common in some areas are Virginia pine, pitch pine, and black oak (Woods et al 1999).

The NLCD classes for the Northern Piedmont portion of the Covered Land area indicate that the area is primarily covered by Pasture/Hay, Deciduous Forest, and Cultivated Crops (see **Table 3.3-18**).

Table 3.3-18: NLCD within the Northern Piedmont Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	3,006	0.86	Mixed Forest	3,418	0.97
Developed, Open Space	21,706	6.18	Scrub/Shrub	13	0.00
Developed, Low Intensity	16,451	4.68	Grassland/Herbaceous	0	0.00
Developed, Medium Intensity	6,227	1.77	Pasture/Hay	133,985	38.15
Developed, High Intensity	1,912	0.54	Cultivated Crops	55,687	15.85
Barren Land	3,022	0.86	Woody Wetlands	5,116	1.46
Deciduous Forest	89,999	25.62	Emergent Herbaceous Wetland	1,548	0.44
Evergreen Forest	9,158	2.61			
Source: USGS 2003					

Much of the region has been converted to agriculture, urban, suburban, and industrial land uses. Regional agricultural products include feed and forage crops and soybeans. Other land uses common to the region include nurseries, plant farms, Christmas trees plantations, woodlots, and horse and hobby farms. Large settlements are common in the region including the suburban areas of Philadelphia, Baltimore, and most of the Beltway (Griffith 2007).

Atlantic Coastal Pine Barrens

The Atlantic Coastal Pine Barrens ecoregion covers roughly half of the state of New Jersey along with portions of the coastal areas and outer islands of New York, Rhode Island, and Massachusetts (see **Figure 3.3-20**). The ecoregion is distinct from surrounding regions by having a cooler climate, coarser soils, and different vegetation from regions to the south, a milder climate, and different vegetation from regions to the north, and differing terrain from western regions (EPA 2002). The Covered Land area extends over six-miles of this ecoregion, with an overall footprint of 3,983-acres covering portions of the Covered Land area in New Jersey.

Figure 3.3-20: Atlantic Coastal Pine Barrens Ecoregion

Source: CEC 2006

Regional terrain is a combination of sandy beaches, dunes, bays, barrier islands, and marshes. Soils are a combination of Entisols and Ultisols in the form of terminal moraines, outwash plains, and coastal deposits with deep deposits of gravel, sand, silt and clay, generally formed from Quaternary and Tertiary sediment with some Cretaceous geology. Hydrologically, the region hosts numerous perennial streams, lakes, swamps, bogs, and salt and freshwater marshes. Regional climate is described as severe mid-latitude humid continental moderated by maritime influences (Griffith 2007).

The region is composed of the Pine Barrens region of New Jersey along with the beaches, dunes, bays, and marshes of portions of the area coastline. The region is predominantly covered by pine-oak forests, dominated by pitch pine, scarlet oak, black oak, and some areas of shortleaf pine and chestnut oak. Native vegetation in inland areas include mixed oak forests of white oak, black oak, American beech, pignut hickory, mockernut hickory, black walnut, yellow poplar, and red maple, although much of it has been cleared. Areas of Atlantic white cedar swamps also occur. Coastal and dune areas are dominated by dune woodlands, low shrub thickets, and areas of dune grass (Griffith 2007).

The NLCD classes for the Atlantic Coastal Pine Barrens portion of the Covered Land area indicate that the area is primarily covered by Cultivated Crops, Deciduous Forest, and Pasture/Hay (see **Table 3.3-19**).

Table 3.3-19: NLCD within the Atlantic Coastal Pine Barrens Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	14	0.35	Mixed Forest	0	0.00
Developed, Open Space	241	6.04	Scrub/Shrub	0	0.00
Developed, Low Intensity	287	7.21	Grassland/Herbaceous	0	0.00
Developed, Medium Intensity	99	2.48	Pasture/Hay	440	11.04
Developed, High Intensity	37	0.93	Cultivated Crops	1,893	47.52
Barren Land	146	3.67	Woody Wetlands	120	3.01
Deciduous Forest	607	15.25	Emergent Herbaceous Wetland	97	2.43
Evergreen Forest	3	0.07			
Source: USGS 2003					

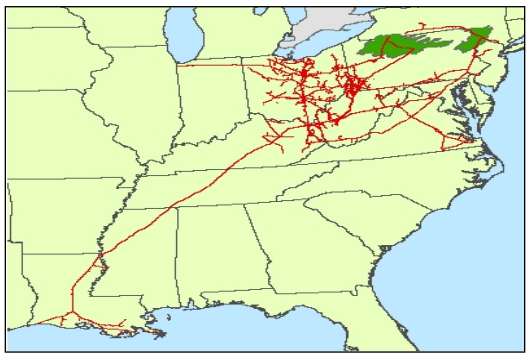
The region is a mosaic of land uses including forestry, agriculture, urban and suburban development, and transportation infrastructure. Products from the area include timber, cranberries, blueberries, corn, wheat, soybeans, vegetables, dairy, and poultry. Tourism and recreational development are also common in the area. Outside of the Pine Barrens, much of the region is heavily developed, including the areas of Long Island and Cape Cod (Griffith 2007).

North Central Appalachians

The North Central Appalachians ecoregion covers a large portion of northern Pennsylvania along with portions of New York and New Jersey (see **Figure 3.3-21**). The ecoregion is distinct from surrounding regions by having heavier forest cover and a general lack of historic glacier activity (EPA 2002). The Covered Land area stretches over 300 miles of this ecoregion, with an

overall footprint of 174,081 acres covering portions of the Covered Land area in Pennsylvania and New York.

Figure 3.3-21: North Central Appalachians Ecoregion



Source: CEC 2006

Regional terrain is described as a combination of plateau surfaces, high hills, and low mountains that were mostly unaffected by glaciations. Soils are generally low nutrient Inceptisols overlying horizontally bedded sandstone, shale, siltstone, conglomerate, and coal. Hydrologically, the region has numerous perennial streams and lakes. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

The region is covered primarily with a combination of northern hardwood forests and Appalachian oak forests along with numerous areas of bog and marsh. By 1870, most of the regional old growth forests were cut or burned and were replaced by mixed hardwood regrowth (Woods et al 1999). Areas of northern hardwood forest are dominated by sugar maple, American beech, and yellow birch. Areas of Appalachian oak forest are dominated by white oak, northern red oak, and hickory. Patches of eastern hemlock, pitch pine, and white pine are also present (Griffith 2007). The glacial till barrens are a mosaic of shrubland dominated by scrub oak, sheep laurel, rhodora, and patches of pitch pine forest (Woods et al 1999).

The NLCD classes for the North Central Appalachians portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest and Mixed Forest (see **Table 3.3-20**).

Table 3.3-20: NLCD within the North Central Appalachians Ecoregion

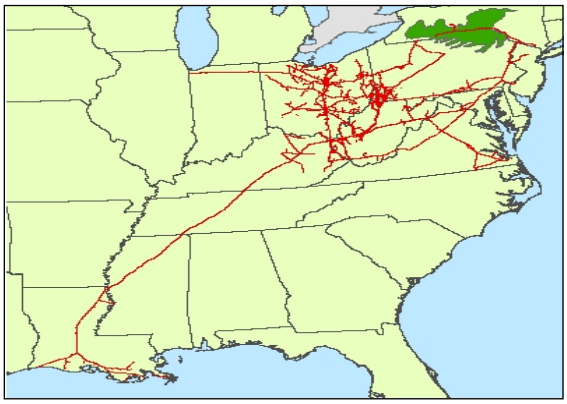
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	985	0.57	Mixed Forest	29,786	17.12
Developed, Open Space	7,562	4.35	Scrub/Shrub	5,278	3.03
Developed, Low Intensity	1,103	0.63	Grassland/Herbaceous	1,240	0.71
Developed, Medium Intensity	269	0.15	Pasture/Hay	7,355	4.23
Developed, High Intensity	66	0.04	Cultivated Crops	1,668	0.96
Barren Land	242	0.14	Woody Wetlands	2,300	1.32
Deciduous Forest	106,559	61.25	Emergent Herbaceous Wetland	232	0.13
Evergreen Forest	9,322	5.36			
Source: USGS 2003					

Land use in the region is predominantly forestry and recreation along with coal mines, oil and gas wells, dairy farming, public lands, and suburban development (Griffith 2007). The Pocono High Plateau area of the ecoregion is heavily utilized for recreation and tourism. Vacation and suburban developments are increasingly common in the region, especially around the area's larger lakes (Woods et al 1999).

Northern Allegheny Plateau

The Northern Allegheny Plateau ecoregion covers portions of northern Pennsylvania and southern New York (see **Figure 3.3-22**). The region forms a transition between the plains of the Great Lakes and the Appalachian. The ecoregion is distinct from surrounding regions by being more rugged and less cultivated and developed than regions to the north and west, and less mountainous, forested, and populated than regions to the south and east (EPA 2002). The Covered Land area extends over 148 miles of the ecoregion, with an overall footprint of 89,359 acres covering portions of the Covered Land area in New York.

Figure 3.3-22: Northern Allegheny Plateau Ecoregion



Source: CEC 2006

Regional terrain is described as glaciated upland plateau with rolling hills, open valleys and low mountains. Soils are primarily Inceptisols overlying Devonian-age shales, siltstones and sandstones. Hydrologically, the region has a number of perennial streams and small glacial lakes. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Native vegetation communities of the area include Appalachian oak and northern hardwood forests. Typical species include white oak, black oak, hickory, white pine, sugar maple, American beech, and yellow birch (Griffith 2007). Other common species include northern red oak, eastern hemlock, white ash, and black cherry. Bogs and marshes are also common in the region (Brooks 2007).

The NLCD classes for the Northern Allegheny Plateau portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest, Pasture/Hay, and Mixed Forest (see **Table 3.3-21**).

Table 3.3-21: NLCD within the Northern Allegheny Plateau Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	406	0.45	Mixed Forest	14,146	15.83
Developed, Open Space	3,483	3.90	Scrub/Shrub	2,149	2.40
Developed, Low Intensity	866	0.97	Grassland/Herbaceous	395	0.44
Developed, Medium Intensity	250	0.28	Pasture/Hay	16,717	18.71
Developed, High Intensity	66	0.07	Cultivated Crops	6,525	7.30
Barren Land	75	0.08	Woody Wetlands	1,040	1.16
Deciduous Forest	37,994	42.52	Emergent Herbaceous Wetland	335	0.37
Evergreen Forest	4,911	5.50			
Source: USGS 2003					

The landscape of this ecoregion is a mosaic of farmland, pasture, forest, and woodlands. Principal crops of the region are hay and grain for dairy cattle operations (Griffith 2007). The dairy industry and supporting crops are prevalent in the region as soils, topography, and climate are unsuitable for traditional agriculture. Farming is declining regionally, with many old farmlands reverting to woodlands. Vacation cabins are also becoming common in the region (Woods et al 1999).

Northeastern Highlands

The Northeastern Highlands ecoregion covers the mountainous portions of New England along with the Adirondacks and Catskills, covering portions of New York, New Jersey, Pennsylvania, Connecticut, Massachusetts, Vermont, New Hampshire, and Maine (see **Figure 3.3-23**). The ecoregion is distinct from surrounding regions by being more rugged and less populated than surrounding regions, and less farmed than regions to the west (EPA 2002). The Covered Land area stretches over 113 miles of this ecoregion, with an overall footprint of 64,945 acres covering portions of the Covered Land area in New Jersey, New York, and Pennsylvania.

Figure 3.3-23: Northeastern Highlands Ecoregion

Source: CEC 2006

Regional terrain is a combination of glaciated hills, mountains, narrow valleys and some hilly plains. Soils are generally nutrient-poor Spodosols and Inceptisols overlaying a variety of metamorphic and igneous rocks along with some sedimentary material. Hydrologically, the area has numerous perennial streams, some large rivers and many large and small glacial lakes, many of them sensitive to deposition from industry in other regions. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Native vegetation in the region is transitional between the boreal regions to the north and the broadleaf deciduous forests to the south, with dominant regional communities including mixed hardwood and spruce-fir forests. Mixed hardwood forests are dominated by sugar maple, American beech, yellow birch, eastern hemlock, and white pine. Spruce-fir forests are dominated by balsam fir, red spruce, and birches. Common species in swampy areas include black spruce, red maple, black ash, and tamarack (Griffith 2007). Appalachian oak forest is also found in the southern portions of the region, dominated by white oak and northern red oak (Woods et al 1999).

The NLCD classes for the Northeastern Highlands portion of the Covered Land area indicate that the area is primarily covered by Deciduous Forest and Cultivated Crops (see **Table 3.3-22**).

Table 3.3-22: NLCD within the Northeastern Highlands Ecoregion

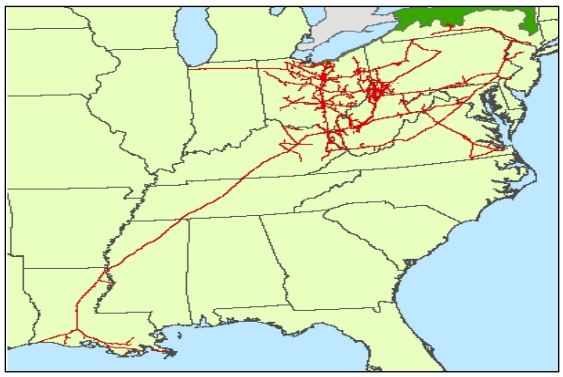
Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	332	0.51	Mixed Forest	3,242	4.99
Developed, Open Space	4,632	7.13	Scrub/Shrub	454	0.70
Developed, Low Intensity	1,244	1.92	Grassland/Herbaceous	458	0.71
Developed, Medium Intensity	372	0.57	Pasture/Hay	4,417	6.80
Developed, High Intensity	100	0.15	Cultivated Crops	8,226	12.67
Barren Land	346	0.53	Woody Wetlands	3,343	5.15
Deciduous Forest	36,876	56.78	Emergent Herbaceous Wetland	114	0.18
Evergreen Forest	788	1.21			
Source: USGS 2003					

The region has a pastoral character due to the scenic nature of the regions forested mountains and relatively sparse population. Primary land uses include recreation, tourism, and forestry. Although the region was once heavily farmed, farm abandonment became common in the region starting in the 19th century and much of the land has reverted to forest cover. Some farming remains in the alluvial valleys, glacial lake basins, and areas of limestone-derived soils with primary products including dairy products, forage crops, apples, and potatoes. Primary uses of regional forest land include recreational homes, tourism, and commercial timber harvest (Griffith 2007).

Eastern Great Lakes Lowlands

The Eastern Great Lakes Lowlands ecoregion covers much of the lowlands of New York and Vermont and the Great Lakes coasts of Pennsylvania and Ohio (see **Figure 3.3-24**). The ecoregion is distinct from regions to the south and east by being less rugged and more populated and agricultural in nature (EPA 2002). The Covered Land area extends over 100 miles in this ecoregion, with an overall footprint of 54,122 acres covering portions of the area in New York and Ohio.

Figure 3.3-24: Eastern Great Lakes Lowlands Ecoregion



Source: CEC 2006

Regional terrain is a glaciated, rolling to level plain. Soils are a combination of Alfisols, Inceptisols, and Spodosols overlying a variety of deep glacial and marine deposits of Paleozoic sedimentary rocks with bedrock outcrops. Hydrologically, the area has a mix of perennial streams, larger rivers, lakes, and wetlands. Regional climate is described as severe mid-latitude humid continental (Griffith 2007).

Native vegetation in the region is a mix of coniferous and deciduous forests. Remnant forests are primarily composed of sugar maple, yellow birch, eastern hemlock, American basswood, and white pine, along with American beech in the warmer areas. Dry areas are typified by northern red oak, red pine, white pine, and eastern white cedar. Wetter areas are composed of red maple, black ash, white spruce, tamarack, and eastern white cedar (Griffith 2007). The NLCD classes for the Eastern Great Lakes Lowlands portion of the Covered Land area indicate that the area is primarily covered by Cultivated Crops, Deciduous Forest, and Pasture/Hay (see **Table 3.3-23**).

Table 3.3-23: NLCD within the Eastern Great Lakes Lowlands Ecoregion

Land Cover Type	Acres	Percent	Land Cover Type	Acres	Percent
Open Water	363	0.67	Mixed Forest	1,989	3.68
Developed, Open Space	5,221	9.65	Scrub/Shrub	1,744	3.22
Developed, Low Intensity	4,381	8.09	Grassland/Herbaceous	178	0.33
Developed, Medium Intensity	1,272	2.35	Pasture/Hay	7,857	14.52
Developed, High Intensity	363	0.67	Cultivated Crops	15,861	29.31
Barren Land	16	0.03	Woody Wetlands	1,483	2.74
Deciduous Forest	12,398	22.91	Emergent Herbaceous Wetland	477	0.88
Evergreen Forest	519	0.96			
Source: USGS 2003					

The region has largely been converted to agriculture and urban and suburban development along with a dense transportation infrastructure. All major cities in upstate New York, along with numerous large Canadian cities, are found within this region. The majority of agricultural activities in the area are associated with dairy operations. Other agricultural areas include orchards, vineyards, and vegetable farming. Typical crops include small grains, corn, soybeans, and hay (Griffith 2007) along with apples, grapes, tart cherries, pears, plums, wheat, oats, barley, cabbage, and potatoes (Taylor 2007).

3.3.2 Wetlands

Wetlands are transitional areas between terrestrial and aquatic systems where water covers the land, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils (EPA 2006).

On a national level, jurisdictional wetlands include those wetlands subject to regulatory authority under Section 404 of the CWA as well as Executive Order (EO) 11990 (Protection of Wetlands). Wetland are defined by the USACE and EPA as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal

circumstances do support a prevalence of wetland vegetation typically adapted for life in saturated soils conditions (USACE 1995). Many states also have state-level regulations that further protect wetland areas, including isolated wetlands not subject to federal regulations.

The wetlands are classified according to Cowardin et al. 1979. Cowardin's wetland classification system is hierarchical and divided into five different Systems and 10 Subsystems based on specific shared characteristics. These Subsystems are further separated into more detailed classes; however, wetlands in the Covered Land area will be described at the System and Subsystem level by ecoregion due to the extent of the Covered Land area. Wetland systems are divided into the following subsystems:

- Marine - Subtidal and Intertidal
- Estuarine - Subtidal and Intertidal
- Riverine - Tidal, Lower Perennial, Upper Perennial, Intermittent, and Unknown Perennial
- Lacustrine - Limnetic and Littoral
- Palustrine - none

Coastlines including the subtidal and intertidal zones are Marine Systems, whereas wetlands in which the ocean is periodically inundated by freshwater runoff from land (e.g., where rivers flow into the ocean) are Estuarine Systems. Wetlands along the edges of rivers and streams are Riverine Systems, and wetlands along the edges of lakes are Lacustrine Systems. Palustrine wetlands include the majority of vegetated freshwater wetlands except those along lakes and rivers. Palustrine wetlands are generally small in size and shallow and may be isolated or connected by surface or groundwater to rivers and lakes (Cowardin et al. 1979).

Water regime, and consequently, vegetation and soils vary for each of the systems. Marine Systems are dominated by tides. Estuarine Systems are influenced by the interaction of tides, precipitation, and freshwater runoff. Riverine Systems reflect the controlling role of flooding from high flows, whereas the water supply for Lacustrine Systems depends on the lake level and the water supply to the lake in the form of precipitation and groundwater. Palustrine Systems usually are influenced primarily by precipitation. As noted previously, groundwater may play an influential role in any of these systems, depending on the local geological situation (EPA 2006).

In order to generally characterize wetland resources within the Covered Land area, the USFWS's National Wetlands Inventory (NWI) dataset were analyzed where information was available. This overarching analysis is depicted in **Table 3.3-24** below. NWI surveys are primarily intended for broad scope analyses. Project specific wetland surveys and jurisdictional determinations would be required on a case-by-case basis for future projects; therefore further large-scale analyses (e.g., soil mapping) were not conducted at this time.

As part of the analysis, acres for each wetland system were totaled for the Covered Land area by ecoregion. Of the almost 9.8 million acres encompassed by the Covered Land area, approximately 6.5 million acres, or 66 percent, is mapped by NWI, with the remaining 34 percent unmapped at the time of analysis. Of the 6.5 million acres of NWI mapped area, approximately 300,000 acres, or about 5 percent of the NWI mapped portion of the Covered Land area is considered a wetland by NWI. For example, within the Eastern Corn Belt Plains, approximately 87 percent of the area is not mapped by NWI, with the remaining 13 percent of the Covered Land area, the mapped portion, composed primarily (98 percent) of upland, with palustrine, lacustrine, and riverine wetlands making up the remainder of the area (2 percent).

Table 3.3-24: Wetlands by Ecoregion within the Covered Land Area

Ecoregion III Name	Wetland System	Acres	Percent of Covered Land
Atlantic Coastal Pine Barrens	Palustrine	302	7.58% wetlands
Blue Ridge	Palustrine	104	0.32% wetlands
	Lacustrine	0.1	
Central Appalachians	Palustrine	4,131	0.86% wetlands
	Lacustrine	1,138	
	Riverine	4,820	
Central Corn Belt Plains	Palustrine	1,798	8.03% wetlands
	Lacustrine	30	
	Riverine	18	
Eastern Corn Belt Plains	Palustrine	1,193	1.59% wetlands
	Lacustrine	188	
	Riverine	141	
	No Digital Data Available	660,860	87.37% unmapped
Eastern Great Lakes Lowlands	Palustrine	397	2.74% wetlands
	Lacustrine	74	
	Riverine	22	
	No Digital Data Available	36,126	66.75% unmapped
Erie Drift Plain	Palustrine	695	4.17% wetlands

Ecoregion III Name	Wetland System	Acres	Percent of Covered Land
	Riverine	175	
	No Digital Data Available	1,240,805	98.35% unmapped
Huron/Erie Lake Plains	Palustrine	410	3.34% wetlands
	Lacustrine	123	
	Riverine	181	
	No Digital Data Available	171,486	89.93% unmapped
Interior Plateau	Palustrine	3,165	2.51% wetlands
	Lacustrine	4,175	
	Riverine	411	
	No Digital Data Available	28,177	8.37% unmapped
Middle Atlantic Coastal Plain	Estuarine	3,237	24.75% wetlands
	Palustrine	15,192	
	Lacustrine	982	
	Riverine	319	
Mississippi Alluvial Plain	Estuarine	37,886	72.89% wetlands
	Palustrine	67,598	
	Lacustrine	3,762	
	Riverine	4,469	
	No Digital Data Available	142,871	47.83% unmapped
Mississippi Valley Loess Plains	No Digital Data Available	9,917	100% unmapped
North Central Appalachians	Palustrine	3,593	2.72% wetlands
	Lacustrine	247	
	Riverine	427	
	No Digital Data Available	16,894	9.70% unmapped
Northeastern Highlands	Palustrine	3,640	6.32% wetlands
	Lacustrine	207	
	Riverine	257	
Northern Allegheny Plateau	Palustrine	1,284	1.96% wetlands
	Lacustrine	80	
	Riverine	348	
	No Digital Data Available	1,774	1.99% unmapped
Northern Piedmont	Palustrine	8,079	3.19% wetlands
	Lacustrine	1,858	
	Riverine	1,281	
Piedmont	Palustrine	2,723	5.78% wetlands
	Lacustrine	289	
	Riverine	199	
Ridge and Valley	Palustrine	5,398	0.92% wetlands
	Lacustrine	1,316	

Ecoregion III Name	Wetland System	Acres	Percent of Covered Land
	Riverine	4,622	
South Central Plains	No Digital Data Available	58,897	100% unmapped
Southeastern Plains	Palustrine	15,582	11.46% wetlands
	Lacustrine	368	
	Riverine	538	
	No Digital Data Available	40,446	21.95% unmapped
Southern Michigan/Northern Indiana Drift Plains	Palustrine	2,764	5.12% wetlands
	Lacustrine	140	
Western Allegheny Plateau	Palustrine	6,291	1.66% wetlands
	Lacustrine	3,771	
	Riverine	26,584	
	No Digital Data Available	893,219	28.76% unmapped
Western Gulf Coastal Plain	Estuarine	24,087	32.60% wetlands
	Palustrine	20,773	
	Lacustrine	6,400	
	Riverine	1,277	
	No Digital Data Available	12,327	7.11% unmapped
Source: USFWS 2007c			

The most abundant wetland system within the Covered Land area is Palustrine, accounting for 165,112 acres or two percent of the area (**Table 3.3-25**). The total acreage accounted for by wetlands within the Covered Land area is 301,559 acres. This number does not take into account portions of the Covered Land area where wetlands have not been digitally mapped. In addition, as discussed above, NWI surveys are interpretations of large scale aerial photography and do not include field verification; accordingly, this data is primarily intended for broad scope analyses. Project specific wetland surveys and jurisdictional determinations would be required on a case-by-case basis for future projects.

Table 3.3-25: Overview of NWI-Mapped Wetlands Included within the Covered Land Area

Wetland Classification	Total Acres of Covered Land	Percent of Covered Land
Palustrine	165,112	1.69
Estuarine	65,210	0.67
Riverine	46,089	0.47
Lacustrine	25,148	0.26
Source: USFWS 2007c		

Within the Covered Land, wetlands represent approximately 3 percent of the land cover. Compliance with wetlands standards and any associated state-specific regulations regarding any specific NiSource operations, maintenance, or new construction projects will occur on a project-by-project basis for those projects requiring additional Federal approvals. A complete analysis of wetland impacts is not possible at the scale of this EIS. As such, the environmental consequences examined in Chapter 4 are somewhat general. The environmental details presented in this Chapter will provide a basis for future analysis of site-specific conditions and associated NEPA analysis. NEPA tiering assures that Federal agencies participating on this EIS will take a hard look when project details are known.

3.3.3 Wildlife and Fish

The most prevalent land-use type in the Covered Land area is Deciduous Forest (49.30%), followed by Cultivated Crops (17.72%), Pasture/Hay (13.53%), and Developed – Open Space (6.47%). The remainder of the area is covered by eleven other types, none exceeding 3% of the total area. A description of each land-use-cover class is included in Table 3.2 in the MSHCP. Appendix E in the MSHCP provides data on conservation lands owned by federal, state, and local governments and nongovernmental organizations that are crossed by the Covered Land. These habitats provide local wildlife with areas for foraging, cover, and breeding.

Forested lands consist of deciduous, evergreen, and mixed upland forests, as well as forested wetlands. Upland forests provide both interior and edge habitats that often attract different species based on their habitat preferences. Interior forested habitats are secluded, wetter, and more stable, whereas edge habitats are more volatile, experiencing more dramatic environmental change. Exterior forests are sunnier, drier, windier, and more prone to disturbance. Forested wetlands comprise diverse vegetation assemblages that provide an abundance of cover, foraging, and nesting habitat for a variety of wildlife species, such as migrating birds, reptiles, amphibians, and mammals.

Agricultural lands generally consist of pasture/hay, row crops, and small grains. These lands provide cover and foraging opportunities for wildlife species within the crops or

pastures, or within the small areas of natural vegetation, such as vegetation along streams or small forested patches, that sometimes occur within agricultural lands. Although generally not as diverse as other habitat types, agricultural lands provide habitat for a variety of wildlife species.

Herbaceous uplands include upland grasslands, maintained rights-of-way, fallow fields, and areas used for production of hay and small grains. Herbaceous habitats can be important to a variety of species, particularly birds and small mammals, by providing edge areas and feeding and rearing habitats. Herbaceous wetlands include emergent wetlands, ditches, road and railroad rights-of-way, pipeline and power line utility corridors, fallow fields, and areas used for production of hay and small grains where hydric soils are present. Herbaceous wetlands provide an abundance of cover, foraging, and nesting habitat for a variety of wildlife species including mammals, birds, and reptiles. Emergent wetlands also provide resting sites for migratory birds; food sources for waterfowl; and nursery habitat for amphibians, crustaceans, and fish.

Aquatic habitats include large rivers, streams, and ponds. These habitats provide food and water sources, in addition to habitat for species such as wading birds, waterfowl, beavers, otters, snakes, and other wildlife species dependent upon an aquatic environment.

Developed land consists of residential, industrial, and other areas developed for active human use. Residential land occurs throughout the Covered Land area in varying densities. These areas generally do not have diverse vegetative communities or provide substantial forage or cover for wildlife. Although they may be used by some wildlife species that are well adapted to human activity, these areas are not considered to provide significant value as wildlife habitat.

An overview of common fish and wildlife species from major taxonomic groups for the Covered Land area is provided below. As these are common species, the list below excludes species listed under the ESA, which are discussed in a later section.

Additionally, representative non-listed fish and wildlife species for each ecoregion within the Covered Land area are included (**Table 3.3-26**). Examples of species identified within individual state wildlife action plans as being "Species of Greatest Conservation Need" are presented in this section.

Mammals

- ***Furbearers/Small Game*** - beaver, mink, muskrat, raccoon, Virginia opossum, striped skunk, eastern cottontail, woodchuck, long-tailed weasel
- ***Squirrels*** - gray squirrel, eastern fox squirrel, red squirrel, thirteen-lined ground squirrel, eastern chipmunk, southern flying squirrel
- ***Big Game*** - white-tailed deer, elk
- ***Small Mammals*** - eastern mole, meadow vole, white-footed mouse, masked shrew, short-tailed shrew
- ***Bats*** - hoary bat, little brown bat, big brown bat, Eastern pipistrelle, red bat, southeastern myotis, silver-haired bat, eastern small-footed bat, Rafinesque's big-eared bat, Indiana bat
- ***Canids*** - coyote, gray fox, red fox
- ***Felids*** - lynx, bobcat
- ***Large Carnivores*** – American black bear

Birds

Hundreds of bird species spend at least some portion of the year within the Covered Land area. Common species occurring include:

- ***Waterfowl*** - mallard, canvasback, Canada goose, hooded merganser, bufflehead, snow goose, American coot, American black duck, common goldeneye, northern pintail, wood duck
- ***Shorebirds*** - killdeer, American woodcock, Wilson's snipe, upland sandpiper, semipalmated plover, American black-bellied plover
- ***Raptors*** - red-tailed hawk, red-shouldered hawk, broad-winged hawk, bald eagle, Cooper's hawk, peregrine falcon, osprey, northern harrier, American kestrel

- ***Owls*** - eastern screech-owl, barred owl, barn owl, short-eared owl, great horned owl, ferruginous pygmy owl
- ***Land Birds*** - tufted titmouse, northern cardinal, Carolina wren, blue jay, mourning dove, red-headed woodpecker, hairy woodpecker, northern flicker, white-breasted nuthatch, downy woodpecker, common nighthawk, whip-poor-will, black-and-white warbler, Blackburnian warbler, Canada warbler, Kentucky warbler, mourning warbler, cerulean warbler, prothonotary warbler, red-eyed vireo, wood thrush, field sparrow, grasshopper sparrow, Bachman's sparrow, Baltimore oriole, eastern wood-pewee, eastern kingbird, eastern meadowlark, summer tanager, scarlet tanager, Louisiana waterthrush, sedge wren, bobolink, dickcissel, brown thrasher
- ***Upland Game Birds*** - wild turkey, ruffed grouse, northern bobwhite, ring-necked pheasant
- ***Water Birds*** - great blue heron, black-crowned night heron, little blue heron, American bittern, Virginia rail, sora

Herpetofauna

- ***Snakes*** - cottonmouth, cornsnake, common gartersnake, copperhead, eastern diamondback rattlesnake, coralsnake, northern watersnake, northern pinesnake
- American alligator
- ***Turtles*** - alligator snapping turtle, eastern box turtle, red-eared slider, spotted turtle
- ***Salamanders/Newts*** - mudpuppy, red-spotted newt, blue-spotted salamander, tiger salamander, dusky salamander, redback salamander
- ***Frogs/Toads*** - bullfrog, eastern American toad, northern leopard frog, wood frog, Woodhouse's toad, spring peeper, pickerel frog

Fish

- bluegill, pumpkinseed, redear sunfish, black crappie, white crappie, white perch, yellow perch, rainbow trout, brown trout, brook trout, muskellunge, channel catfish, pickerel, walleye, yellow bass, white bass, largemouth bass, smallmouth bass, striped bass, herring, northern pike, buffalo fish, and American shad.

Table 3.3-26: Representative Fauna by Ecoregion in the Covered Land Area

Level III Ecoregions	States	Representative Fish and Wildlife Species
Atlantic Coastal Pine Barrens	NJ	black skimmer, least tern, loggerhead
Blue Ridge	PA,VA	American black bear, bobcat, red squirrel, northern flying squirrel, rock vole, wild turkey, common raven, ruffed grouse, saw-whet owl, blackburnian warbler, brook trout, red-spotted newt, longtail salamander
Central Appalachians	KY,PA,WV	American black bear, gray fox, bobcat, red squirrel, eastern fox squirrel, big brown bat, wild turkey, ruffed grouse, scarlet tanager, hermit thrush, eastern box turtle, smallmouth bass
Central Corn Belt Plains	IN	coyote, bobcat, meadow vole, upland sandpiper, Illinois mud turtle, Illinois chorus frog
Eastern Corn Belt Plains	IN,OH	coyote, gray fox, Rafinesque's big-eared bat, white-footed mouse, eastern mole, indigo bunting, eastern bluebird, Canada warbler, American redstart, American tree sparrow, bluebreast darter, redside dace
Eastern Great Lakes Lowlands	NY	American black bear, moose, coyote, snowshoe hare, red squirrel, gray squirrel, osprey, eastern screech-owl, ruffed grouse, pileated woodpecker, wood thrush, Canada warbler, canvasback, wood duck
Erie Drift Plain	OH,PA	woodchuck, beaver, striped skunk, eastern chipmunk, eastern fox squirrel, bald eagle, osprey, red-tailed hawk, northern flicker, canvasback, wood duck, Canada warbler, eastern screech-owl, snapping turtle, dusky salamander
Huron/Erie Lake Plains	OH	downy woodpecker, green heron, wood duck, snapping turtle, northern watersnake, flathead catfish, greater redhorse
Interior Plateau	KY,TN	American black bear, bobcat, gray fox, pine vole, northern cardinal, northern mockingbird, summer tanager, brown thrasher, snapping turtle, blackspot shiner, northern cavefish.
Middle Atlantic Coastal Plain	DE,NJ,VA	American black bear, bobcat, gray fox, gray squirrel, wild turkey, northern bobwhite, mourning dove, double-crested cormorant, prothonotary warbler, eastern box turtle
Mississippi Alluvial Plain	LA,MS	bobcat, gray fox, swamp rabbit, wild turkey, wood thrush, yellow-throated vireo, American alligator, alligator gar.
Mississippi Valley Loess Plains	MS	gray squirrel, wood thrush, Carolina wren, northern bobwhite, mourning dove, wild turkey, bayou darter
North Central Appalachians	NY,PA	American black bear, bobcat, coyote, beaver, gray fox, gray squirrel, mink, river otter, snowshoe hare, red-shouldered hawk, saw-whet owl, northern goshawk, wild turkey, ruffed grouse, gray treefrog
Northeastern Highlands	NJ,NY,PA	moose, American black bear, bobcat, lynx, snowshoe hare, porcupine, fisher, beaver, northern flying squirrel, osprey, red-tailed hawk, wild turkey, ruffed grouse, black-backed woodpecker, gray jay, common loon, redback salamander.
Northern Allegheny Plateau	NY	American black bear, gray fox, beaver, striped skunk, gray squirrel, wild turkey, ruffed grouse, American woodcock, wood duck, Cooper's hawk, cerulean warbler, redback salamander, wood turtle
Northern Piedmont	MD,NJ,VA	gray fox, red squirrel, mink, muskrat, ruffed grouse, eastern

Level III Ecoregions	States	Representative Fish and Wildlife Species
		meadowlark, field sparrow, great blue heron
Piedmont	VA	American black bear, bobcat, gray fox, gray squirrel, eastern chipmunk, pine vole, wild turkey, Carolina wren, wood thrush, prairie warbler, field sparrow, eastern box turtle, common gartersnake, copperhead
Ridge and Valley	MD,PA,VA,WV	American black bear, bobcat, gray fox, muskrat, mink, eastern fox squirrel, bald eagle, wild turkey, northern bobwhite, red-eyed vireo, eastern box turtle, sculpins, minnows, darters
South Central Plains	LA	coyote, beaver, muskrat, mink, river otter, swamp rabbit, armadillo, mourning dove, white ibis, Mississippi kite, American alligator, Louisiana pinesnake
Southeastern Plains	MS,NC,TN,WV	American black bear, bobcat, gray fox, gray squirrel, swamp rabbit, eastern chipmunk, pine vole, wild turkey, Carolina wren, wood thrush, hooded warbler, summer tanager, American alligator, eastern box turtle, common gartersnake, copperhead, eastern diamondback rattlesnake
Southern Michigan/Northern Indiana Drift Plains	IN	coyote, gray fox, beaver, river otter, mink, Canada warbler, upland sandpiper, northern pike, walleye, salmon, rainbow trout
Western Allegheny Plateau	KY,OH,PA,WV	gray fox, woodchuck, gray squirrel, wild turkey, ruffed grouse, barred owl, pileated woodpecker, ovenbird, Kentucky warbler, northern watersnake, dusky salamander
Western Gulf Coastal Plain	LA	ocelot, coyote, eastern ringtail, armadillo, swamp rabbit, American alligator, ferruginous pygmy-owl, green jay, Altimira oriole, Attwater's prairie chicken, whooping crane
Source: EPA 2002, Griffith 2007; updated Ecoregion Names, EPA 2010		

State Wildlife Action Plans

Fish and wildlife agencies in all 50 states have developed Wildlife Action Plans that examine the health and status of each state's wildlife and habitats, identify potential threats, and outline the actions that are needed to conserve wildlife and their habitats over the long term. Wildlife Action Plans (WAP) for each of the 14 states within the Covered Land area are summarized below.

Delaware Division of Fish & Wildlife - The Delaware State WAP identifies over 1,000 wildlife species across the state with more than 450 identified as Species of Greatest Conservation Need (SGCN) including 18 mammals, 146 birds, 23 fish, and 33 amphibians and reptiles. Some of these species include horseshoe crab, Atlantic sturgeon, Cooper's hawk, northern harrier, and coyote (DEDFW 2006). For a complete list see: http://www.dnrec.state.de.us/nhp/information/DEWAPTOC.shtml

Indiana Department of Natural Resources - The Indiana Wildlife Diversity Section is responsible for the conservation and management of over 750 species of non-game and endangered wildlife across Indiana, representing more than 90-percent of the state's mammals, birds, fish, mussels, reptiles, and amphibians. According to the Indiana Comprehensive Wildlife Strategy, over 270 species are listed as SGCN, including 22 mammals, 40 birds, 28 reptiles and amphibians, and 25 fish. Some of these species include badger, bobcat, barn owl, common nighthawk, hoary bat, northern leopard frog, river otter, and sandhill crane (INDNR 2006). For a complete list see: http://www.in.gov/dnr/fishwild/endangered/CWS_MANUSCRIPT.pdf

Kentucky Department of Fish & Wildlife Resources - A total of 251 SGCN were identified in Kentucky's WAP, representing species from seven taxonomic groups including bivalves, fishes, lampreys, amphibians, reptiles, birds, and mammals. Some of these species include the black bear, eastern spotted skunk, lake sturgeon, American woodcock, white pelican, barn owl, osprey, wood thrush, alligator snapping turtle, eastern mud turtle, barking treefrog, and wood frog (KYDFWR 2005). For a complete list of species see: http://fw.ky.gov/kfwis/stwg/

Louisiana Department of Wildlife & Fisheries - The Louisiana WAP identified 240 SGCN, including 18 mammals, 69 birds, 45 reptiles and amphibians, and 28 freshwater fish. Some of these species include the eastern spotted skunk, American bittern, American woodcock, wood stork, short-eared owl, long-tailed weasel, wood thrush, southern crawfish frog, southern red salamander, and alligator snapping turtle (LADWF 2005). For a complete list of species see:

http://www.wlf.state.la.us/experience/wildlifeactionplan/wildlifeplandetails/

Maryland Department of Natural Resources - The Maryland Wildlife Diversity Conservation Plan identified over 500 SGCN, including 34 mammals, over 40 amphibians and reptiles, and over 140 birds. Some of these species include the porcupine, bobcat, eastern spotted skunk, common loon, canvasback, eastern meadowlark, scarlet tanager, brook trout, wood turtle, and red salamander (MDDNR

2005). For a complete list of species go to:

http://www.dnr.state.md.us/wildlife/divplan_propneed.asp

Mississippi Department of Wildlife, Fisheries & Parks - The Mississippi Comprehensive Wildlife Conservation Strategy (CWCS) identified nearly 300 SGCN, including 17 mammals, 53 amphibians and reptiles, 74 fish, and 70 birds. Some of these species include the American black bear, eastern spotted skunk, little blue heron, white ibis, wood stork, bearded red crayfish, and crawfish frog (MSDWFP 2005). For a complete list of species go to: http://www.mdwfp.com/Level2/cwcs/Final.asp

New Jersey Department of Environmental Protection - The New Jersey WAP identified nearly 290 SGCN, including 17 mammals, 149 birds, 20 fish, and 28 amphibians and reptiles. Some of these species include the Allegheny woodrat, bobcat, American bittern, least tern, upland sandpiper, cornsnake, blue-spotted salamander, and the northern pinesnake (NJDEP 2008). For a complete list of species go to: http://www.state.nj.us/dep/fgw/ensp/wap/pdf/wap_apx1.pdf.

New York Department of Environmental Conservation - The New York CWCS identified 535 SGCN, including 22 mammals, 118 birds, 40 freshwater fish, and 44 amphibians and reptiles. Some of these species include American marten, Allegheny woodrat, American black duck, little blue heron, long-eared owl, northern harrier, red-headed woodpecker, eastern box turtle, wood turtle, blue-spotted salamander, and the hellbender (NYDEC 2005). A complete list of species identified can be found at: http://www.dec.ny.gov/animals/9406.html.

North Carolina Wildlife Resources Commission - The North Carolina CWCS identified 365 SGCN, including 38 mammals, 92 birds, 83 fish, and 84 amphibians and reptiles. Some of these species include Cooper's hawk, short-eared owl, whip-poor-will, northern flicker, long-tailed weasel, eastern mole, eastern fox squirrel, spotted salamander, marbled salamander, American alligator, cornsnake, shortnose sturgeon,

and Atlantic sturgeon (NCWRC 2005). For a complete list of species see:

http://www.ncwildlife.org/pg07_wildlifespeciescon/WAP_complete.pdf

Ohio Department of Natural Resources - The Ohio CWCS identified 240 SGCN, including 25 mammals, 89 birds, 40 freshwater fish, and 32 amphibians and reptiles. Some of these species include American black bear, bobcat, badger, sandhill crane, American bittern, snowshoe hare, trumpeter swan, eastern plains gartersnake, blue-spotted salamander, and Ohio lamprey (OHDNR 2005). For a complete list of species go to: http://www.fws.gov/midwest/FederalAid/state_plans.html

Pennsylvania Game Commission - The Pennsylvania WAP identified 572 SGCN, including 14 mammals, 44 birds, 69 fish, and 37 amphibians and reptiles. Some of these species include upland sandpiper, northern bobwhite, short-eared owl, Allegheny woodrat, eastern spotted skunk, northern flying squirrel, hellbender, spotted turtle, mountain chorus frog, green salamander, eastern sand darter, and Atlantic sturgeon (PAGC 2005). For information on the entire list of species go to:

http://www.pgc.state.pa.us/pgc/cwp/view.asp?a=496&q=162067

Tennessee Wildlife Resources Agency - The Tennessee CWCS identified 664 SGCN, including 29 mammals, 81 birds, 85 fish, and 41 amphibians and reptiles. Some of these species include southern cavefish, green salamander, southern cricket frog, upland sandpiper, whip-poor-will, winter wren, snowshoe hare, Allegheny woodrat, red squirrel, and northern pinesnake (TNWRA 2005a). For a complete list go to: http://www.state.tn.us/twra/cwcs/tncwcs2005app.pdf

Virginia Department of Game & Inland Fisheries - The Virginia WAP identified 925 SGCN, including 24 mammals, 96 birds, 97 fish, and 60 amphibians and reptiles. Some of these species include the Carolina northern flying squirrel, snowshoe hare, fisher, peregrine falcon, American black duck, least tern, wood turtle, barking treefrog, green salamander, shortnose sturgeon, and paddlefish (VADGIF 2005). For a complete list see: http://bewildvirginia.org/species/

West Virginia Division of Natural Resources - The West Virginia Wildlife Conservation Action Plan identified 524 SGCN, including 26 mammals, 74 birds, 73 fish, and 39 amphibians and reptiles. Some of these species include northern goshawk, northern bobwhite, marsh wren, yellow-bellied sapsucker, Cooper's hawk, Rafinesque's big-eared bat, eastern harvest mouse, least shrew, spotted turtle, cornsnake, West Virginia spring salamander, and northern leopard frog (WVDNR 2005). For a complete list see: http://www.wvdnr.gov/Wildlife/PDFFiles/wvwcap.pdf

Migratory Birds

Migratory birds are those species that migrate to north of the Tropic of Cancer (the United States and Canada) during the summer months to breed, but spend winter months south of that latitude in such areas as Mexico, Central America, South America, or the Caribbean. About 200 species of migratory birds have been identified in the western hemisphere, primarily including song birds, though many shorebirds, raptors, and waterfowl are included (SNZP 2009).

Migratory birds are protected by the MBTA of 1918 (16 USC 703-711), the Convention for the Protection of Migratory Birds with Great Britain on behalf of Canada of 1916, the Convention for the Protection of Migratory Birds and Game Mammals-Mexico of 1936, the Convention for the Protection of Birds and Their Environment-Japan of 1972, the Convention for the Conservation of Migratory Birds and Their Environment-Union of Soviet Socialist Republics of 1978.

Species of migratory birds that are protected under the MBTA include all species listed within 50 CFR 10.13. These include songbirds, raptors, ducks, waterbirds, and others. For a complete list of the birds protected, refer to http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtintro.html. As described in Chapter 1, the MBTA generally prohibits the taking (both intentional and unintentional) of migratory birds, the destruction or disturbance of migratory bird nests, or the disturbance of any eggs or young of migratory birds without prior authorization from the USFWS. In addition to protection under MBTA, certain birds have been listed

under the ESA and receive additional regulatory protections. ESA-listed birds that may occur within the Covered Land are the Interior Least Tern, Piping Plover, and Red-cockaded Woodpecker. These three bird species are covered more fully in Section 3.3.4.

Executive Order 13186 (66 CFR 3853) also serves to protect migratory birds from adverse impacts of federal actions. The EO, enacted in 2001, is intended to ensure that, among other things, prior to all federal actions, an evaluation of potential direct or indirect impacts to migratory birds is conducted, with an emphasis on species of concern, priority habitat, and key risk factors. One requirement of the EO is that agencies are required to establish memoranda of understanding with the Service detailing each agency's responsibilities to migratory birds. The MOUs that have been developed to date focus on avoiding or minimizing impacts to migratory birds and strengthening conservation through enhanced communication and collaboration between the Service and the cooperating Federal agency. Of relevance to NiSource activities, the NPS, USFS, Department of Defense, and FERC have finalized MOUs with the Service. Copies of the completed MOUs are available on the Service's web site at: http://www.fws.gov/migratorybirds/PartnershipsAndIniatives.html.

Four generalized migration corridors, or flyways, have been identified in the United States, roughly defined by large scale physiographic features. Two of these flyways, the Atlantic Flyway and Mississippi Flyway cross through the Covered Land. The Atlantic Flyway, encompassing the east coast to the Allegheny Mountains, is the route followed by most migrants from Eastern Canada and the New England states, with most species wintering in Florida, the Caribbean, and Eastern Mexico and South America. The Mississippi Flyway, encompassing the Mississippi River valley and surrounding flatlands into Central Canada, is the route followed by many Central Canada migrants along with a portion of the Alaskan migrants, with most species wintering in Mexico, Central, and South America. For more information on the flyways of the United States, see www.flyways.us.

Under the Fish and Wildlife Conservation Act of 1980 ("Nongame Act", 16 USC 2901-2912), the USFWS is required to "*identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing*" under the ESA. The goal of the Nongame Act is to prevent the listing of further migratory non-game species through the implementation of proactive management and conservation actions (see http://ecos.fws.gov/tess_public/pub/listedAnimals.jsp for a list of Threatened and Endangered Wildlife in the U.S.). To this end, Partners in Flight (PIF), a cooperative partnership among federal, state and local government agencies, along with philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals and organizations was founded in 1990 to emphasize the conservation of birds not covered by existing conservation initiatives. For more information on PIF, see www.partnersinflight.org.

Similarly, the U.S. North American Bird Conservation Initiative (NABCI), formed in 1999 as a coalition of government agencies, private organizations, and bird initiatives, aims to advance integrated bird conservation through enhanced cooperation among North American groups. To that goal, NABCI, along with PIF and multiple other contributing groups divided the continent into Bird Conservation Regions (BCRs), or ecologically distinct regions of the continent with similar bird communities, habitats, and resource management issues to aid in the development and implementation of regional Conservation Plans (CPs). The Covered Land area encompasses portions of eleven BCRs, covering a wide range of habitat types and bird communities. For information on NABCI or the BCRs, and what migratory birds populate these regions, see www.nabci-us.org. BCRs crossed by the Covered Land include:

- Appalachian Mountains
- Central Hardwoods
- Eastern Tallgrass Prairie
- Gulf Coastal Prairie

- Lower Great Lakes/St. Lawrence Plain
- Mississippi Alluvial Valley
- New England/Mid-Atlantic Coast
- Piedmont
- Prairie Hardwood Transition
- Southeastern Coastal Plain
- West Gulf Coastal Plain/Ouachitas

For each BCR, one or more CPs were developed to aid in the management and monitoring of landbirds, shorebirds, waterbirds, and waterfowl. Within each CP, a list of species suggested for population monitoring and potential management is included. High priority members of these lists were compiled to form a list of high priority species by BCR. As BCRs cover large areas, including many areas outside of the Covered Land, these high priority species lists were further refined by cross comparing them with Species of Interest lists developed by State Division of Wildlife and Natural Heritage Programs. Through this analysis, 114 species of migratory birds potentially occurring within Covered Land were identified (Appendix D) for future site-specific evaluation. These 114 species have been identified by PIF to be declining within habitats that occur in the Covered Land.

Bald and Golden Eagles

Eagles are the largest members of the raptor family, with two representatives, the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) found in the lower 48 states. The bald eagle was removed from the federal list of threatened and endangered species on August 9th, 2007. After nearly disappearing from the lower 48 states, the bald eagle is now flourishing across the nation and no longer requires the protection of the ESA. The golden eagle, while relatively common in portions of the west, is largely diminished in the eastern United States. The golden eagle is not officially listed as threatened or endangered under the ESA, but has been identified as a

Species of Concern by the USFWS. Golden eagles are not known to nest in the eastern United States or in any part of the Covered Land.

Both species of eagle are large raptors with a 6- to 8-foot wing-span, have generalist diets consisting primarily of small mammals, fish, and carrion, and are variably migratory based on breeding location and year-round habitat suitability. Both species are most prone to disturbance during the nesting period, making those areas the principal area of concern for protection. Nests are located in mature or old-growth trees, snags, cliffs, or rock promontories. Bald eagle nests are most commonly associated with coastlines, rivers, or large lakes and streams while golden eagle nests are most commonly associated with cliffs in hilly or mountainous areas. As stated previously, golden eagles are not known to nest within the Covered Land. Bald eagles however may nest, roost, and forage in the Covered Land. Bald eagle nesting within the Covered Land can occur anywhere between October in the deep South to May in the Northeast, with full incubation and fledging lasting between four and five months.

Threats to Bald Eagles

During the breeding season, bald eagles are sensitive to a variety of human activities. Some pairs nest successfully just dozens of yards from human activity, while others abandon nest sites in response to activities much farther away. If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Unattended eggs and nestlings are subject to predation. Young nestlings are particularly vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal

human activity. During this period, until about six weeks after departure from the nest, the juveniles still depend on the adults to feed them.

Disruption, destruction, or obstruction of roosting and foraging areas can also negatively affect bald eagles. Disruptive activities in or near eagle foraging areas can interfere with feeding, reducing chances of survival. Interference with feeding can also result in reduced productivity (number of young successfully fledged). Migrating and wintering bald eagles often congregate at specific roosting sites for purposes of feeding and sheltering. Human activities near or within communal roost sites may prevent eagles from feeding or taking shelter, especially if there are no other undisturbed and productive feeding and roosting sites available. Activities that permanently alter communal roost sites and important foraging areas can altogether eliminate the elements that are essential for feeding and sheltering eagles.

Laws Protecting Eagles

Although bald eagles are no longer afforded protection under the ESA, they are still protected under the BGEPA, Migratory Bird Treaty Act, Lacy Act, and by most States.

- *Bald and Golden Eagle Protection Act* – Passed in 1940, this law provides protection for eagles *by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.*

- *Migratory Bird Treaty Act* – This act is a Federal law that codifies the U.S. commitment to four international conventions with Canada, Japan, Mexico, and Russia. The conventions provide protection for birds that migrate across international borders, including eagles, and regulate any potential "take" of those species. The Act specifically prohibits the *taking, killing, possession,*

transportation, and importation of migratory birds, their eggs, parts, and nests except as authorized under a valid permit.

- *Lacey Act* – Even though the bald eagle was delisted, they are still covered under the Lacey Act, which protects the species by making it a Federal offense to take, possess, transport, sell, import, or export their nests, eggs, and parts that are taken in violation of any State, Tribal, or Federal law.

- *State laws and regulations* - Most states have their own laws, regulations and/or guidelines for bald eagle protection and management. Some states may continue to list the bald eagle as endangered, threatened, or of special concern.

Management Guidelines for Bald Eagles

In 2007, the Service developed and published National Bald Eagle Management Guidelines (Guidelines) to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the Bald and Golden Eagle Protection Act (BGEPA) may apply to their activities. A variety of activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed, or raise young. The Guidelines are intended to help minimize such impacts, particularly where they may constitute "disturbance," which is prohibited by the BGEPA. For more information on the National Bald Eagle Management Guidelines see (http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf).

T&E and Candidate Species

Under the ESA, an "endangered" species is defined as one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is defined as one that is likely to become endangered in the foreseeable future. Candidate species are those species being considered by the Service for listing as a T&E species but are not yet the subject of a proposed rule.

Originally, 104 species were considered for inclusion in the MSHCP. **Table 3.3-27** provides a complete list of these 104 species.

Table 3.3-27: List of Species Analyzed for Potential Inclusion in MSHCP

Group	#	Common Name	Scientific Name	Federal Status
Mammals	1	Gray bat	*Myotis grisescens*	Endangered
	2	Indiana bat	*Myotis sodalist*	Endangered
	3	Louisiana black bear	*Ursus americanus luteolus*	Threatened
	4	Virginia big-eared bat	*Plecotus townsendii*	Endangered
	5	West Virginia northern flying squirrel	*Glaucomys sabrinus fuscus*	Endangered
	6	New England cottontail	*Sylvilagus transitionalis*	Candidate
	7	Delmarva fox squirrel	*Sciurus niger cinereus*	Endangered
	8	West Indian manatee	*Trichechus manatus*	Endangered
Birds	9	Bald eagle	*Haliaeetus leucophalus*	Delisted
	10	Brown pelican	*Pelecabus occidentalis Linnaeus*	Delisted
	11	Interior least tern	*Sterna antillarum*	Endangered
	12	Piping plover	*Charadrius melodus*	Threatened (Endangered in Great Lakes)
	13	Red-cockaded woodpecker	*Picoides borealis*	Endangered
	14	Roseate tern	*Sterna dougallii*	Endangered/Threatened
Reptiles	15	Bog turtle	*Glyptemys muhlenbergii*	Threatened
Reptiles (cont.)	16	Copperbelly watersnake	*Nerodia erythrogaster*	Threatened
	17	Eastern massasauga	*Sistrurus catenatus catenatus*	Candidate
	18	Louisiana pinesnake	*Pituophis ruthveni*	Candidate
	19	Lake Erie water snake	*Nerodia sipedon insularum*	Delisted
	20	Leatherback sea turtle	*Dermochelys coriacea*	Endangered
	21	Loggerhead sea turtle	*Caretta caretta*	Threatened
	22	Atlantic Ridley sea turtle	*Lepidochelys kempii*	Endangered
	23	Green sea turtle	*Chelonia mydas*	Threatened
	24	Hawk's bill sea turtle	*Eretmochelys imbricate*	Endangered
	25	Timber rattlesnake	*Crotalus horridus*	None (state-listed)
Amphibians	26	Cheat mountain salamander	*Plethodon netting*	Threatened
	27	Shenandoah salamander	*Plethodon Shenandoah*	Threatened
Fish	28	Maryland darter	*Etheostoma sellare*	Endangered
	29	Pallid sturgeon	*Scapnirhynchus albus*	Endangered
	30	Roanoke logperch	*Percina rex*	Endangered
	31	Spotfin chub	*Erimonax monachus*	Threatened
	32	Blackside dace	*Phoxinus cumberlandensis*	Threatened
	33	Cumberland darter	*Etheostoma susanae*	Candidate
	34	Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened
	35	Scioto madtom	*Noturus trautmani*	Endangered
	36	Slackwater darter	*Etheostoma boschungi*	Threatened
	37	Diamond darter	*Crystallaria cincotta*	Candidate

Table 3.3-27: List of Species Analyzed for Potential Inclusion in MSHCP

Group	#	Common Name	Scientific Name	Federal Status
	38	Pygmy madtom	*Noturus stanauli*	Endangered (XN)
Crustaceans/ Gastropods	39	Madison cave isopod	*Antrolana lira*	Threatened
	40	Nashville crayfish	*Orconectes shoupi*	Endangered
	41	Flat-spired three-toothed snail	*Triodopsis platysayoides*	Threatened
Mollusks	42	Birdwing pearlymussel	*Lemiox rimosus*	Endangered
	43	Clubshell	*Pleurobema clava*	Endangered
	44	Cracking pearlymussel	*Hemistena lata*	Endangered
	45	Cumberland bean pearlymussel	*Villosa trabalis*	Endangered (XN)
	46	Cumberland monkeyface pearlymussel	*Quadrula Rafinesque*	Endangered
	47	Dromedary pearlymussel	*Dromus dromas*	Endangered (XN)
	48	Dwarf wedgemussel	*Alasmidonta heterodon*	Endangered
	49	Fanshell	*Cyprogenia stegaria*	Endangered
	50	Fat pocketbook	*Potamilus capax*	Endangered
	51	Fluted kidneyshell pearlymussel	*Ptychobranchus subtentum*	Candidate
	52	James spinymussel	*Pleurobema collina*	Endangered
	53	Louisiana pearlshell	*Margaritifera hembeli*	Endangered
	54	Northern riffleshell	*Epioblasma torulosa rangiana*	Endangered
	55	Orangefoot pimpleback pearlymussel	*Plethobasus cooperianus*	Endangered
	56	Oyster mussel	*Epioblasma capsaeformis*	Endangered
	57	Pale liliput pearlymussel	*Toxolasma cylindrellus*	Threatened
Mollusks (cont.)	58	Pink mucket pearlymussel	*Lampsilis orbiculata*	Endangered
	59	Purple cat's paw pearlymussel	*Epioblasma obliquata*	Endangered
	60	Rabbitsfoot	*Quadrula cylindrica cylindrica*	Proposed
	61	Rayed bean	*Villosa fabalis*	Endangered
	62	Ring pink mussel	*Obovaria retusa*	Endangered
	63	Rough pigtoe	*Pleurobema plenum*	Endangered
	64	Sheepnose	*Plethobasus cyphyus*	Proposed
	65	Slabside pearlymussel	*Lexingtonia dolabelloides*	Candidate
	66	Spectaclecase	*Cumberlandia monodonta*	Proposed
	67	Tan riffleshell	*Epioblasma florentina walkeri*	Endangered
	68	White cat's paw pearlymussel	*Epioblasma obliquata perobliqua*	Endangered
	69	White wartyback pearlymussel	*Plethobasus cicatriocosus*	Endangered
Insects	70	American burying beetle	*Nicophorus americanus*	Endangered
	71	Karner blue butterfly	*Lycaeides melissa samuelis*	Endangered
	72	Mitchell's satyr butterfly	*Neonympha mitchellii mitchellii*	Endangered
	73	Puritan tiger beetle	*Cicindela puritan*	Threatened
Plants	74	American chaffseed	*Schwalbea Americana L.*	Endangered
	75	Braun's rock cress	*Arabis perstellata*	Endangered
	76	Eastern prairie fringed orchid	*Platanthera leucophaea*	Threatened

Table 3.3-27: List of Species Analyzed for Potential Inclusion in MSHCP

Group	#	Common Name	Scientific Name	Federal Status
	77	Globe bladderpod (previously Short's bladderpod)	*Lesquerella globosa*	Candidate
	78	Harperella	*Ptilimnium nodosum*	Endangered
	79	Lakeside daisy	*Tetraneuris herbacea*	Endangered
	80	Leafy prairie clover	*Dalea foliosa*	Endangered
	81	Leedy's roseroot	*Rhodiola integrifolia Leedyi*	Threatened
	82	Mead's milkweed	*Asclepias meadii*	Threatened
	83	Michaux's sumac	*Rhus michauxii*	Threatened
	84	Northeastern bulrush	*Scirpus ancistrochaetus*	Endangered
	85	Northern monkshood	*Aconitum noveboracense*	Threatened
	86	Peter's mountain mallow	*Iliamna corei*	Endangered
	87	Pitcher's thistle	*Cirsium pitcher*	Threatened
	88	Pondberry	*Lindera melissifolia*	Threatened
	89	Price's potato bean	*Apios priceana*	Endangered
	90	Running buffalo clover	*Trifolium stoloniferum*	Endangered
	91	Sandplain gerardia	*Agalinis acuta*	Endangered
	92	Sensitive joint-vetch	*Aeschynomene sensitive*	Threatened
	93	Shale barren rockcress	*Arabis serotina*	Endangered
	94	Short's goldenrod	*Solidago shortii*	Endangered
	95	Small whorled pogonia	*Isotria medeoloides*	Threatened
	96	Smooth coneflower	*Echinacea laevigata*	Endangered
	97	Spring Creek bladderpod	*Lesquerella perforate*	Endangered
	98	Swamp pink	*Helonias bullata L.*	Threatened
Plants (cont.)	99	Tennessee purple coneflower	*Echinacea tennesseenis*	Endangered
	100	Tennessee yellow-eyed grass	*Xyris tennesseensis kral*	Endangered
	101	Virginia sneezeweed	*Helenium virginicum*	Threatened
	102	Virginia spiraea	*Spiraea virginiana*	Threatened
	103	White fringeless orchid	*Platanthera integrilabia*	Candidate
	104	White-haired goldenrod	*Solidago albopilosa*	Threatened

NiSource chose to seek take coverage for only 10 of these species and analyzed 32 others. These 42 species, their habitats, general locations and anticipated impacts are summarized in Table 3.3-28, below (Also see Appendix E for more comprehensive descriptions of the 19 species for which impacts or take are anticipated). Although not the Service's preference to exclude species from the MSHCP, it is the applicant's prerogative. Nevertheless, the Service is still obligated to analyze the potential impacts to any other species as a result of NiSource activities. As such, this DEIS and the Service's Biological Opinion do so. Table 3.3-29 provides the Service's summary of

these 61 non-MSHCP species and their status. This includes 16 species that the Service has determined will not be impacted because they do not presently occur within the Covered Land. In addition, it identifies 45 species for which further analysis will be necessary (See Appendix F for additional species-specific information).

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Mammals	Gray bat[4] *Myotis grisescens*	Endangered	**May affect**[6] in Adair, Allen, Carter, Clark, Estill, Fayette, Garrard, Greenup, Lee, Letcher, Lincoln, Madison, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Powell, and Rowan counties, KY; and Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson counties, TN.	Suitable winter hibernacula are typically deep and vertical, with a large volume below the lowest entrance that acts as a cold air trap. A much wider variety of cave types are used during spring and fall transient periods. In summer, maternity colonies prefer caves that act as warm air traps or that provides restricted rooms with dome ceilings that are capable of trapping the combined body heat of thousands of clustered individuals. Gray bats forage primarily over water along river and reservoir edges. Forestlands located around caves, between caves and foraging habitats are important for gray bats. Gray bats utilize surrounding forest outside of cave entrances for shelter for young that have just begun to fly and for bats of any age to fly from the cave to feeding areas in the protection of the forest canopy.	Human disturbance during hibernation and destruction of roosting habitat; reduction in insect prey (specifically mayflies, caddis flies and stoneflies) over streams possibly degraded through excessive pollution and siltation from forest clearing, channelization, siltation, herbicides, pesticides, etc.; deforestation of areas near cave entrances and between caves and rivers/reservoirs where gray bats feed; pesticide poisoning; herbicide spraying	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Mammals	Indiana bat[5] *Myotis sodalist*	Endangered	**May affect**[6] throughout the entire Covered Land footprint in Indiana, Kentucky, Ohio, Pennsylvania, Tennessee, and West Virginia; and in Allegany, Garret, and Washington counties, MD; Hunterdon, Morris, and Warren counties, NJ; Orange and Rockland counties, NY; and Albemarle, Alleghany, Augusta, Botetourt, Clarke, Frederick, Giles, Greene, Lexington, Lexington City, Madison, Page, Rockbridge, Rockingham, Shenandoah, Warren, Waynesboro City, and Waynesboro counties, VA[1]	Indiana bats are restricted to suitable underground roost sites that attain appropriate temperatures and relative humidity to hibernate. The majority of these sites are caves located in karst areas of the east-central United States; however, Indiana bats also hibernate in other cave-like locations. Bats choose roosts with a low risk of freezing. Ideal sites are 50° or below when bats arrive in October and November. Maternity colonies are typically located under the sloughing bark of live, dead, and partially dead trees in upland and lowland forest. A typical primary roost is located under the exfoliating bark of dead ash, elm, hickory, maple, oak, or poplar, although any tree that retains large, thick slabs of peeling bark probably is suitable. Colony trees are usually large-diameter, standing dead trees with direct exposure to sunlight. Observations of Indiana bat indicate that they typically forage in closed to semi-open forested habitats and forest edges. The Indiana bat consistently follows tree-lined paths rather than crossing large open areas. As a result, suitable forest patches may not be available to Indiana bats unless the patches are connected by a wooded corridor. A much wider variety of cave types are used during spring and fall transient	Destruction/degradation of hibernation habitat; disturbances that arouse the bat from hibernation using fat reserves necessary to survive the winter (noise greater than 0.5 miles away); loss/degradation of summer habitat, migration habitat, and swarming habitat; dredging and channelization of riverine habitat; Impacts to migratory habitat and surface areas surrounding hibernacula; environmental contaminants	Yes

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Mammals	Louisiana black bear[4] *Ursus americanus luteolus*	Threatened	**May affect**[6] in East Carroll, Franklin, Iberia, Madison, Richland, and St. Mary parishes, LA; and Humphreys, Issaquena, Sharkey, Warren, and Washington counties, MS. **No effect**[7] in Avoyelles and St. Landry Parish, LA	Species occupy bottomland hardwood forests or forests within southeastern United States floodplains which can consist of a number of woody species occupying positions of dominance and co-dominance. Other habitat types may be utilized, including marsh; upland forested areas; forested spoil areas along bayous, brackish marsh, and freshwater marsh; salt domes; and agricultural fields.	Habitat modification and destruction; habitat fragmentation (primarily roads and highways); human induced mortality (vehicle collisions, disturbance causing den abandonment)	No
	Virginia big-eared bat[4] *Plecotus townsendii*	Endangered	**May affect**[6] in Bath, Carter, Estill, Jackson, Lee, Madison, Menifee, Montgomery, Morgan, Owsley, Powell, and Rowan counties, KY; Augusta, Bland, Giles, Rockingham, and Shenandoah counties, VA; and Fayette, Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker counties, WV.	Habitat typically consists of caves or cliffs in limestone karst areas within mature hardwood forests dominated by oak, hickory, beech, maple, or hemlock trees. Hibernation caves are cool 36.5°F to 49.1°F and well ventilated. They typically roost near cave entrances or in areas of significant air movement.	Very intolerant of disturbance in summer and winter; habitat destruction; pesticides effecting important food sources; human alteration through filling and rock removal; loss of foraging habitat through forest clearing	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Delmarva fox squirrel[4] *Sciurus niger cinereus*	Endangered	**No Effect**[7]	n/a	n/a	No
	West Indian manatee[4] *Trichechus manatus*	Endangered	**No Effect**[7]	n/a	n/a	No
Birds	Interior least tern[4] *Sterna antillarum*	Endangered	**May affect**[6] in East Carroll Parish, LA; and Issaquena, County, MS. **No effect**[7] in Grant and Madison parishes, LA; and Warren and Washington counties, MS.	Interior least terns depend on sand or gravel bars containing sparse vegetation, within an unobstructed river channel, or salt flats along lake shores for nesting. They often also nest on artificial habitats such as sand or gravel pits and dredge islands. Least terns often choose nest locations at higher elevations to prevent flooding that can occur during high flows.	Habitat alteration and destruction (loss of sandbar habitat); hydrologic alteration (e.g. dams and reservoirs, channelization, irrigation); river narrowing resulting in decreased sand bar habitat; human disturbance	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Reptiles	Bog turtle[5] *Glyptemys muhlenbergii*	Threatened	**May affect**[6] in New Castle County, DE; Baltimore, Cecil, and Harford counties, MD; Gloucester, Hunterdon, Morris, Salem, and Warren counties, NJ; Orange and Rockland counties, NY; and Adams, Bucks, Chester, Cumberland, Delaware, Lancaster, Lehigh, Monroe, Montgomery, Northampton, and York counties, PA.	The bog turtle is a semi-aquatic species, and usually occurs in small, discrete populations occupying suitable wetland habitat dispersed along a watershed. Bog turtles prefer wetland habitats that include shallow, spring-fed fens, sphagnum bogs, swamps, marshy meadows, and pastures that have soft, muddy bottoms; clear, cool, slow-flowing water, often forming a network of rivulets; and open canopies.	Continued loss, alteration, and fragmentation of its highly specialized wetland habitat; habitat fragmentation/alteration causing exposure to crushing on roads; alterations to local hydrological systems from development; increasing levels of human use, including habitat fragmentation, nutrient enrichment, and contaminant inputs from septic, road, and fertilizer run-off; establishment of alien/invasive plants from disturbance of surface soils and degraded water quality	Yes
	Copperbelly watersnake[4] *Nerodia erythrogaster*	Threatened	**No Effect**[7]	n/a	n/a	No
	Louisiana pinesnake[4] *Pituophis ruthveni*	Candidate	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Amphibians	Cheat Mountain salamander[4] *Plethodon nettingi*	Threatened	**May affect**[6] in Grant, Pendleton, Pocahontas, Randolph, and Tucker counties, WV.	Habitat is located above an altitude of 3,412 feet, preferably in red spruce or mixed-deciduous forests with moist soil and relatively cool temperatures. This species is found under rocks and logs during the day, or in rock crevices below the ground. At night, especially during rainy weather, the species forages on the forest floor in the damp cool climate.	Removal of canopy cover from below disturbances; logging; habitat loss and alteration; dispersal barriers (clear cuts, pipelines, new roads, anything that removes the litter layer or opens the canopy cover, also affects mating which appears to occur where habitats overlap)	No
	Shenandoah salamander[4] *Plethodon Shenandoah*	Threatened	**No Effect**[7]	n/a	n/a	No
Fish	Maryland darter[4] *Etheostoma sellare*	Endangered	**No Effect**[7]	n/a	n/a	No
	Blackside dace[4] *Phoxinus cumberlandensis*	Threatened	**No Effect**[7]	n/a	n/a	No
	Cumberland darter[4] *Etheostoma susanae*	Candidate	**No Effect**[7]	n/a	n/a	No
	Gulf sturgeon[4] *Acipenser oxyrinchus desotoi*	Threatened	**No Effect**[7]	n/a	n/a	No
	Scioto madtom[4] *Noturus trautmani*	Endangered	**No Effect**[7]	n/a	n/a	No
	Slackwater darter[4] *Etheostoma boschungi*	Threatened	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Crustaceans	Madison cave isopod[5] *Antrolana lira*	Threatened	**May affect**[6] in Augusta, Clarke, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties, and the City of Waynesboro, VA.	Madison Cave isopods are predominantly adapted to unlighted subsurface lakes and deep, water-filled fissures in western Virginia. Habitat consists of deep karst aquifers and underground lakes where water temperatures range from 11 to 14 degrees. The species is typically found in waters supersaturated with calcium carbonates.	Habitat degradation (ground water contamination/pollution); sensitive to disturbance	Yes

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Nashville crayfish[5] *Orconectes shoupi*	Endangered	**May affect**[6] in Davidson and Williamson counties, TN.	The Nashville crayfish has been found in a wide range of environments including gravel and cobble runs, pools with up to 3.94 inches of settled sediment, and under slabrocks and other cover. The species has also been found in small pools where the flow was intermittent. Gravel-cobble substrate provides good cover for juveniles. The substrate of Mill Creek, the primary water body in which the species is found, is mainly bedrock covered in some areas with gravel and scattered limestone slabs. The pools, backwater areas, and stream margins of Mill Creek are covered with silt and sand. Adult Nashville crayfish tend to be solitary, seeking cover under large rocks, logs, debris, or rubble; the largest individuals generally select the largest cover available.	Siltation; stream alterations; general water quality deterioration associated land disturbance; road and bridge construction, stream channel modifications, impoundments, single catastrophic event, e.g. toxic chemical spill or other contamination	Yes

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Mollusks	Birdwing pearlymussel[4] *Lemiox rimosus*	Endangered	**May affect**[6] in Maury County, TN.	Habitat is typically shallow, fast-flowing water with stable, clean substrate. However, the species has been reported at water depths of up to seven feet. Preferred habitat also includes small to medium free-flowing steams of moderate gradient over stable, relatively silt-free rubble, gravel, and sand substrates.	Siltation and pollution	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
Mollusks	Clubshell mussel[5] *Pleurobema clava*	Endangered	**May affect**[6] in Franklin, Madison, and Pickaway counties, OH; Armstrong and Clarion counties, PA; and Braxton, Clay, and Doddridge counties, WV. **No effect**[7] in Dekalb and Marshall counties, IN; Allen, Bath, Bracken, Mason, Pendleton, and Robertson counties, KY; Coshocton, Defiance, Delaware, Fairfield, Greene, Hancock, Trumbull, Tuscarawas, and Union counties, OH; Cattaraugus County, NY; Hardin County, TN; and Kanawha and Lewis counties, WV.	Habitat consists primarily of small to medium-sized rivers with coarse sand and fine gravel substrates in shallow riffles or runs with moderate current, often just downstream of a riffle. Species is commonly found at depths of less than 1 meter, and often buries itself completely beneath the substrate. The clubshell requires clean substrate and flowing water, and cannot tolerate mud or slackwater conditions.	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	Yes

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Cracking pearlymussel[4] *Hemistena lata*	Endangered	**May affect**[6] in Hardin, Maury, and Wayne counties, TN.	Habitat consists of moderately sized streams and occurs primarily in gravel-riffle areas where it is habitually buried deep within the substrate. Habitats may also have sand, gravel, and cobble, with higher water velocities. If this species is found in slower flows, a substrate of sand and mud is preferred.	Sedimentation; land use practices causing a decrease in water quality and population loss; pollution; oil and gas exploration and production; gravel dredging; channel maintenance	No
	Cumberland bean pearlymussel[4] *Villosa trabalis*	Endangered (XN)	**No Effect**[7]	n/a	n/a	No
Mollusks	Cumberland monkeyface pearlymussel[4] *Quadrula intermedia*	Endangered	**May affect**[6] in Maury County, TN	Habitat consists of shallow (i.e., generally two feet or less in depth) shoal and riffle areas in free-flowing streams of high to moderate gradient. Substrate preferences include firm rubble, gravel, and sand and the species most often remains buried with only siphons visible. The species has never been found in small streams.	Habitat degradation (sedimentation, pollution) and habitat loss (dam construction, channelization)	No
	Dromedary pearlymussel[4] *Dromus dromas*	Endangered (XN)	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Fanshell mussel[5] *Cyprogenia stegaria*	Endangered	**May affect**[6] in Bracken, Nicholas, Pendleton, and Robertson counties, KY; Coshocton, Meigs, Morgan, Muskingum, and Washington counties, OH; Hardin County, TN; and Jackson and Kanawha counties, WV. **No effect**[7] in Allen, Barren, Boyd, Carter, Greenup, Lawrence, Lewis, Mason, Monroe, and Powell counties, KY; and Wood County, WV	Habitat consists of the shoals and riffles of medium to large rivers. It has been reported primarily from relatively deep water in sandy or gravelly substrate with moderate to strong current.	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	Yes
	James spinymussel[5] *Pleurobema collina*	Endangered	**May affect**[6] in Albemarle, Alleghany, Botetourt, Goochland, Greene, Orange, Powhatan, and Rockbridge counties, VA. **No effect**[7] in Giles County, VA; and Monroe County, WV	Habitat consists primarily of streams of slow to moderate currents and a substrate of sand and cobble with or without boulders, pebbles, or silt. Stream width for this species varies from 10 to 75 feet with a water depth of 0.5 to 3 feet. It is limited to areas of unpolluted water.	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	Yes
Mollusks	Louisiana pearlshell[4] *Margaritifera hembeli*	Endangered	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Northern riffleshell mussel[5] *Epioblasma torulosa rangiana*	Endangered	**May affect**[6] in Pickaway, County, OH; Armstrong and Clarion counties, PA; and Kanawha County, WV. **No effect**[7] in De Kalb County, IN; Bath, Pendleton, and Rowan counties, KY; Franklin, Madison, and Union counties, OH; and Braxton and Clay counties, WV.	Habitat occurs in a wide variety of streams, large and small, preferring runs with a bottom composed of firmly packed sand and fine to coarse gravel. These fresh water mussels also require swiftly moving, well-oxygenated water.	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	Yes
	Oyster mussel[4] *Epioblasma capsaeformis*	Endangered	**May affect**[6] in Maury County, TN. **No effect**[7] in Monroe County, KY	Habitat occurs in streams ranging from medium-sized creeks to large rivers. Prefers a gravel/boulder and coarse sand substrate, and moderate to swift currents. The species appears to prefer shallow shoals and riffles in association with beds of water willow. The oyster mussel also has been observed in areas of swift currents in gravel pockets between bedrock ledges.	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	No
	Pale liliput pearlymussel[4] *Toxolasma cylindrellus*	Threatened	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Purple cat's paw pearlymussel[4] *Epioblasma obliquata*	Endangered	**No Effect**[7]	n/a	n/a	No
Mollusks	Sheepnose mussel[5] *Plethobasus cyphyus*	Proposed	**May affect**[6] in Bath, Boyd, Bracken, Clark, Fayette, Greenup, Lewis, Madison, Mason, Nicholas, Pendleton, and Rowan counties, KY; Sunflower County, MS; Adams, Brown, Clermont, Gallia, Lawrence, Meigs, Scioto, and Washington counties, OH; and Cabell, Jackson, Mason, Wayne, and Wood counties, WV. **No effect**[7] in Garrard County, KY; Humphreys County, MS; and Athens, Coshocton, and Morgan counties, OH.	Primarily shallow shoal habitats with moderate to swift currents over coarse sand and gravel. May also have mud, cobble, and boulders. Specimens in larger rivers may occur in deep runs. In field trials it was demonstrated that mussels in streams occur chiefly in flow refuges, or relatively stable areas that displayed little movement of particles during flood events	Dams; impoundments; channelization; dredging; pollution (fertilizers causing plant growth and reduced dissolved oxygen); sedimentation; fish kills that eliminate host fish; introduction of non-native species	Yes
	Tan riffleshell[4] *Epioblasma florentina walkeri*	Endangered	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	White cat's paw pearlymussel[4] *Epioblasma obliquata perobliqua*	Endangered	**No Effect**[7]	n/a	n/a	No
	White wartyback pearlymussel[4] *Plethobasus cicatriocosus*	Endangered	**No Effect**[7]	n/a	n/a	No
Insects	American burying beetle[5] *Nicophorus americanus*	Endangered	**May affect**[6] in Athens, Morgan, and Perry counties, OH. **No effect**[7] in Lafayette County, MS; and Gloucester County, NJ; and Hocking and Vinton counties, OH.	Little is known about the natural habitat of the American burying beetle. Natural habitat may be mature forests, although the species exhibits tolerance to an array of vegetation. American burying beetles are recorded from grassland, old field shrub land, and hardwood forests. Soil properties however, are important. The beetle must be able to bury a carcass within which eggs are laid to sustain development of the larvae. It must also be able to dig big escape tunnels nearby. To do so, the soil must not be extremely dry, saturated, or of loose sandy consistency	Habitat loss, alteration and degradation due to development (increase in edge habitat, fragmentation), barriers (natural gas pipelines), pesticides	Yes
	Karner blue butterfly[4] *Lycaeides melissa samuelis*	Endangered	**No Effect**[7]	n/a	n/a	No

Table 3.3-28: Species Analyzed in the MSHCP

Group	Common/Scientific Name	Federal Status	Determination within Project Area	Habitat Type[2]	Potential Threats[3]	Take Requested?
	Mitchell's satyr butterfly[4] *Neonympha mitchellii mitchellii*	Endangered	**No Effect**[7]	n/a	n/a	No
	Puritan tiger beetle[4] *Cicindela puritana*	Threatened	**No Effect**[7]	n/a	n/a	No
Plants	Braun's rock cress[4] *Arabis perstellata*	Endangered	**No Effect**[7]	n/a	n/a	No
	Mead's milkweed[4] *Asclepias meadii*	Threatened	**No Effect**[7]	n/a	n/a	No
	Pitcher's thistle[4] *Cirsium pitcheri*	Threatened	**No Effect**[7]	n/a	n/a	No
	Sandplain gerardia[4] *Agalinis acuta*	Endangered	**No Effect**[7]	n/a	n/a	No

[1]See Appendix E for county-specific listing
[2]See Appendix E for species references related to habitat type
[3]See Appendix E for species references related to potential threats
[4]No Take requested for this species
[5]Take requested for this species
[6]May Affect – the conclusion reached by the Service when a Proposed Action may pose any effects on listed species or critical habitat
[7]No Effect – the conclusion reached by a Federal action agency when a Proposed Action will not affect a listed species or critical habitat

Table 3.3-29: Non-MSHCP Species Outside of Covered Land Area or Delisted

Group	#	Common Name	Scientific Name	Federal Status
Mammals	1	New England cottontail	*Sylvilagus transitionalis*	Candidate
	2	Bald eagle	*Haliaeetus leucophalus*	Delisted
Birds	3	Brown pelican	*Pelecabus occidentalis Linnaeus*	Delisted
	4	Roseate tern	*Sterna dougallii*	Endangered/Threatened
	5	Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Reptiles	6	Loggerhead sea turtle	*Caretta caretta*	Threatened
	7	Atlantic Ridley sea turtle	*Lepidochelys kempii*	Endangered
	8	Green sea turtle	*Chelonia mydas*	Threatened
	9	Hawk's bill sea turtle	*Eretmochelys imbricata*	Endangered
	10	Timber rattlesnake	*Crotalus horridus*	None (state-listed)
	11	Copperbelly watersnake	*Nerobia erthrogaster*	Threatened
	12	Louisiana pinesnake	*Pituophis ruthveni*	Candidate
	13	Flat-spired three-toothed snail	*Triodopsis platysayoides*	Threatened
Crustaceans	14	Tennessee yellow-eyed grass	*Xyris tennesseensis kral*	Endangered
Plants	15	White fringeless orchid	*Platanthera integrilabia*	Candidate
	16	Sandplain gerardia	*Agalinis acuta*	Endangered

NEPA requires that all T&E species with the potential to be impacted within the Covered Land area be examined regardless of status in the MSHCP. As such, the remaining Non-MSHCP Species are discussed briefly in Table 3.3-30 below, including an overview of general locations, habitat types, and potential threats. See Appendix F for further species-specific information.

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Mammals	West Virginia Northern flying squirrel *Glaucomys sabrinus fuscus*	Endangered	**Known populations** in Grant, Pocahontas, Pendleton, Randolph, Tucker, and Webster counties, WV	Small, nocturnal, gliding mammal endemic to the Allegheny Highlands of WV and VA. Species is confined to montane boreal forests of the central Appalachians. Primarily uses spruce, mixed spruce-northern hardwood, and open habitats. Species nests mainly in tree cavities.	Habitat modification through clearing of suitable habitat during nesting season, habitat loss and degradation	No
Mussels	Dwarf wedgemussel *Alasmidonta heterodon*	Endangered	**Known populations** in Delaware, Orange, Sullivan, and Warren counties, NY; Pike County, PA; and Culpepper, Dinwiddie, Fauquier, Greensville, Hanover, Louisa, Prince William, and Sussex counties, VA. Potential for rediscovery of the species within portions of its **historic range** in Morris County, NJ; and Chesterfield County, VA.	Freshwater mussel that is most commonly found in shallow to deep water with a quick current and a stream bed of cobble, fine gravel, or firm silt/sand. Submerged aquatic vegetation and overhanging tree limbs near stream banks are also potential habitats.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Fat pocketbook *Potamilus capax*	Endangered	**Known populations** in East Carroll Parish, LA; and Issaquena, Sharkey, and Washington counties, MS.	Freshwater mussel that has a preference for a substrate with a stable mix of sand, mud and fine gravel. Flowing water is required for the species to thrive. Recent studies have also found the species inhabiting agricultural ditches, sloughs, bayous and streams of the St. Francis watershed.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No
	Fluted Kidney shell pearlymussel *Ptychobranchus subtentum*	Candidate	**Known populations** in Jackson County, KY.	Fresh water mussel that generally inhabits small to medium rivers in swift current or riffle areas, with some populations recently documented in the shoal areas of larger rivers. Individuals are usually embedded in sand, gravel, or cobble substrates.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Mussels	Orangefoot pimpleback pearlymussel *Plethobasus cooperianus*	Endangered	**Known populations** in Bracken, Lewis, and Pendleton counties, KY; and Hardin and Maury counties, TN.	Fresh water mussel that is primarily found in medium to large rivers with sand, gravel and cobble substrates. Generally the species inhabits deep water riffles and shoals with steady currents, though it is also found in some shallower shoals and riffles.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No
	Pink mucket pearlymussel *Lampsilis abrupta*	Endangered	**Known populations** in Bath, Pendleton, and Rowan counties, KY; Gallia, Lawrence, Meigs, Morgan, and Washington counties, OH; Hardin and Trousdale counties, TN; and Clay, Jackson, Kanawha and Mason counties, WV.	Fresh water mussel that is found in medium to large rivers with substrates ranging from silt to boulders, rubble, gravel, and sand. The species is primarily found in large rivers with moderate to fast flowing water at depths from 1.5 to 26 feet.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Rabbitsfoot *Quadrula cylindrica*	Candidate	**Known populations** in DeKalb County, IN; Adair, Allen, Barren, Campbell, Floyd, Greenup, Jackson, Lewis, Monroe, Owsley, and Pendleton counties, KY; Sunflower County, MS; Adams, Ashland, Coshocton, Defiance, Delaware, Fairfield, Franklin, Knox, Madison, Muskingum, Pickaway, Putnam, and Union counties, OH; Allegheny, Armstrong, Beaver, Fayette, Greene, Lawrence, Washington, and Westmoreland counties, PA; and Hardin and Maury Counties, TN.	Fresh water mussel that generally inhabits small to medium rivers with moderate to swift currents. In smaller streams it generally inhabits bars or gravel and cobble close to fast currents, while in medium to large rivers it usually resides in sand and gravel.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Mussels	Rayed bean *Villosa fabalis*	Proposed Endangered	**Known populations** in Dekalb and Marshall counties, IN; Brown, Champaign, Clermont, Coshocton, Defiance, Delaware, Franklin, Hancock, Hardin, Lucas, Madison, Marion, Morrow, Pickaway, Scioto, Union, Warren, and Wyandot counties, OH; and Armstrong, Clarian and Mercer counties, PA.	Fresh water mussel that is generally found in smaller, headwater creeks, though it has also been reported in larger rivers. Inhabited areas generally include shoal or riffle areas, and in shallow, wave-washed portions of glacial lakes, including extant populations in Lake Erie. It is usually found in substrates of gravel and sand, though it is also often found buried among the roots of vegetation such as water willow and water milfoil.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No
	Ring pink mussel *Obovaria retusa*	Endangered XN	**Known populations** in Bracken, Greenup, Lewis, and Pendleton counties, KY.	Fresh water mussel that is primarily a large river species that generally inhabits gravelly and sandy substrates in relatively shallow water, usually up to two feet deep.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Rough pigtoe *Pleurobema plenum*	Endangered	**Known populations** in Bracken, Lewis, and Pendleton counties, KY; and Hardin and Trousdale counties, TN.	Fresh water mussel that is primarily found in medium to large rivers in shoals with moderate current. They inhabit sand, gravel, and cobble substrates and typically require flowing, well-oxygenated water to thrive, though it is also occasionally found on flats and muddy sand.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No
Mussels	Slabside pearlymussel *Lexingtonia dolabelloides*	Candidate	**Known populations** in Maury County, TN.	Fresh water mussel that is generally found in large creeks to moderately sized rivers, inhabiting sand, fine gravel, and cobble substrates in relatively shallow riffles and shoals with moderate current. This species requires flowing, well-oxygenated water to thrive, and is usually found at depths of less than three feet.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Snuffbox *Epioblasma triquetra*	Endangered	Potential for rediscovery of the species within portions of its **historic range** in Bath, Carter, Greenup, Menifee, Montgomery, Nicholas, Powell, Robertson, and Rowan County, KY; Coshocton, Franklin, Greene, Madison, Marion, Monroe, Muskingum, Pickaway, and Washington County, OH; Clarion County, PA; Maury County, TN; Brooke, Calhoun, Doddridge, Gilmer, Kanawha, Marshall, Mason, Putnam, and Wetzel County, WV	Small fresh water mussel found in Alabama, Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin. It lives in small to medium-sized creeks in areas with a swift current, although it is also found in Lake Erie and some larger rivers.	Primary threats include modification and destruction of river and stream habitats, primarily by the construction of impoundments	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Spectaclecase *Cumberlandia monodonta*	Proposed Endangered	**Known populations** in Hardin County, TN.	Fresh water mussel that is primarily found in larger streams and appears to be more of a habitat specialist than most mussel species. The species inhabits substrates from mud and sand to gravel, cobble, and boulders, generally in shallow riffles and shoals with variable current. Most commonly is found in firm mud between large rocks in quiet water directly adjacent to swifter currents.	Short-term impoundments, increased siltation, pollution run-off into the water body, exotic invasive species introduction, and further population fragmentation and genetic bottlenecking through take.	No
Plants	American chaffseed *Schwalbea americana*	Endangered	Potential for rediscovery of the species within portions of its **historic range** in Greensville and Sussex counties, VA.	Perennial herb in the Figwort family located in pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Eastern prairie fringed orchid *Plateurothera leucophaea*	Threatened	**Known populations** in Elkhart, Lake, LaPorte, Noble and St. Joseph counties, IN; Clark, Holmes, Lucas, Ottawa, Sandusky, and Wayne counties, OH; and Augusta County, VA.	Perennial herb in the Orchid family that requires full sun for optimum growth, and is primarily found in tall grass calcareous silt loams or sub-irrigated sand prairies, though it can also be found in open portions of fens, sedge meadows, marshes, and bogs.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No
	Globe (Shortt's) bladderpod *Lesquerella globosa*	Candidate	**Known populations** in Bourbon, Fayette, and Madison counties, KY; and Davidson and Trousdale counties, TN. Potential for rediscovery of the species within portions of its **historic range** in Clark, Garrard, and Powell counties, KY; and Maury County, TN.	Perennial herb in the Mustard family that is primarily found on steep, rocky wooded slopes and talus areas, along with cliff tops, bases, and ledges. It is often found in close proximity to rivers or streams, and generally on south to west facing slopes, often in association with outcrops of calcareous rock.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Harperella *Ptilimnium nodosum*	Endangered	**Known populations** in Allegany and Washington counties, MD.	Annual herb in the Carrot family. The riverine form of the species grows on rocky and sandy shoals, or occasionally on muddy banks, of seasonally flooded and quickly moving streams; generally in microsites that are sheltered from rapidly moving water the pond form is found on the edges of shallow pineland ponds, low savanna meadows, and along a granite outcrop in one site.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No
Plants	Lakeside daisy *Hymenoxys herbacea*	Threatened	**Known populations** in Erie and Ottawa counties, OH.	Perennial herb in the Sunflower family that grows on outcrops of dolomite or limestone bedrock, dry gravelly prairies on terraces or hills associated with major river systems, rocky shores, sand fields, and alvars. U.S. populations persist on dry, thin-soiled, degraded prairies with limestone or dolomite bedrock at or near the surface.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Leafy-prairie clover *Dalea foliosa*	Endangered	**Known populations** in Davidson, Maury, Williamson, and Wilson counties, TN. Potential for rediscovery of the species within portions of its **historic range** in Sumner County, TN.	Perennial herb in the Pea family that grows in thin-soiled mesic and wet-mesic dolomite prairies, limestone cedar glades, and limestone barrens.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No
	Leedy's roseroot *Rhodiola integrifolium leedyi*	Threatened	**Known populations** in Schuyler and Yates counties, NY.	Perennial herb in the Stonecrop family that is found on north or east-facing talus slopes or cliff ledges. It is always found associated with areas where ground water or cool air constantly seep through the strata or between rocks, which effectively maintains a cool, wet microclimate throughout the summer.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, and the use of herbicides/pesticides.	No
	Michaux's sumac *Rhus michauxii*	Endangered	**Known populations** in Dinwiddie County, VA.	Perennial herb in the Sumac family found primarily in sandy or rocky open woods, underlain by sand or sandy loam acidic soils with low cation exchange capacities.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, the use of herbicides/pesticides, and further genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Northeastern bulrush *Scirpus ancistrochaetus*	Endangered	**Known populations** in Washington County, MD; Adams, Bedford, Cambria, Centre, Clinton, Cumberland, Franklin, Fulton, Lehigh, Monroe, and Northampton counties, PA; Alleghany, Augusta, and Rockingham counties, VA; and Hardy County, WV.	Perennial herb in the Sedge family found in open, tall herb-dominated wetlands throughout its range. It is primarily found at the water's edge or within very shallow water, though it may also be located in areas with up to three feet of water, or in upland areas. Habitats include natural ponds, shallow sinkholes, and wet depressions, though it has not been found in artificial habitats such as ditches, borrow pits, or dredged ponds.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Northern monkshood *Aconitum noveboracense*	Threatened	**Known populations** in Delaware and Sullivan counties, NY; and Hocking County, OH.	Perennial herb in the Buttercup family. Midwestern populations are found on shaded or partially shaded cliffs and talus slopes. New York populations are found at high-elevation headwaters and in crevices along streams. All inhabited areas have a generally cold soil environment, with either active and continuous cold air drainage, or cold ground water flow seeping out of nearby bedrock, creating a cool, damp microclimate.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, and the use of herbicides/pesticides.	No
Plants	Peter's Mtn. mallow *Iliamna corei*	Endangered	**Known populations** in Giles County, VA.	Perennial herb in the Mallow family only found in one location; shallow soil-filled pockets and crevices of the Clinch sandstone outcrops on the northwest-facing slope of Peters Mountain. They are found in proximity to the ridge line of a mixed deciduous-evergreen forest.	Introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Pondberry *Lindera melissifolia*	Endangered	**Known populations** in Sharkey and Sunflower counties, MS.	Perennial herb in the Laurel family capable of occupying a variety of habitats as long as its hydrological requirements are met. Across its range, the species has been found on seasonally flooded wetlands, on the bottoms and edges of shallow seasonal ponds of old dune fields, along the edges of ponds and depressions in pine forests, around the edges of sinkholes in coastal areas with karst topography, and along the edges of sphagnum bogs.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Price's potato bean *Apios priceana*	Endangered	**Known populations** in Maury, Wayne, and Williamson counties, TN. Potential for rediscovery of the species within portions of its **historic range** in Davidson County, TN.	Perennial herb in the Pea family that thrives in open, wooded areas, and is usually found in forest gaps or along forest edges. The species shows a preference for mesic areas, often being located in open, low areas near streams, or along stream and river banks. It is also sometimes found at the base of small limestone bluffs. Most extant populations are found in cleared areas, such as powerline or road right-of-ways.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, the use of herbicides/pesticides, and further fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Running buffalo clover *Trifolium stoloniferum*	Endangered	**Known populations** in Bourbon, Campbell, Clark, Fayette, Madison, and Montgomery counties, KY; Brown, Clermont, and Lawrence counties, OH; and Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties; WV. Potential for rediscovery of the species within portions of its **historic range** in Jackson County, KY; and Monongalia County, WV.	Perennial herb in the Pea family that is primarily found in areas underlain by limestone or other calcareous bedrocks. Habitat associations include mesic woodlands, savannahs, floodplains, stream banks, sandbars, grazed woodlots, mowed paths, old logging roads, off-road trails, mowed wildlife openings within mature forest, and steep ravines.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Sensitive joint-vetch *Aeschynomene virginica*	Threatened	**Known populations** in Chesterfield, Henrico, and James City counties, VA. Potential for rediscovery of the species within portions of its **historic range** in Gloucester and Salem counties, NJ; Delaware County, PA; and Prince George and Surry Counties, VA.	Annual herb in the Pea family primarily found in sparsely vegetated areas within 6-7 feet of the low water mark on raised banks; generally on peaty, sandy, or gravelly substrates.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No
Plants	Shale barren rockcress *Arabis serotina*	Endangered	**Known populations** in Alleghany, Augusta, Page, and Rockbridge counties, VA; and Greenbrier, Hardy, and Pendleton counties, WV.	Biennial herb in the Mustard family found in sparsely-vegetated xeric shale deposits on south or west facing slopes. Populations are found on both shale openings and shale woodlands adjacent to the openings.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Short's goldenrod *Solidago shortii*	Endangered	**Known populations** in Nicholas and Robertson counties, KY	Perennial herb in the Aster family primarily found in cedar glades and glade-like habitats (e.g. right-of-ways, roadside ledges, meadows/pastures) where droughty soils prevent habitat succession to trees/shrubs. The species is also found on roadsides, and on dry, rocky, overgrazed pastures.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, the use of herbicides/pesticides, and further fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Small-whorled pogonia *Isotria medeoloides*	Threatened	**Known populations** in New Castle County, DE; Hocking and Scioto counties, OH; Centre and Chester counties, PA; and Fairfax, James City, Madison, and Prince William counties, VA. Potential for rediscovery of the species within portions of its **historic range** in Montgomery County, MD; Hunterdon County, NJ; Rockland County, NY; Greene, Monroe, and Montgomery counties, PA; and Greenbrier County, WV.	Perennial herb in the Orchid family found primarily in mixed-deciduous or mixed-deciduous/coniferous forests, often in second- or third-growth stages, occurring in both fairly young woodlands and in maturing stands. Common characteristics for the majority of inhabited locations include sparse to moderate ground cover, a relatively open understory canopy, and proximity to logging roads, streams, or other long persisting breaks in the forest canopy.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Smooth coneflower *Echinacea laevigata*	Endangered	**Known populations** in Allegheny and Botetourt counties, VA. Potential for rediscovery of the species within portions of its **historic range** in Lancaster County, PA.	Perennial herb in the Aster family found in open woods, cedar barrens, along roadsides, within clear cuts, along dry limestone bluffs, and within power line right-of-ways. Soils are generally rich in magnesium or calcium, usually associated with amphibolite, dolomite, limestone, gabbro, diabase, or marble. Optimal habitat for the species is characterized by abundant sunlight and little competition with other species in the herbaceous layer.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, the use of herbicides/pesticides, and further fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Spring creek bladderpod *Lesquerella perforata*	Endangered	**Known populations** in Wilson County, TN.	Annual herb in the Mustard family found within the floodplain fields of three streams. It is primarily located on newly disturbed sites and appears to require some degree of annual disturbance to complete its life cycle. Historically this disturbance came from periodic flooding and its associated scouring, though cultivation appears capable of approximating this disturbance currently.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Swamp pink *Helonias bullata*	Threatened	**Known populations** in New Castle County, DE; Cecil County, MD; Gloucester, Morris, and Salem counties, NJ; and Augusta and Henrico counties, VA.	Perennial herb in the Lily family found in forested wetlands that are groundwater influenced and perennially water-saturated. These wetlands occur at sites where the water table is at or very near the surface and maintains a relatively stable height throughout the spring and summer. Some primary habitats include Atlantic white cedar swamps, headwater seepage wetlands, red maple swamps, and occasionally black spruce-tamarack bogs.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, the use of herbicides/pesticides, and further fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Plants	Virginia sneezeweed *Helenium virginicum*	Threatened	**Known populations** in Augusta and Rockingham counties, VA.	Small perennial forb in the Aster family generally found in locations with a substrate consisting of poorly drained, acidic, silty soils underlain by gray clays and dolomitic bedrock. Basin habitat is generally flooded from January to July. The species appears to be dependent on fluctuating water levels giving it a competitive advantage over other species such as shrubs and trees	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Virginia spirea *Spiraea virginiana*	Threatened	**Known populations** in Lewis County, KY; Sioto County, OH; and Greenbrier, Mercer, Raleigh, Summers, and Upshur counties, WV. Potential for rediscovery of the species within portions of its **historic range** in Fayette County, PA.	Perennial shrub in the Rose family that inhabits the banks of high gradient sections of second and third order streams, along with meander scrolls and point bars, natural levees, and other braided features of lower stream reaches, often near the mouth of the stream. The species is found in early successional areas with a regime of frequent disturbance. A lack of competition appears to be key to the species.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, the use of herbicides/pesticides, and further fragmentation and genetic bottlenecking through take.	No
Plants	White-haired goldenrod *Solidago albopilosa*	Threatened	**Known populations** in Menifee and Powell counties, KY.	Perennial herb in the Aster family found in rock-shelters on the upper slopes of the Red River Gorge. It is usually found in partial shade behind the drip line of rock-shelters, but is not found in the furthest depths of the larger rock shelters, nor in full sun, showing an apparent preference for partial shade. It is also occasionally found on rock ledges or in the sandy soil along trails.	Habitat loss or degradation, partial defoliation, local population or individual extirpation, introduction and/or spread of exotic species, and the use of herbicides/pesticides.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Birds	Piping plover *Charadrius melodus*	Endangered	**Known populations** in Cameron, Lafourche, Plaquemines, St. Mary, Terrebonne, and Vermilion parishes, LA.	Migratory shorebird that utilizes sandy upper beaches, especially in association with scattered grassy tufts, and sparsely vegetated shores and islands for breeding. Wintering populations are found most commonly on ocean beaches or on sand or algal flats in protected bays, with the highest abundance found on expansive sandflats, sandy mudflats, and sandy beaches, generally in habitats with high heterogeneity.	Temporary or permanent loss or degradation of habitat, potential attraction of predators, increased disturbance stress on individuals, and the potential for contaminant impacts from accidental spills or the use of herbicides for O&M activities.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Birds	Red-cockaded woodpecker *Picoidees borealis*	Endangered	**Known populations** in Calcasieu, Evangeline, Grant, La Salle, and Rapides parishes, LA; and Lafayette County, MS. Potential for rediscovery of the species within portions of its **historic range** in Powell County, KY; Catahoula Parish, LA; Northampton County, NC; Hardin and McNairy counties, TN; and Southampton and Sussex counties, VA.	Small, non-migratory woodpecker found in open pine woodlands and savannahs, with large old-growth pines for nesting and roosting habitat. Cavity trees must be in open stands with a limited quantity of hardwood mid- or over-story. Foraging habitats consist of mature pines with an open canopy, low densities of small pines and hardwoods, and abundant native bunchgrass and forbs as groundcover.	Temporary or permanent loss or degradation of habitat, and further species fragmentation and genetic bottlenecking.	No
Fish	Diamond Darter *Crystallaria cincotta*	Proposed Endangered	**Known populations** in Kanawha and Clay counties, WV.	Benthic invertivore that inhabits moderate to large warm-water streams with clean sand and gravel substrates and moderate current.	Short-term impoundments, increased siltation, pollution run-off into the water body, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Kentucky arrow darter *Etheostoma sagitta ssp. spilotum*	Candidate		Not Applicable	Not Applicable	Not Applicable
	Pallid sturgeon *Scaphirhynchus albus*	Endangered	**Known populations** in East Carroll, Madison, Rapides, and St. Mary parishes, LA; and Issaquena, Sharkey, Warren, and Washington counties, MS.	Large freshwater benthic-dwelling fish in the Sturgeon family found in large, turbid, free-flowing rivers with swift currents. They are generally over sand or gravel substrate in water around 15 feet deep, usually in areas with an irregular bottom contour, which are common at the downstream end of sunken sand bars and in open channels with dunes.	Short-term impoundments, pollution run-off and small spills into the water body, and potential entrainment of juveniles or fry during water intake for hydrostatic test water.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Fish	Roanoke logperch *Percina rex*	Endangered	**Known populations** in Brunswick, Dinwiddie, Greensville, Mecklenburg, Southampton, and Sussex counties, VA.	Small freshwater fish in the Perch family that occupies clean, clear, moderate to large sized warm-water streams and rivers with moderate gradients and relatively unsilted substrata. They most commonly inhabit riffle-run-pool areas and substrates made of mostly gravel and rubble. Males are generally found in shallow riffles, females in deep runs with gravel and small cobble bottoms, and young in slow runs and pools with clean sand bottoms. All classes are assumed to winter under boulders in deep pools.	Short-term impoundments, increased siltation, pollution run-off and small spills into the water body, potential entrainment of individuals during water intake for hydrostatic test water, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
	Spotfin chub *Erimonax monachus*	Threatened XN	**Known populations** in Lewis County, TN.	Small freshwater fish in the Minnow family primarily found in moderate to large streams and rivers, generally of widths ranging from 55 to 230 feet with water depths from 1 to 3.2 feet. They generally inhabit riffles and pools with moderate to swift current and clear water at cool to warm temperatures. Preferred substrates range from gravel to bedrock, though the species is rarely found in conjunction with sand and silt substrates.	Short-term impoundments, increased siltation, pollution run-off and small spills into the water body, and potential entrainment of juveniles or fry during water intake for hydrostatic test water, and further population fragmentation through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Fish	Pygmy madtom *Noturus stanauli*	Endangered XN	**Known populations** in Maury County, TN.	Small freshwater fish in the Catfish family that inhabits moderate to large rivers with clear water, and is generally located on shallow pea-size gravel or fine sand shoals, with a current ranging from moderate to strong. The species is also found in the flowing portions of pools during the reproductive season, and eggs are generally laid under slab rocks, in empty mussel shells, or in other similar situations	Short-term impoundments, increased siltation, pollution run-off and small spills into the water body, potential entrainment of individuals during water intake for hydrostatic test water, and further population fragmentation and genetic bottlenecking through take.	No

Table 3.3-30: Non-MSHCP Species Analyzed in the EIS

Category	Name	Status	Locations within Project Area	Habitat Type[1]	Potential Threats[2]	Take Requested?
Reptiles	Eastern massasauga *Sistrurus catenatus catenatus*	Candidate	**Known populations** in Elkhart, LaPorte, Marshall, Noble, Porter, and St. Joseph counties, IN; Ashtabula, Champaign, Clark, Clinton, Columbiana, Crawford, Defiance, Erie, Fairfield, Fayette, Greene, Hardin, Huron, Licking, Logan, Lorain, Lucas, Marion, Medina, Montgomery, Ottawa, Paulding, Sandusky, Seneca, Stark, Trumbull, Warren, Wayne, and Wyandot counties OH; and Butler and Mercer counties, PA.	Medium-sized rattlesnake found in both wetland and upland habitats, which typically shifts between the two seasonally, with the shift varying across the species range, along with between sexes and life stages. Occupied sites generally contain a mix of open sunlit areas and shaded areas for thermoregulation; have a water table near the surface for hibernation, and variable elevations between the adjoining wetland and upland areas.	Temporary or permanent loss or degradation of habitat, individual disturbance or mortality, chemical contaminants, facilitated predation and collection, water level manipulation and sedimentation, and further species fragmentation and genetic bottlenecking.	No
[1]See Appendix F for more information about species' habitat types [2]See Appendix F for more information about potential threats to species from all sources						

State Listed Species

For the purpose of compliance with state wildlife laws and regulations, state-listed species (as a group) are not covered by the NiSource MSHCP. State-listed species will be considered separately by NiSource via individual state-by-state processes that address those species and any associated state laws and regulations. Those processes will lag behind the federal HCP process so NiSource can use the HCP process as a model. All 10 take species, as well as a majority of the MSHCP and non-MSHCP species, are either state listed threatened or endangered.

Information on state listed species that potentially occur within the Covered Land is available on state web sites, as described in Section 3.3.3, State Wildlife Action Plans, and in reports developed by The Conservation Fund (TCF) from research conducted for the mitigation planning component of the NiSource MSHCP, which can be found at http://www.fws.gov/midwest/Endangered/permits/hcp/r3hcps.html.

TCF's research was directed at creating detailed species summaries using each state's Wildlife Action Plan for the purpose of understanding how mitigation for NiSource Take Species could also benefit state-listed species that share habits and habitats as those species. For each species, the following information was collected and summarized: protection status, location and habitat needs, conservation issues, and actions needed to conserve and protect the species or manage its long-term

3.4 Social and Economic Resources

To characterize the human environment potentially affected by the Proposed Action and alternatives, the Social Resources section examines a range of socio-economic resource areas, including land ownership and use, socio-economics, demographics, income, employment, environmental justice, housing, public services, transportation and utilities, cultural resources, recreation, visual resources, and noise. Data are presented

on a state-by-state basis, and, when available, additional site-specific data are also presented at the Covered Land area level.

3.4.1 Land Ownership and Use

In the following section, several land use measures are discussed. The discussion begins with the percentage of each state included within the Covered Land area, and types of ownership, including federal, state, and local conservation lands. This is followed by regional and state-by-state descriptions of land use types based on best available data sources.

State-by-State Overview

Approximately 75-percent of the entire Covered Land area falls within three states: Ohio (33-percent), West Virginia (25-percent), and Pennsylvania (17-percent). On the contrary, lands in Delaware, Indiana, New Jersey, and North Carolina combined make up less than 2-percent of the Covered Land area (See **Table 3.4-1**).

Table 3.4-1: Covered Land Area by State

State	Acres in Covered Land	Percent of Covered Land By State
Delaware	2,049	0.02
Indiana	88,599	0.91
Kentucky	499,418	5.11
Louisiana	485,622	4.97
Maryland	371,784	3.80
Mississippi	140,909	1.44
New Jersey	43,335	0.44
New York	185,422	1.90
North Carolina	936	0.01
Ohio	**3,219,472**	**32.93**
Pennsylvania	**1,694,423**	**17.33**
Tennessee	122,393	1.25
Virginia	446,248	4.56
West Virginia	**2,475,988**	**25.33**
Total	9,776,598	

As shown in **Table 3.4-2**, data from aggregate land ownership for the 14 states show that the majority (91-percent) of land is under private ownership and approximately 8-percent is under either state or federal ownership. Within the Covered Land area (See **Table 3.4-3**), approximately 94-percent of the land is under private ownership, and 6-percent is under state or federal ownership. Less than 1-percent of both land areas is identified as being owned by local governments and NGOs.

Table 3.4-2: Aggregate Land Ownership Type by State

Owner	Acres	Percent
Federal	12,212,811	3.86
Local	1,085,814	0.34
NGO	448,588	0.14
Private	287,245,357	90.81
State	14,158,842	4.48
Other/Unknown	1,152,870	0.36
Total	316,304,282	
Source: State Based Ownership Data**, NAUS 2006a, NPS 2007a, USFS 2006a		

** Note: Tables and data in Section 3.4 compiled from the following (noted as State Based Ownership Data below): CMI 2000, Cornell 2000, Ducks Unlimited 2006, ESRI 1998, INDNR Unpublished, KYDFWR 2001, KYIA 2007, MDDNR/UMDES 2002a-c, MSDWFP Unknown, MSU 2003, NCCGIA 2002, NCDA 2006, NCDENR 2006, NCSU 2001, TNWRA 1997, USGS 2000, WVU 2000

Table 3.4-3: Aggregate Land Ownership Type for Covered Land Area

Owner	Acres	Percent
Federal	243,856	2.49
Local	29,129	0.30
NGO	1,594	0.02
Private	9,144,863	93.54
State	349,773	3.58
Other/Unknown	7,383	0.08
Total	9,776,598	
Source: State Based Ownership Data, NAUS 2006a, NPS 2007a, USFS 2006a		

Land Ownership

An analysis of land ownership, particularly public lands, is important because many of the species impacted by the issuance of the ITP may rely on habitat conserved by federal, state, and local government lands. Below is a state-by-state discussion of land ownership, with a focus on conservation lands and lands available for recreation.

Private Lands

Values for the proportion of private land encompassed by the Covered Land area for each state range from 80-percent in Maryland to 100-percent in North Carolina. The number of acres of private land included within the Covered Land area is greatest in Ohio, followed by Pennsylvania and West Virginia (**Table 3.4-4**). North Carolina and Delaware have the least amount of private land included within the Covered Land area.

Table 3.4-4: State-by-State Land Ownership Type for the Covered Land Area

State	Federal Acres	State Acres	Local Acres	Private Acres	NGO Acres	Water Acres	Total Acres in Covered Land
Delaware	-	-	72	1,065	-	-	1,137
Indiana	-	751	423	87,344	81	-	88,599
Kentucky	5,421	6,526	474	486,997	-	-	499,418
Louisiana	2,891	9,919	-	473,112		-	485,922
Maryland	476	66,814	6,376	298,138	414	-	372,218
Mississippi	3,438	1,037	-	137,679	-	-	142,154
New Jersey	-	1,356	437	41,235	176	-	43,204
New York	-	11,280	-	173,538	-	482	185,301
North Carolina	-	-	-	929	-	-	929
Ohio	126,595	38,524	18,389	3,035,622	342	-	3,219,472
Pennsylvania	17,113	163,081	2,192	1,494,606	122	-	1,677,115
Tennessee	4,779	4,960	-	117,192	-	-	122,865
Virginia	51,833	2,379	669	398,957	-	-	453,837
West Virginia	35,378	43,146	96	2,398,448	459	724	2,478,251
Total	**247,924**	**349,773**	**29,128**	**9,144,862**	**1,594**	**1,206**	**9,774,487**
Source: State Based Ownership Data, NAUS 2006a, NPS 2007a, USFS 2006a							

Federal Land

In total, the Covered Land area crosses approximately 243,856-acres of federal land under federal control. The greatest acreage of federal land within the Covered Land area is located in Ohio, followed by West Virginia, Virginia, and Pennsylvania. As shown in **Table 3.4-5**, West Virginia has the greatest number of individual properties under federal ownership. Several states, including Delaware, Indiana, New Jersey, New York, and North Carolina have no federal lands within the Covered Land area.

Federal land management agencies that control lands within the Covered Land area include the NPS, USFS, USFWS, USACE, the Department of Defense (DOD), the General Services Administration (GSA), and the Metropolitan Washington Airport. The majority of lands are managed by the USFS, followed by the NPS and USFWS. The majority of federal lands in the area are available for some level of recreational use. Some of the larger tracts (over 1,000-acres) of federal land included within the Covered Land area are summarized below in **Table 3.4-5**.

Table 3.4-5: Federal Lands with Over 1000 Acres in Covered Land Area

Agency	Area	States	Acres
USFS	Wayne NF	OH, WV	121,475
USFS	Monongahela NF	WV	67,655
USFS	Daniel Boone NF	KY	39,972
USFS	George Washington & Jefferson NFs	VA-WV	41,435
USFS	Allegheny NF	PA	23,512
NPS	Chesapeake and Ohio Canal National Historic Park (NHP)	MD	7,269
NPS	Shenandoah National Park (NP)	VA	4,402
NPS	Green Springs National Historic Landmark (NHL)	VA	3,505
USFS	Holly Springs NF	MS	3,104
NPS	Upper Delaware Scenic & Recreational River (SRR)	NY, PA	2,871
USACE	J. Percy Priest Lake	TN	2,699
NPS	Delaware Water Gap National Recreation Area (NRA)	NJ-PA	2,344
USFWS	Cameron Prairie National Wildlife Refuge (NWR)	LA	2,225
USACE	Old Hickory Lake	TN	2,080
USFWS	Grand Cote NWR	LA	1,936
USFWS	Great Dismal Swamp NWR	NC-VA	1,607
USFWS	Canaan Valley NWR	WV	1,371
NPS	Manassas National Battlefield Park (NBP)	VA	1,307
Source: NAUS 2006a, NPS 2007a, USFS 2006a			

State Lands

There are approximately 349,773-acres of state-owned lands within the Covered Land area. Nearly 47-percent of these state lands are located in Pennsylvania. Another 42-percent is located in Maryland, West Virginia, and Ohio, collectively. Ohio and Pennsylvania have the greatest number of individual state owned properties within the Covered Land area. Several states have no state lands within the Covered Land area, including North Carolina and Delaware.

State lands typically include State Parks (SP), Wildlife Management Areas (WMAs), and State Forests (SF). All are considered conservation lands and available for some level of recreational use. Some of the larger areas of state owned lands included in the Covered Land area (over 1,000-acres) include the following in **Table 3.4-6**.

Table 3.4-6: Named State Lands with Over 1000-Acres in Covered Land Area

Area	States	Acres
Green River Lake WMA	KY	3,835
Rockefeller WMA	LA	6,912
Boeuf WMA	LA	2,311
Green Ridge SF	MD	43,880
Savage River SF	MD	1,467
Patuxent SP	MD	1,165
Rocky Gap SP	MD	3,131
Dans Mountain WMA	MD	8,864
Warrior Mountain WMA	MD	4,169
Malmaison WMA	MS	1,037
Palisades - Harriman	NY	4,347
Palisades – Sterling Forest	NY	1,133
Mongaup Valley	NY	2,555
Buckeye SP	OH	1,802
Crane Hollow NP	OH	1,088
Killbuck Marsh Wildlife Area	OH	1,231
Kokosing Lake	OH	1,210
Mohican SP	OH	1,062
Mohican-Memorial SF	OH	4,569
Hocking Hills SP	OH	2,487
Hocking Hills SF	OH	9,405
Tar Hollow SF	OH	1,085
Tri Valley Wildlife Area	OH	1,746
Warriors Path SP	PA	1,490,124
Sproul SF	PA	29,697
Shawnee SP	PA	14,522
Burns Run Wild Area	PA	13,913
Sinnemahoning SP	PA	7,117
Kettle Creek SP	PA	5,279
Ryerson Station SP	PA	4,648
Yellow Creek SP	PA	4,482
Marsh Creek SP	PA	3,227
Hyner Run SP	PA	3,164
Moshannon SF	PA	2,601
Blue Knob SP	PA	2,304
Mont Alto SP	PA	2,214
Clear Creek SF	PA	1,267
Gallitzin SF	PA	1,177
Mcconnells Mill SP	PA	1,044

Area	States	Acres
Eagle Creek WMA	TN	3,738
Canaan Valley SP	WV	1,509
Coopers Rock SF	WV	5,669
Kanawha SF	WV	9,388
Pipestem SP	WV	1,017
Twin Falls SP	WV	1,498
Frozencamp WMA	WV	1,826
Hillcrest WMA	WV	1,486
Lewis Wetzel WMA	WV	9,328
Wallback WMA	WV	3,548
Woodrum Lake WMA	WV	1,869
Source: State Based Ownership Data		

Local Land

Existing state data sets do not provide a comprehensive or consistent measure of locally owned acreage within the Covered Land area. Of the data that are available, Ohio and Maryland have the largest acreage of known lands owned by local governments within the area. Lands that are identified as owned by local governments are typically local parks and nature preserves. Most of the known locally owned properties are small in size, 100-acres or less, and are considered conservation lands available for some level of recreational use.

Non-Governmental Organizations Lands (NGOs)

Six states have lands owned by NGOs within the Covered Land area. NGO properties in the Covered Land area are primarily owned and managed by TNC, along with state, regional and local conservation and land management groups.

A summary of the number of publicly owned properties by state within the Covered Land area can be found in **Table 3.4-7**.

Table 3.4-7: Number of Individual Publicly Owned Properties within the Covered Land Area

State	Federal Properties	State Properties	Local Properties
Delaware	-	-	4
Indiana	-	5	3
Kentucky	2	8	16
Louisiana	4	8	-
Maryland	2	17	47
Mississippi	2	1	-
New Jersey	-	10	1
New York	-	17	-
North Carolina	-	-	-
Ohio	5	89	185
Pennsylvania	6	58	16
Tennessee	5	5	-
Virginia	12	6	Incomplete Data
West Virginia	19	37	1
Source: State Based Ownership Data, NAUS 2006a, NPS 2007a, USFS 2006a			

Land Cover/Land Use Type

Existing land use is also an important consideration when determining whether a species may be present within a given area. NLCD data were examined to determine existing land cover classes within the Covered Land area. A summary of land-use types within the Covered Land area as a whole is provided below in **Table 3.4-8**.

The most prevalent land cover classes in the Covered Land area include Deciduous Forest, Cultivated Crops, Pasture/Hay, and Developed, Open Space. The remainder of the area is covered by 11 other types, none exceeding three-percent of the total area.

Table 3.4-8: Land Use Cover Classes within the Covered Land Area (NLCD 2001)

Land Cover Class	Acres of Covered Land	Percent of Covered Land	Class Description
Deciduous Forest	4,799,870	49.34	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
Cultivated Crops	1,722,685	17.71	Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
Pasture/Hay	1,321,169	13.58	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
Developed, Open Space	625,981	6.43	Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot, single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
Developed, Low Intensity	244,524	2.51	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20 percent-49 percent of total cover. These areas most commonly include single-family housing units.
Evergreen Forest	215,417	2.21	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
Woody Wetlands	151,182	1.55	Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
Open Water	134,753	1.39	All areas of open water, generally with less than 25 percent cover of vegetation or soil.
Mixed Forest	124,263	1.28	Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.

Land Cover Class	Acres of Covered Land	Percent of Covered Land	Class Description
Grassland/Herbaceous	107,445	1.10	Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
Emergent Herbaceous Wetlands	102,396	1.05	Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
Developed, Medium Intensity	79,184	0.81	Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50 percent-79 percent of the total cover. These areas most commonly include single-family housing units.
Shrub/Scrub	44,315	0.46	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
Developed, High Intensity	28,907	0.30	Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial facilities. Impervious surfaces account for 80 percent to100 percent of the total cover.
Barren Land (Rock/Sand/Clay)	25,783	0.27	Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits, and other accumulations of earthen material. Generally, vegetation accounts for less than 15 percent of total cover
Source: USGS 2003			

Land Conversion

Land conversion to urban and suburban development has increased throughout the U.S. in the last few decades. **Table 3.4-9** provides an overview of increase in development on a state-by-state basis for a 15-year period between 1982 and 1997. For the U.S. as a whole, the USDA Natural Resources Inventory (NRI) estimates that just less than 5-percent of available non-federal land was developed in 1982. This figure rose to almost 6.6-percent in 1997.

All 14 states have higher percentages of land developed, as well as higher rates of change over this 15-year timeframe. New Jersey, Maryland, and Delaware had the highest percentages of developed non-federal land in both 1982 and 1997. Mississippi, on the other hand, had the lowest percent of non-federal lands developed in 1997, followed by Louisiana and West Virginia. North Carolina saw the highest increase in developed land from 1982 to 1997, followed by Tennessee and Kentucky. The only states with an increase in developed lands below the national average for this time period were New York, Indiana, and Ohio.

Table 3.4-9: Percentage of Developed Non-Federal Land 1982-1997

State	Non Federal Land - 1982			Non Federal Land – 1997			Percent Change in Developed Acres (1982-1997)
	Total*	Developed*	Percent Developed	Total*	Developed*	Percent Developed	Increase
US	1,495,931.7	73,245.8	4.90	1,492,011.4	98,251.7	6.59	34.1
Delaware	1,214.3	167.0	13.75	1,213.8	225.5	18.58	35.0
Indiana	22,338.1	1,834.8	8.21	22,329.1	2,260.4	10.12	23.2
Kentucky	24,183.0	1,145.3	4.74	24,064.9	1,737.5	7.22	51.7
Louisiana	26,525.0	1,233.9	4.65	26,287.8	1,623.8	6.18	31.6
Maryland	6,057.2	913.0	15.07	6,044.0	1,235.7	20.45	35.3
Mississippi	28,172.2	1,120.2	3.98	27,902.6	1,474.0	5.28	31.6
New Jersey	4,565.5	1,265.5	27.72	4,543.8	1,778.2	39.13	40.5
New York	29,885.6	2,635.8	8.82	29,885.9	3,183.6	10.65	20.8
North Carolina	28,804.3	2,416.7	8.39	28,448.7	3,856.4	13.56	59.6
Ohio	25,709.5	2,782.8	10.82	25,681.0	3,611.3	14.06	29.8
Pennsylvania	27,808.3	2,818.8	10.14	27,799.6	3,983.2	14.33	41.3
Tennessee	25,002.7	1,504.7	6.02	24,967.2	2,370.6	9.49	57.5
Virginia	22,562.1	1,841.3	8.16	22,511.8	2,625.8	11.66	42.6
West Virginia	14,237.2	583.9	4.10	14,125.4	873.6	6.18	49.6

* Values in Thousands of Acres - Source: NRCS 2000

Land Use Restrictions, Easements and Zoning

Land use restrictions, easements, and zoning regulations cover a range of legal mechanisms through which public (e.g. federal, state, county, municipal, and regional governments or agencies) and private (e.g. NGOs, utilities, businesses, individuals) groups can guide, limit, or prevent development on properties. Due to the spatial scale of the Covered Land area and the wide range of lands and regions crossed, a variety of land use and development restrictions is anticipated to be encountered. Existing ROWs and facilities have been established within the bounds of local ordinances along the Covered Land corridor. In the case of covered activities that involve additional construction, restrictions will be applied in concert with any applicable public ordinances or laws. The impacts of any restrictions will be factored into future NEPA tiering to the extent that the project is bounded by those restrictions.

One example of land use restrictions within the Covered Land area is the Louisiana Coastal Zone Management (CZM) area, crossed by the Covered Land within Cameron, Iberia, Lafourche, Plaquemines, St. Charles, St. Mary, Terrebonne, and Vermillion parishes. The program, a cooperative venture between the USACE and the Louisiana Coastal Resources Program, a branch of the Louisiana Department of Natural Resources, seeks to protect the natural resources of the coastal wetland zone while encouraging multiple resource uses and adequate economic development. A Coastal Use Permit (CUP) would be required for any dredge and fill work, shoreline maintenance, or other wetland impacting activities within the listed parishes. For more information, see: http://dnr.louisiana.gov/crm/coastmgt/coastmgt.asp.

As specific projects are undertaken, depending upon the nature of the activity, local approvals and/or state level permits or review may be required. As such, potential impacts from land use restrictions, easements, and/or zoning would be considered on a project-by-project basis, and may be subject to future NEPA analysis. Examples may

include coordination with local or regional zoning boards, consultation with NGOs or public agencies with interests in the area, or the completion of land use permits prior to construction activities.

3.4.2 Socioeconomic Conditions

In the following section, several socioeconomic measures are discussed. The discussion begins with a regional perspective by examining the population within U.S. Census Bureau (USCB) Regions and Divisions in the Covered Land area. This is followed by state-by-state descriptions of current, estimated, and projected population, employment, unemployment, personal income, poverty, and local/state employment. Housing and public services are also discussed.

Demographics, Income, and Employment

Census Regions and five Census Divisions are located within the Covered Land area. See **Table 3.4-10** for a list of all Regions, Divisions, and States within the Covered Land area.

Table 3.4-10: USCB Regions, Divisions and States in the Covered Land Area

Region 1: Northeast	Region 2: Midwest	Region 3: South
Middle Atlantic Division: ♦ New Jersey ♦ New York ♦ Pennsylvania	*East North Central Division:* ♦ Indiana ♦ Ohio	*South Atlantic Division:* ♦ Delaware, ♦ Maryland, ♦ North Carolina, ♦ Virginia, ♦ West Virginia
		East South Central Division: ♦ Kentucky, ♦ Mississippi, ♦ Tennessee
		West South Central Division: ♦ Louisiana

As depicted in **Table 3.4-11**, overall population growth in the U.S. is expected to be just over seven-percent between 2000 and 2007. The Northeast and Midwest Census Regions each have lower estimated population growth rates than the national average at two-percent and three-percent, respectively. Only the Southern Region has an expected growth rate that is higher than the national average.

Table 3.4-11: Estimated Population and Growth in the Covered Land Area

Geographic Area	Census 2000	July 1, 2007 Population Estimate	Estimated Growth (percent)
UNITED STATES	281,421,906	301,621,157	7.2
Northeast Region	53,594,378	54,680,626	2.0
Middle Atlantic Division	39,671,861	40,416,441	1.9
Midwest Region	64,392,776	66,388,795	3.1
East North Central Division	45,155,037	46,338,216	2.6
South Region	100,236,820	110,454,786	10.2
South Atlantic Division	51,769,160	57,860,260	11.8
East South Central Division	17,022,810	17,944,829	5.4
West South Central Division	31,444,850	34,649,697	10.2
Source: USCB 2007a			

According to the USCB, the Covered Land area includes six of the 25 largest Metropolitan Areas in the country including; (1) New York-Northern New Jersey-Long Island, NY; (4) Washington-Baltimore, DC-MD-VA-WV; (6) Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD; (16) Cleveland-Akron, OH; (22) Pittsburgh, PA; and (24) Cincinnati-Hamilton, OH-KY-IN. These six Metropolitan Areas alone comprised over 42-million residents according to the 2000 Census (USCB 2001).

Average population and population density per square mile varies among the states in the Covered Land area, although density in each state is higher than the national

average. **Table 3.4-12** summarizes the total 2000 population, land area, and persons per square mile for each of the 14 states in the Covered Land area.

The states within the Covered Land area comprise approximately 35-percent of the U.S. population. The three most populous states are New York, Pennsylvania, and Ohio, comprising approximately 44-percent of the Covered Land area's population. Delaware and West Virginia are the least populous states in the area, comprising less than one-percent of the Covered Land area's population.

Of the states in the Covered Land area, only Mississippi and West Virginia have densities lower than the national average. Delaware, Maryland, New York and New Jersey have the highest densities, at least five times higher than that national average.

Table 3.4-12: 2000 Population, Land Area, and Density by State in the Covered Land Area

Geographic Area	Population	Land Area	Persons per Sq. Mile of Land Area
U.S.	**281,421,906**	**3,537,438**	**79.6**
Delaware	783,600	1,954	401
Indiana	6,080,485	35,867	170
Kentucky	4,041,769	39,728	102
Louisiana	4,468,976	43,562	103
Maryland	5,296,486	9,774	542
Mississippi	2,844,658	46,907	61
New Jersey	8,414,350	7,417	1,134
New York	18,976,457	47,214	402
North Carolina	8,049,313	48,711	165
Ohio	11,353,140	40,948	277
Pennsylvania	12,281,054	44,817	274
Tennessee	5,689,283	41,217	138
Virginia	7,078,515	39,594	179
West Virginia	1,808,344	24,077	75
Source: USCB 2000a			

Population growth between 2000 and July 2007 varied tremendously among the fourteen states in the Covered Land area (See **Table 3.4-13**). Nine states were expected to grow at a slower rate than the national average, and one was expected to decline. Louisiana's population was expected to decline nearly four-percent over this seven year timeframe; due largely to the impacts of the 2005 hurricane season. West Virginia, New York, Ohio, and Pennsylvania had expected growth rates of less than two-percent. Only Delaware, North Carolina, Tennessee, and Virginia had higher estimated growth rates than the national average.

Table 3.4-13: 2000 Population, 2007 Population Estimate and Estimated Growth

Geographic Area	Census 2000	July 2007 Population Estimate	Estimated Growth (percent)
U.S.	**281,421,906**	**301,621,157**	**7.2**
Delaware	783,600	864,764	10.4
Indiana	6,080,485	6,345,289	4.4
Kentucky	4,041,769	4,241,474	4.9
Louisiana	4,468,976	4,293,204	-3.9
Maryland	5,296,486	5,618,344	6.1
Mississippi	2,844,658	2,918,785	2.6
New Jersey	8,414,350	8,685,920	3.2
New York	18,976,457	19,297,729	1.7
North Carolina	8,049,313	9,061,032	12.6
Ohio	11,353,140	11,466,917	1.0
Pennsylvania	12,281,054	12,432,792	1.2
Tennessee	5,689,283	6,156,719	8.2
Virginia	7,078,515	7,712,091	9.0
West Virginia	1,808,344	1,812,035	0.2
Source: USCB 2007a			

The USCB also generates long-term population projections (See **Table 3.4-14**). These projections are based on assumptions that current state trends in fertility, mortality, domestic migration, and international migration will continue. Eight states are expected to grow at much slower rates than the national average, whereas Maryland, North Carolina, and Virginia are expected to grow at faster rates than the national average. Only West Virginia expected to see a population decline over the next 30 years.

Table 3.4-14: 2000 Population and Long Term Projections

Geographic Area	Census April 1, 2000	Projections July 1, 2010	Projections July 1, 2020	Projections July 1, 2030	Percent change 2000 to 2030
U.S.	**281,421,906**	**308,935,581**	**335,804,546**	**363,584,435**	**29.2**
Delaware	783,600	884,342	963,209	1,012,658	29.2
Indiana	6,080,485	6,392,139	6,627,008	6,810,108	12.0
Kentucky	4,041,769	4,265,117	4,424,431	4,554,998	12.7
Louisiana	4,468,976	4,612,679	4,719,160	4,802,633	7.5
Maryland	5,296,486	5,904,970	6,497,626	7,022,251	32.6
Mississippi	2,844,658	2,971,412	3,044,812	3,092,410	8.7
New Jersey	8,414,350	9,018,231	9,461,635	9,802,440	16.5
New York	18,976,457	19,443,672	19,576,920	19,477,429	2.6
North Carolina	8,049,313	9,345,823	10,709,289	12,227,739	51.9
Ohio	11,353,140	11,576,181	11,644,058	11,550,528	1.7
Pennsylvania	12,281,054	12,584,487	12,787,354	12,768,184	4.0
Tennessee	5,689,283	6,230,852	6,780,670	7,380,634	29.7
Virginia	7,078,515	8,010,245	8,917,395	9,825,019	38.8
West Virginia	1,808,344	1,829,141	1,801,112	1,719,959	-4.9
Source: USCB 2005					

Employment and Unemployment

Within the Covered Land area, the states with the largest labor force in both 2000 and 2007 are New York, Pennsylvania, and Ohio, which corresponds with the population rankings of these states. Louisiana and West Virginia experienced a loss in total labor force during this timeframe, corresponding to their declining or stable populations.

Unemployment rates for most of the fourteen states are similar to the national average in both 2000 and 2007 (See **Table 3.4-15**). The highest unemployment rates are seen

in Mississippi, followed by Ohio and Kentucky. The lowest unemployment rates in the Covered Land area are in Virginia, followed by Delaware and Louisiana.

Table 3.4-15: Employment and Unemployment Statistics for the Covered Land Area

Geographic Area	Nov. 2000 Civilian Labor Force*	2000 Average Unemployment Rate (percent)	Nov. 2007 Civilian Labor Force*	Nov. 2007 Unemployment Rate (percent)	Change in Labor Force 2000 to 2007 (percent)
U.S.	**-**	**4.00**	**-**	**4.70**	**-**
Delaware	415.2	3.30	445.4	3.40	7.30
Indiana	3093.3	2.90	3,230.50	4.70	4.40
Kentucky	1989.7	4.20	2,057.20	5.00	3.40
Louisiana	2043.2	5.00	2,008.60	3.50	-1.70
Maryland	2857.1	3.60	3,021.80	3.70	5.80
Mississippi	1324.9	5.70	1,342.60	6.30	1.30
New Jersey	4234	3.70	4,522.10	4.20	6.80
New York	8991.5	4.50	9,524.10	4.60	5.90
North Carolina	3983.9	3.70	4,537.20	4.70	13.90
Ohio	5891.6	4.00	6,007.60	5.60	2.00
Pennsylvania	6002	4.20	6,336.10	4.20	5.60
Tennessee	2844.1	4.00	3,059.60	4.90	7.60
Virginia	3662.9	2.30	4,088.70	3.20	11.60
West Virginia	818.7	5.50	818	4.60	-0.10

* Values in Thousands
Source: USBLS 2001 and 2008

Income

Personal income statistics show that New York had the highest personal income of the 14 state area in both 1990 and 2006, followed by Pennsylvania, New Jersey, and Ohio (See **Table 3.4-16**). Average annual growth of personal income varied slightly among the states. The fastest personal income growth rate was seen in North Carolina, Tennessee, and Virginia. The slowest growth rate was seen in Ohio, Pennsylvania, West Virginia, and New York.

Table 3.4-16: Total Personal Income in Current Dollars by State

Geographic Area	1990 Personal Income	2006 Personal Income	Average Annual Growth Rate 1990-2006 (percent)
U.S.	$4,861,936,000	$10,966,808,000	5.2
Delaware	$14,343,329	$33,271,963	5.4
Indiana	$97,213,489	$203,457,453	4.7
Kentucky	$57,025,587	$125,000,728	5.0
Louisiana	$64,052,221	$134,504,614	4.7
Maryland	$109,685,959	$245,821,150	5.2
Mississippi	$33,754,245	$78,317,451	5.4
New Jersey	$190,753,441	$404,192,118	4.8
New York	$423,896,642	$848,744,137	4.4
North Carolina	$114,926,195	$286,404,526	5.9
Ohio	$203,630,112	$381,260,142	4.0
Pennsylvania	$234,334,315	$456,429,169	4.3
Tennessee	$81,700,422	$195,085,114	5.6
Virginia	$127,129,323	$302,381,894	5.6
West Virginia	$25,980,212	$51,038,834	4.3

In Thousands of Dollars. All state dollar estimates are in current dollars (not adjusted for inflation).
Source: USBEA 2007

In examining per capita income, Department of Commerce data show that personal income varies widely across the region (See **Table 3.4-17**). New Jersey has the highest per capita income, followed by New York, Maryland, Virginia, and Delaware. Several states had levels well below the national average of $36,629. Mississippi had the lowest per capita income levels in the 14 state region, followed by West Virginia and Kentucky. On a national level, New Jersey ranked 3rd in the country while West Virginia and Mississippi rank 49th and 50th, respectively, in national per capita income levels.

Table 3.4-17: Per Capita Income by State

Geographic Area	2000 Per Capita Income	2006 Per Capita Income	Average Annual Percent Change
U.S.	$29,843	$36,629	3.47
Delaware	$30,867	$38,984	3.79
Indiana	$27,130	$32,226	2.91
Kentucky	$24,411	$29,719	3.33
Louisiana	$23,079	$31,369	5.25
Maryland	$34,256	$43,774	4.17
Mississippi	$21,005	$26,908	4.21
New Jersey	$38,362	$46,328	3.19
New York	$34,895	$43,962	3.92
North Carolina	$27,067	$32,338	3.01
Ohio	$28,205	$33,217	2.76
Pennsylvania	$29,693	$36,689	3.59
Tennessee	$26,096	$32,305	3.62
Virginia	$31,085	$39,564	4.10
West Virginia	$21,898	$28,067	4.22

All state dollar estimates are in current dollars (not adjusted for inflation).
Source: USBEA 2007

Of the 14 states included in the Covered Land area, seven have poverty levels higher than the national average (See **Table 3.4-18**). Based on the most recent data available, Mississippi has the highest percent of its population below the poverty level, followed by Louisiana, West Virginia, Kentucky, Tennessee, and New York. States with the lowest poverty level include Maryland, New Jersey, and Virginia. All states except Maryland, West Virginia, and Louisiana showed an increase in the number of individuals below the poverty level between 2000 and 2005.

Table 3.4-18: Individuals Below Poverty Level by State

Geographic Area	2000 (percent)	2005 (percent)
U.S.	**12.2**	**13.3**
Delaware	9.3	10.4
Indiana	10.1	12.2
Kentucky	16.4	16.8
Louisiana	20.0	19.8
Maryland	9.3	8.2
Mississippi	18.2	21.3
New Jersey	7.9	8.7
New York	13.1	13.8
North Carolina	13.1	15.1
Ohio	11.1	13.0
Pennsylvania	10.5	11.9
Tennessee	13.5	15.5
Virginia	9.2	10.0
West Virginia	18.6	18.0
Source: USCB 2008		

Government Employment

Local and state government employment generally showed a consistent increase within all 14 states (see **Table 3.4-19**). North Carolina had the largest increase in state and local government employment between 1995 and 2005 at two-percent, two-thirds higher than the national average. Delaware, Kentucky, New Jersey, Tennessee, and Virginia also had an increase in individuals employed by state or local government higher than the national average. West Virginia had the smallest increase in the number of individuals employed by state or local government among the 14 states.

Table 3.4-19: Total Local and State Government Employment

Geographic Area	1995 Government Employment	2005 Government Employment	Average Annual Growth Rate 1995-2005 (percent)
U.S.	14,090,531	15,923,650	1.2
Delaware	41,279	47,114	1.3
Indiana	305,747	332,761	0.9
Kentucky	206,035	238,421	1.5
Louisiana	263,576	283,287	0.7
Maryland	252,816	278,497	1.0
Mississippi	172,368	188,707	0.9
New Jersey	437,174	501,643	1.4
New York	1,113,591	1,184,190	0.6
North Carolina	395,200	483,464	2.0
Ohio	567,185	620,466	0.9
Pennsylvania	521,411	576,511	1.0
Tennessee	272,878	321,954	1.7
Virginia	362,702	417,788	1.4
West Virginia	94,247	98,422	0.4
Source: USCB 2007b			

Table 3.4-20: Minority and Low Income Population within the Covered Land Area (DE-MD)

Demographic	Delaware	Indiana	Kentucky	Louisiana	Maryland
Total Population	15,526	198,448	573,573	439,323	418,353
White, Non-Hispanic	10,875	178,556	545,079	337,558	335,857
Hispanic or Latino	344	7,590	5,015	5,947	9,717
Black or African American	3,380	7,869	15,706	79,925	44,953
American Indian or Alaskan Native	30	398	925	7,327	663
Asian	589	1,584	2,179	3,685	20,636
Native Hawaiian or Other Pacific Islander	7	36	73	66	85
Some Other Race	29	126	301	397	589
Two or More Races	272	2,289	4,295	4,418	5,853
Total Minority	4,651	19,892	28,494	101,765	82,496
Total Poverty	1,351	20,490	142,680	111,661	38,959

Demographic	Delaware	Indiana	Kentucky	Louisiana	Maryland
Percent Minority	30.0	10.0	5.0	23.2	19.7
Percent Poverty	8.7	10.3	24.9	25.4	9.3
State Percent Minority	27.5	14.2	10.7	37.5	37.9
State Percent Poverty	11.3	10.7	21.4	24.6	10.4
Source: USCB 2000a,b, NAUS 2005b, 2006b and 2006c Poverty numbers based on 2001 Small Area Income and Poverty Estimates program data					

Table 3.4-21: Minority and Low Income Population within the Covered Land Area (MS-OH)

Demographic	Mississippi	New Jersey	New York	North Carolina	Ohio
Total Population	156,802	168,340	284,849	6,296	2,894,520
White, Non-Hispanic	107,884	147,452	263,597	1,480	2,703,796
Hispanic or Latino	2,393	5,110	7,270	28	36,727
Black or African American	45,066	5,671	6,131	4,731	95,690
American Indian or Alaskan Native	240	140	503	20	5,636
Asian	339	7,919	3,869	6	18,642
Native Hawaiian or Other Pacific Islander	21	42	61	1	494
Some Other Race	45	173	283	1	2,267
Two or More Races	814	1,833	3,135	29	31,268
Total Minority	48,918	20,888	21,252	4,816	190,724
Total Poverty	44,052	10,639	41,991	1,530	382,671
Percent Minority	31.2	12.4	7.5	76.5	6.6
Percent Poverty	28.1	6.3	14.7	24.3	13.2
State Percent Minority	39.3	34.0	38.0	29.8	16.0
State Percent Poverty	26.2	9.2	14.2	16.9	12.8
Source: USCB 2000a,b, NAUS 2005b, 2006b and 2006c Poverty numbers based on 2001 Small Area Income and Poverty Estimates program data					

Table 3.4-22: Minority and Low Income Population within the Covered Land Area (PA-WV)

Demographic	Pennsylvania	Tennessee	Virginia	West Virginia
Total Population	1,718,007	230,964	1,062,943	1,006,320
White, Non-Hispanic	1,638,283	199,027	784,418	962,178
Hispanic or Latino	20,697	4,465	34,826	5,043
Black or African American	32,548	20,972	189,616	24,364
American Indian or Alaskan Native	1,830	533	2,636	1,802
Asian	11,144	3,252	32,664	4,265
Native Hawaiian or Other Pacific Islander	250	70	375	170
Some Other Race	1,122	181	1,570	529
Two or More Races	12,133	2,464	16,838	7,969
Total Minority	79,724	31,937	278,525	44,142
Total Poverty	204,721	37,815	71,021	224,350
Percent Minority	4.6	13.8	26.2	4.4
Percent Poverty	11.9	16.4	6.7	22.3
State Percent Minority	15.9	20.8	29.8	5.4
State Percent Poverty	12.6	18.5	13.6	21.8
Source: USCB 2000a,b, NAUS 2005b, 2006b and 2006c Poverty numbers based on 2001 Small Area Income and Poverty Estimates program data				

Housing

The issuance of the ITP does not specifically authorize projects that will significantly impact short or long term populations in a specific area, and there is no expectation that the issuance of the ITP would impact local or regional housing availability. However, site specific projects may need approvals or permits from local land use and/or state agencies. As such, potential impacts on local housing availability would be considered on a project-by-project basis, and may be subject to conditions of approval that are outside the scope of this EIS. Given the nature of the covered activities anticipated

under this ITP, any increases in employment within a local labor market are expected to be very minimal and would not result in significant changes in either population or housing. Accordingly, no specific mitigation measures are anticipated to offset impacts to population or housing.

Public Services

Public services typically include those services supported by government taxes, most notably public schools, police protection, and fire protection. Within the Covered Land area, hundreds of school districts, as well as city or rural (township) fire departments, and city, county, and state police departments potentially occur. The issuance of the ITP does not specifically authorize projects that would directly affect the capacity of existing schools in a particular area, or specifically tax the capacity of existing fire or police services, locally.

As specific projects are undertaken, depending upon the nature of the activity, local approvals and/or state level permits or review may be required. As such, potential impacts on public services would be considered on a project-by-project basis, and may be subject to conditions of approval that are outside the scope of this EIS. Examples may include preparing (prior to construction) an Emergency Response Plan addressing construction and operation safety issues and response procedures to emergencies and providing public notification of proposed construction activities, including timing of construction, to all local service providers within the immediate vicinity.

3.4.3 Transportation and Utilities

Transportation includes vehicular traffic, including roads, highways, railroads, and airports. Traffic circulation refers to the movement of vehicles throughout a road or highway network. Utilities include water/sewer lines, electric transmission lines, and telecommunication lines.

The issuance of the ITP does not authorize projects that would directly affect the capacity of the existing transportation infrastructure or utility systems within the 14 state Covered Land area. That said, site specific projects may need approval and/or encroachment permits from local governments, and some may also require additional state or federal level permits or review. Therefore, any potential site specific impacts on transportation or utilities would be considered on a project-by-project basis, and the approval of individual projects may be subject to specific mitigation measures. Conditions of approval for transportation may include notification requirements and traffic control measures during construction. Mitigation related to utilities could potentially include efforts to avoid temporary construction-related disruptions in service, including advance coordination with service providers and scheduling work during low-demand periods. Other examples include communication with utility providers prior to construction to coordinate the relocation of utilities within an alternative right-of-way, if needed. Construction would be scheduled to minimize or avoid potential service interruptions. Below is a general description of the types of transportation and utilities located within the Covered Land area.

Railroads

There are approximately 1,677-miles of railroad and 53 unique railroad lines crossed within all states in the Covered Land area except North Carolina. The majority of lines have less than five-miles within the Covered Land area. CSX Transportation Incorporated and Norfolk Southern Railway Company are the two primary lines within the Covered Land area; making up just over 73-percent of the total. **Table 3.4-23** below show the ten railroad companies with the most miles of line within the Covered Land area.

Table 3.4-23: Major Railroads within the Covered Land Area

Primary Owner	States	Miles Crossed
CSX Transportation, Incorporated	DE/IN/KY/MD/NJ/OH/PA/TN/VA/WV	722.17
Norfolk Southern Railway Company	IN/KY/MD/MS/NJ/NY/OH/PA/VA	517.30
Wheeling and Lake Erie Railway Company	OH/PA/WV	54.11
Indiana and Ohio Railway Company	OH	47.52
Ashland Railway, Incorporated	OH	46.80
Buffalo and Pittsburgh Railroad, Incorporated	NY/PA	37.76
Union Pacific Railroad Company	LA	32.27
Columbus and Ohio River Railroad Company	OH	30.07
Canadian National Railway	IN/OH/MS	19.41
Kansas City Southern Railway Company	LA/MS	16.25
Source: NAUS 2005d		

Roads

There are innumerous federal, state, county, and local roadways crossed by the Covered Land area. Site specific projects that cross roadways will be required to comply with applicable local, state, or federal requirements, depending upon the nature of the activities undertaken. The bulleted list below provides a general overview, by state, of the federal and state roadways crossed in the Covered Land area (NAUS 1999).

- In **Delaware**, the Covered Land area crosses Interstate 495 and 95, two other numbered US Routes, and one other numbered State Route.
- In **Indiana**, the Covered Land area crosses Interstate 65 and Interstate 69, as well as six other numbered US Routes, and nine numbered State Routes.
- In **Kentucky**, the Covered Land area crosses Interstate 64 and Interstate 75, two named Parkways, 11 other numbered US Routes and 31 numbered State Routes.
- In **Louisiana**, the Covered Land area crosses Interstates 10, 20 and 49, as well as seven other numbered US Routes, and 26 numbered State Routes.

- In **Maryland**, the Covered Land area crosses Interstates 68, 70, 83, 270, and 795, seven other numbered US Routes, and 22 numbered State Routes.
- In **Mississippi**, the Covered Land area crosses Interstate 55, seven numbered US Routes, and 13 numbered State Routes.
- In **New Jersey**, the Covered Land area crosses Interstates 78, 295, and 287, the New Jersey Turnpike, four numbered US Routes, and five numbered State Routes.
- In **New York**, the Covered Land area crosses Interstates 81, 84, 97, the Pine Island Turnpike, Palisades Interstate Parkway, five numbered US Routes, and 24 numbered State Routes.
- The Covered Land area crosses no major federal or state roads in **North Carolina**.
- In **Ohio**, the Covered Land area crosses Interstates 70, 71, 75, 76, 77, 80, 90, 270, 470, 475, 480, 20 other numbered US Routes, and more than 75 numbered State Routes.
- In **Pennsylvania**, the Covered Land area crosses Interstates 70, 76, 78, 79, 80, 81, 83, 84, 95, 17 numbered US Routes, and more than 80 numbered State Routes.
- In **Tennessee**, the Covered Land area crosses Interstates 24, 40, and 65, the Natchez Trace Parkway, seven numbered US Routes, and 20 numbered State Routes.
- In **Virginia**, the Covered Land area crosses Interstates 64, 66, 81, 95, 295, and 464, as well as 28 numbered US Routes, and 20 numbered State Routes.
- In **West Virginia**, the Covered Land area crosses Interstate 64, 68, 70, 77, and 79, as well as 15 numbered US Routes, and 34 numbered State Routes.

Airports

There are five airports located within the Covered Land area and 15 others that are within a three-mile radius of the Covered Land area, including two major international

airports (Washington Dulles International and Pittsburgh International) (NAUS 2001a). The five airports located directly within the Covered Land area include:

- Bedford County Airport, Bedford County, PA
- Lancaster Airport, Lancaster County, PA
- Lima Allen County Airport, Allen County, OH
- Tri-State/Milton J. Ferguson Field, Wayne County, WV
- Yeager Airport, Kanawha County, WV

The fifteen other airports within a three-mile radius of the Covered Land area include:

- Abbeville Chris Crusta Memorial Airport, Vermillion Parish, LA
- Altoona-Blair County Airport, Blair County, PA
- Binghamton Regional/Edwin A. Link Field, Broome County, NY
- Bradford Regional Airport, McKean County, PA
- Carl R. Keller Field, Ottawa County, OH
- Du Bois-Jefferson County Airport, Jefferson County, PA
- Elmira/Corning Regional Airport, Chemung County, NY
- Geauga County Airport, Geauga County, OH
- Greater Cumberland Regional Airport, Mineral County, WV
- Griffing Sandusky Airport, Erie County, OH
- Hagerstown Regional-Richard A. Henson Field, Washington County, MD
- Morristown Municipal Airport, Morris County, NJ
- Pittsburgh International Airport, Allegheny County, PA
- Port Columbus International Airport, Franklin County, OH
- Salem Airpark, Inc., Mahoning County, OH
- Washington Dulles International Airport, Loudoun County, VA

Utilities

Information on locations of utility corridors and natural gas pipelines has been protected since the events of September 11, 2001. FERC licensing and permitting processes require that companies provide pipeline corridor locations associated with their applications on the company web sites. For the NiSource Covered Lands which is the subject of this EIS, the pipeline information is available at: www.ngts.com. Consolidated information on the location of utility corridors in the Covered Land is no longer available; however, 1993 data (ESRI 1993) show that the majority of transmission lines within the Covered Land area are located in Ohio, followed by West Virginia, and Pennsylvania (see **Table 3.4-24**).

Table 3.4-24: Miles of Transmission Line within the Covered Land Area

State	Miles
Indiana	31.95
Kentucky	167.82
Louisiana	99.12
Maryland	100.05
Mississippi	24.47
New Jersey	19.54
New York	86.44
North Carolina	1.05
Ohio	917.46
Pennsylvania	366.95
Tennessee	70.67
Virginia	137.73
West Virginia	774.95
Source: ESRI 1993	

3.4.4 Cultural Resources

The National Historic Preservation Act (NHPA) is a comprehensive law that creates a framework for managing cultural resources in the United States. The law expands the National Register of Historic Places (NRHP); establishes State Historic Preservation

Officers (SHPOs), Tribal Historic Preservation Officers (THPOs), and the Advisory Council on Historic Preservation (ACHP); and provides a number of mandates for federal agencies. Section 106 of the NHPA directs all federal agencies to consider the effects of their actions and authorizations on historic properties, and afford the ACHP an opportunity to comment on the undertaking. Historic properties are prehistoric and historic districts, sites, buildings, structures, objects, and sites of traditional and cultural importance to a Native American tribe, which are included in, or eligible for, the NRHP. The process for complying with Section 106 of the NHPA is outlined in the ACHP implementing regulations at 36 CFR 800.

In addition, other laws, regulations, policies, and EOs pertaining to cultural resources apply to projects undertaken on federal land or which require federal permitting or funding. These include EO 11593, “Protection and Enhancement of the Cultural Environment” (1971); Archaeological and Historic Preservation Act (1974) (AHPA); Archaeological Resources Protection Act of 1979 (ARPA); American Indian Religious Freedom Act of 1978 (AIRFA); Native American Graves Protection and Repatriation Act of 1990 (NAGPRA); EO 13007, “Indian Sacred Sites” (1996); EO 13287, “Preserve America” (2003); and the Federal Land Policy and Management Act of 1976 (FLPMA).

Compliance with Section 106 will occur within the Covered Land as projects are reviewed for site-specific resource issues (see Chapter 2 Section 2.1.1 for a description of the NHPA process that NiSource will follow). Areas that have been maintained within the pipeline ROW have already been reviewed for archeological resource issues. As new activities occur, such as expansion projects, the areas will be reviewed for compliance with the NHPA by the lead federal agency authorizing the activity. NiSource annual project planning includes consultation with State Historic Preservation Officers for clearance or completion of any required compliance documentation (e.g., Phase I surveys). In the event that a site-specific project requires further planning relative to

impacts on historic or cultural resources, NiSource serves as the non-Federal representative to complete those plans. For the Federal agency, and for agencies cooperating on this EIS, future NEPA documentation will include evaluation of any historic or cultural preservation concerns as a result of NiSource planning and providing the information.

From a practical standpoint, the extent to which NiSource is able to document previous NHPA clearance for maintenance activities, such review will be completed. Where new ground disturbance is anticipated, such as looping of the existing pipeline, NiSource must assure that their Federally permitted activities are in full compliance with NHPA and other applicable Federal and state law governing historic and cultural resource preservation. Specific NEPA analysis of historic and cultural resources within the Covered Land is not completed within this EIS due to the scale of the project and lack of specific information regarding the on-the-ground impacts anticipated over time.

The Covered Land “affected environment” is, generally, disturbed land where historic and cultural concerns have been addressed in the past 50+ years of pipeline construction and operation. NiSource has, in practice, exercised caution when it has encountered any areas that appear to contain any artifacts, bones, etc. The procedures for addressing these types of resources have evolved over the last decades and all known historic and cultural sites that have been protected through the NiSource planning process. In the event that an area appears to have historic resource concerns that were previously unknown, the activity ceased until an archeologist could be consulted. At this time, the Gala compressor station (Virginia) is one of the sites that included planning in a manner to preserve this type of resource. In this case, NiSource operates the compressor station under terms of an agreement with the Virginia SHPO.

Table 3.4-25 below provides examples of federal and state-specific historic review/compliance statutes that may apply depending upon the nature of the project.

Table 3.4-25: Federal and State Historic Review/Compliance Requirements

State	Federal/State Historic Review Requirements
Delaware	NHPA - Section 106; Delaware Code, Title 7, Chapter 54
Indiana	NHPA - Section 106
Kentucky	NHPA - Section 106
Louisiana	NHPA - Section 106
Maryland	NHPA - Section 106; Article 83B Section 5-617 and 5-618 of the Maryland Code
Mississippi	NHPA - Section 106; Antiquities Act of Mississippi
New Jersey	NHPA - Section 106; New Jersey Register of Historic Places Act
New York	NHPA - Section 106; Section 14.09 of the New York State Parks, Recreation and Historic Preservation Law of 1980; State Environmental Quality Review Act (SEQRA) of 1978
North Carolina	NHPA - Section 106; General Statute 121-12
Ohio	NHPA - Section 106
Pennsylvania	NHPA - Section 106; Title 37 - Pennsylvania History Code
Tennessee	NHPA - Section 106
Virginia	NHPA - Section 106; Virginia Environmental Impacts Report Act (10.1-1188)
West Virginia	NHPA - Section 106; §29-1-8. Historic preservation section
Source: See web-pages listed below	

The following websites can be referenced for many of the state-specific Cultural Resources rules and regulations:

- Delaware Division of Historical and Cultural Affairs: http://history.delaware.gov/preservation/protection/sec106.shtml
- Indiana Division of Historic Preservation and Archaeology: http://www.state.in.us/dnr/historic/106statereview.html
- Kentucky Heritage Council: http://www.state.ky.us/agencies/khc/section106.htm

- Louisiana Division of Historic Preservation: http://www.crt.state.la.us/hp/sect106.htm
- Maryland Historic Trust: http://www.marylandhistoricaltrust.net/projrev.html
- Mississippi Department of Archives and History: http://www.mdah.state.ms.us/hpres/fedstatereview.php
- New Jersey Historic Preservation Office: http://www.state.nj.us/dep/hpo/2protection/protect.htm#106
- New York Historic Preservation Field Services Bureau: http://www.nysparks.com/shpo/environ/forms/PRCoverForm.pdf
- North Carolina State Historic Preservation Office: http://www.hpo.dcr.state.nc.us/er.htm
- Ohio Historic Preservation Office: http://www.ohiohistory.org/resource/histpres/services/106rev.html
- Pennsylvania Historical and Museum Commission: http://www.portal.state.pa.us/portal/server.pt?open=512&mode=2&objID=1426
- Tennessee Historical Commission: http://www.tennessee.gov/environment/hist/federal/sect106.shtml
- Virginia Department of Historic Resources: http://www.dhr.virginia.gov/homepage_general/forms.htm
- West Virginia Department of Culture and History: http://www.wvculture.org/shpo/review.html

3.4.5 Recreation

This section describes the amount and type of land in public ownership (federal, state, local) by state within the Covered Land area. Data on visitation rates for specific federal lands are provided when available. This section then examines recreational uses on federal lands owned by the USFS, NPS, USFWS, and USACE.

Recreation Lands

As shown in **Table 3.4-26**, nearly all land within the Covered Land area is under private ownership, with the remaining land under local, state, or federal ownership. Lands that are under local, state, or federal ownership are considered public lands for the purpose of this analysis and as such are open to some level of recreational use.

Table 3.4-26: Aggregate Land Ownership Type for the Covered Land Area

Owner	Acres	Percent
Federal	243,856	2.50
Local	29,129	0.30
NGO	1,594	0.02
Private	9,144,863	93.60
State	349,773	3.58
Water	1,206	0.01

Source: State Based Ownership Data, NAUS 2006a, NPS 2007a, USFS 2006a

The majority of publicly accessible lands are concentrated in Ohio, West Virginia, Virginia, and Pennsylvania (**Table 3.4-27**). In total, the Covered Land area includes 243,856 acres of land under federal control. Several states, including Delaware, Indiana, New Jersey, New York, and North Carolina have no federal lands within the Covered Land area.

The Covered Land area encompasses nearly 350,000 acres state-owned lands. Nearly 47 percent of state lands are located in Pennsylvania, while 42 percent is located in Maryland, West Virginia, and Ohio, collectively. Several states have no state lands

within the Covered Land area, including North Carolina and Delaware. State lands typically include state parks, wildlife management areas and state forests.

Lands that are identified as owned by local governments are typically local parks and nature preserves. Individual parcels are generally 100 acres or less. The majority of properties owned by local governments are located in Ohio and Maryland.

Table 3.4-27: Public Land Ownership in the Covered Land Area

State	Total Acres in Covered Land Area	Federal Acres	State Acres	Local Acres
Delaware	1,137	-	-	72
Indiana	88,599	-	751	423
Kentucky	499,418	5,421	6,526	474
Louisiana	485,922	2,891	9,919	-
Maryland	372,218	476	66,814	6,376
Mississippi	142,154	3,438	1,037	-
New Jersey	43,204	-	1,356	437
New York	185,301	-	11,280	-
North Carolina	929	-	-	-
Ohio	3,219,472	126,595	38,524	18,389
Pennsylvania	1,677,115	17,113	163,081	2,192
Tennessee	122,865	713	4,960	-
Virginia	453,837	51,833	2,379	669
West Virginia	2,478,251	35,378	43,146	96
Source: State Based Ownership Data, NAUS 2006a, NPS 2007a, USFS 2006a				

U.S. Forest Service Lands

USFS data from 2005 show that the six National Forests within the Covered Land area had estimated site visitation rates ranging from a low of approximately 458,000 in Wayne NF in Ohio, to a high of 4.17 million in the George Washington - Jefferson NF (see **Table 3.4-28**).

Table 3.4-28: Estimated 2005 Site Visits to National Forests in the Covered Land Area

USFS Area	States	Acres	Estimated Site Visits 2005
Wayne NF	OH	71,874	458,000
Monongahela NF	WV	57,046	1,146,000
Daniel Boone NF	KY	39,178	3,396,000
George Washington – Jefferson NF	VA-WV	35,138	4,168,000
Allegheny NF	PA	23,498	1,616,000
National Forests of Mississippi	MS	3,114	3,166,000
Source: USFS 2006c			

Localized participation rates for a series of activities around USFS lands impacted by the Covered Land area were estimated using data from a recent (2000-2004) National Survey on Recreation and the Environment conducted by the USFS Southern Research Station. Below are estimated participation rates in selected activities for the local population aged 16 and older who live within a 75 mile radius of the six USFS lands (see **Table 3.4-29**).

Overall, participation rates for each activity are fairly similar among all six forests. Walking for pleasure is the most popular activity. Viewing/photographing natural scenery, driving for pleasure, picnicking, and viewing/photographing other wildlife are among the top five activities for all USFS lands, and hunting is the least popular activity.

Table 3.4-29: Participation Rates in Outdoor Activities around USFS Lands

Outdoor Recreation Activities	Wayne NF (percent)	Monongahela NF (percent)	Daniel Boone NF (percent)	George Washington-Jefferson NF* (percent)	Allegheny NF (percent)	Holly Springs – MS NF (percent)
Visiting a wilderness or primitive area	35.0	36.6	38.2	36.5	34..2	27.5
Day hiking	34.8	35.4	36.9	38.2	35.4	20.2
Viewing/photographing natural scenery	64.4	65.3	61.8	63.3	66.7	50.9
Viewing/photographing other wildlife	51.9	53.6	50.8	50.4	52.8	39.3
Freshwater fishing	33.4	32.3	38.0	30.9	28.6	38.6
Hunting	14.4	17.3	15.5	13.5	14.6	18.2
Boating	37.6	37.7	38.1	38.3	39.9	33.7
Swimming in a lake/stream, etc.	42.5	44.8	41.3	43.4	49.2	34.2
Picnicking	62.3	63.1	61.4	62.2	65.5	50.5
Walking for pleasure	86.7	87.3	83.3	86.5	87.2	83.8
Driving for pleasure	62.2	63.1	68.8	65.3	60.8	62.5
*Average of Both NF area statistics - Source: USFS 2006b						

National Park Service Lands

The NPS Social Science Program provides visitation estimates for each of the properties under its management, including summaries by state. In examining the 14 state Covered Land area, the highest visitation rates to NPS lands were found in Virginia, followed by North Carolina, and New York. Delaware has no NPS lands (see **Table 3.4-30**).

Table 3.4-30: Total Visits to NPS Lands by State

State	NPS Recreation Visits 2006
Delaware	--
Indiana	2,190,492
Kentucky	1,924,683
Louisiana	333,508
Maryland	3,249,642
Mississippi	6,016,266
New Jersey	5,708,286
New York	15,154,997
North Carolina	20,091,486
Ohio	2,704,686
Pennsylvania	8,842,235
Tennessee	7,758,199
Virginia	22,944,011
West Virginia	1,737,487
Total	110,579,323
Source: NPS 2007c	

Table 3.4-31 shows the area and number of visitors to 13 unique NPS lands within the Covered Land area between 1996 and 2006. Visitation rates over the last decade show that the most visited NPS land in the Covered Land area has been the Natchez Trace Parkway and National Scenic Trail (NST).

Table 3.4-31: Visits to NPS Lands within the Covered Land Area

National Park Service Lands	State(s)	Acres	Visitation 1996	Visitation 2000	Visitation 2006
Bluestone National Scenic River (NSR)	WV	550	64,651	51,738	46,093
Cedar Creek and Belle Grove Historical Park	VA	893	n/a	n/a	n/a
Chesapeake and Ohio Canal NHP	MD-WV	7,269	904,509	3,115,654	3,039,178
Delaware Water Gap NRA	PA-NJ	2,344	4,657,735	4,900,745	5,254,216
Friendship Hill National Historic Site (NHS)	PA	545	19,228	29,913	25,636
Gettysburg National Military Park (NMP)	PA	646	1,632,720	1,542,184	1,666,365
Green Springs NHL District	VA	3,505	n/a	n/a	n/a
Indiana Dunes National Lakeshore (NL)	IN	91	1,526,166	1,820,228	1,938,132
Manassas NBP	VA	1,307	725,086	692,006	674,851
Natchez Trace Parkway and NST	MS-TN	268	6,088,610	5,737,183	5,713,583
Petersburg National Battlefield	VA	781	171,312	171,009	152,889
Shenandoah NP	VA	4,402	1,571,019	1,419,579	1,076,150
Upper Delaware SRR	NY-PA	2,871	494,267	276,178	276,178
		Total	17,855,303	19,756,417	19,863,271
Source: NPS 1997, 2001 and 2007c					

The 444 mile Natchez Trace Parkway commemorates an ancient trail that connected southern portions of the Mississippi River, through Alabama, to salt licks in central Tennessee (NPS 2007b). The Old Natchez Trace NST commemorates a 500-mile footpath that ran through Choctaw and Chickasaw lands connecting Natchez, Mississippi to Nashville, Tennessee (NPS 2006). The second most popular NPS lands include the Delaware Water Gap NRA and the Chesapeake and Ohio Canal NHP. The Delaware Water Gap NRA is a 40 mile water trail that passes through forested mountains and the “Water Gap” of the Middle Delaware River (NPS 2008b). The Chesapeake and Ohio Canal NHP preserves the U.S. transportation and canal-era history along the Potomac River (NPS 2008a). Gettysburg NMP, Indiana Dunes NL, and Shenandoah NP are also popular areas, with over a million visits annually.

U.S. Fish and Wildlife Service Lands

There are six national wildlife refuges (NWRs) within the Covered Land area. Some of the larger NWRs include the following:

Grand Cote NWR provides valuable waterfowl habitat in the Mississippi/Red River floodplain as part of the North American Waterfowl Management Plan. The 6,000-acre refuge, located in central/north central Louisiana, hosts approximately 10,000 visitors annually (USFWS 2008c).

Cameron Prairie NWR in southwest Louisiana was established to preserve and protect wintering waterfowl and their habitat. It contains 9,621 acres of fresh marsh, coastal prairie, and old rice fields (currently moist soil units). The refuge is located at the convergence of two major flyways. Approximately 30,000 people visit the refuge annually (USFWS 2008a).

The Canaan Valley NWR was established in 1994 to preserve the unique wetlands and uplands of a high elevation region in West Virginia. Canaan Valley contains the largest freshwater wetland area in West Virginia and the central and southern Appalachians (USFWS 2008b).

The Great Dismal Swamp NWR, located in southeastern Virginia and northeastern North Carolina, includes 111,000 acres of forested wetlands and Lake Drummond (USFWS 2008d).

U.S. Army Corps of Engineers Lands

The USACE manages several sites within the Covered Land area. Some of the larger properties include Old Hickory Lake and J. Percy Priest Lake in Tennessee, and Mohawk Reservoir and Charles Mill Lake in Ohio. Both Old Hickory Lake and J. Percy

Priest Lake are located near Nashville and are popular destinations for fishing, hunting, camping, picnicking, boating, canoeing, and hiking for millions of visitors annually. The Mohawk Dam/Reservoir was built along with 13 other dams authorized by the Flood Control Act of 1938 to control flooding within the Muskingum River watershed. The area is available for boating and fishing. Charles Mill Lake is located on the Black Fork of the Mohican River and is a popular area for boating and fishing (USACE 2008b).

Recreation Participation

Table 3.4-32 below shows statewide participation rates in wildlife-associated recreation, including fishing, hunting, and wildlife watching. In total, approximately 37 percent of the U.S. angling population 16 years and older fished within the Covered Land area. Most anglers occurred in North Carolina, Ohio, and New York and the fewest occurred in Delaware and West Virginia. Approximately 39 percent of hunters in the U.S. 16 years or older hunted within the Covered Land area with the most hunters in Pennsylvania and the fewest in Delaware and New Jersey. The most popular recreational activity is wildlife watching. Approximately 31 percent of the total U.S. population participated in some form of wildlife watching. Within the Covered Land area, the greatest number of participants occurs in Pennsylvania, Ohio, and New York.

Table 3.4-32: Participation in Wildlife-Associated Recreation – 2006

State	Total Anglers, Residents and Nonresidents	Total Hunters, Residents and Nonresidents	Wildlife Watching, Total Participants
US Total	29,952	12,510	71,132
Delaware	159	42	212
Indiana	768	272	1,825
Kentucky	721	291	1,341
Louisiana	702	270	712
Maryland	645	161	1,334
Mississippi	546	304	618
New Jersey	654	89	1,537
New York	1,153	566	3,548
North Carolina	1,263	304	2,267
Ohio	1,256	500	3,379
Pennsylvania	994	1,044	3,638
Tennessee	871	329	1,966
Virginia	858	413	2,126
West Virginia	376	269	585
* Numbers in Thousands of Participants - Source: USFWS 2006a			

3.4.6 Visual Resources

Visual resources, including special designations, include natural or human made features that make up the aesthetic quality of a particular area. These features may be landforms, water resources, vegetation, or manufactured in form, and make up the overall visual impression in a certain area. Specific lands or resources that would constitute potentially sensitive visual resources within the Covered Land area include lands owned by the NPS (**see Table 3.4-31**) or USFS (**see Table 3.4-28**), as well as Wild and Scenic Rivers (WSR), and National Scenic Byways (NSB), All-American Roads (AAR), and state-designated scenic byways. Other federal lands of note within the Covered Land area include the Appalachian Trail and the Laurel Forks Wilderness Area within the Monongahela NF in West Virginia. The Appalachian Trail is managed

cooperatively by the NPS, the Appalachian Trail Conservancy, a number of local clubs, the USFS, and other public land managing agencies. The Appalachian Trail is crossed by the Covered Land area eight times; twice in Shenandoah NP, once in the in Delaware Water Gap NRA, and five times on other, non-federal lands. The Laurel Forks Wilderness Area has separate and more stringent requirements under the Wilderness Act of 1964 (Public Law 88-577).

The issuance of the ITP does not specifically authorize projects that would directly affect the quality of visual resources within the Covered Land area. However, as specific projects are undertaken local, state, or federal level permits or review may be required depending upon the nature of the activity. As such, potential impacts on visual resources would be considered on a project-by-project basis, and may be subject to conditions of site-specific approval. Below is a general description of the types of visually sensitive lands and resources within the Covered Land area.

National Park Service Lands

Table 3.4-31 shows that 13 unique NPS lands are crossed in nine different states by the Covered Land area. Resources include about 91 acres of the Indiana Dunes National Lakeshore in Indiana, 4,402 acres of the Shenandoah NP in Virginia, and over 7,200 acres of the Chesapeake and Ohio Canal NHP.

U.S. Forest Service Lands

USFS data shows that the six National Forest areas are directly crossed by the Covered Land area (see **Table 3.4-28**). The Wayne NF in Ohio is the largest area crossed by the Covered Land at nearly 72,000 acres, followed by the Monongahela NF in West Virginia.

Scenic Byways

Scenic Byways include roadways nationally designated by the USDOT Federal Highway Administration (NSBs or AARs) based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. The NSB Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and has been reauthorized under the Transportation Equity Act for the 21st Century, as well as the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005. Many states also have passed state legislation authorizing the designation of state-level byways that are of statewide significance due their archaeological, cultural, historic, natural, recreational, and scenic qualities.

There are 10 states in the Covered Land area that have federally designated byways and/or state designated byways. **Table 3.4-33** provides a breakdown of these byways on a state-by-state basis.

Table 3.4-33: Scenic Byways within the Covered Land Area

State	Name	Designation	Miles
Kentucky	Boone Creek Scenic Byway	State	0.1
	Cordell Hull Highway	State	1.1
	Country Music Highway	NSB, State	22.7
	Cumberland Cultural Heritage Highway	State	11.4
Louisiana	Bayou Teche Scenic Byway	State	26.4
	Bienville Trace Scenic Byway	State	17.0
	Colonial Trails Scenic Byway	State	4.8
	Creole Nature Trail	NSB, State	6.3
	Jean Lafitte Scenic Byway	State	12.6
	River Road Scenic Byway	State	2.7
	Wetlands Cultural Trail	State	23.4
	Zydeco Cajun Prairie Scenic Byway	State	12.8
Maryland	Falls Road	State	1.4
	Historic National Road - Maryland	NSB, State	44.5
	Horses and Hounds Scenic Byway	State	2.0
	Mason and Dixon Byway	State	2.4
	Mountain Maryland Byway	State	36.8

State	Name	Designation	Miles
Mississippi	Great River Road - Mississippi	Other	1.1
	Lower Mississippi Great River Road	NSB	0.1
	Mississippi Delta Great River Road	State	1.0
New York	Upper Delaware Scenic Byway (Route 97)	State	5.5
Ohio	Amish Country Byway	NSB, State	10.5
	Covered Bridge Scenic Byway	USFS	6.8
	Drovers' Trail Scenic Byway	State	13.7
	Gateway to Amish Country	State	24.1
	Historic National Road - Ohio	NSB, State	27.2
	Jefferson Township Scenic Byway	State	5.4
	Lake Erie Coastal Ohio Trail	NSB, State	0.9
	Maumee Valley Scenic Byway	State	3.9
	Morgan County Scenic Byway	State	1.6
	Ohio & Erie Canalway	NSB, State	2.3
	Ohio Lincoln Highway Historic Byway	State	93.3
	Ohio River Scenic Byway	NSB	99.3
	Tappan-Moravian Trail Scenic Byway	State	7.1
	Wally Road Scenic Byway	State	5.8
	Welsh Scenic Byway	State	5.0
Pennsylvania	Brandywine Valley Scenic Byway	State	7.4
	Bucktail Trail	State	2.9
	High Plateau Scenic Byway	State	16.1
	Historic National Road - Pennsylvania	NSB, State	16.4
	Kinzua Bridge Byway	State	0.8
	Laurel Highlands Scenic Byway	State	0.5
Tennessee	Natchez Trace Parkway	NSB, USFS, NPS	3.1
Virginia	Old Georgetown Pike	State	1.5
	Skyline Drive	NSB, NPS	3.3
West Virginia	Cheat River Byway	State	14.1
	Coal Heritage Trail	NSB, State	6.5
	Farm Heritage Road	State	9.9
	Historic National Road - West Virginia	NSB	4.9
	Little Kanawha Parkway	State	2.2
	Midland Trail	NSB, State	28.6
	Northwestern Turnpike	State	28.0
	Ohio Lincoln Highway Historic Byway	State	0.5
	Old Route 7 Byway	State	27.3
	Rich Mountain Backway	State	2.2
	Staunton-Parkersburg Turnpike	NSB, State	9.5
Source: NSB Program unpublished data a,b			

Wild and Scenic Rivers

The Wild and Scenic Rivers Act was passed on October 2, 1968 to protect rivers with outstanding scenic, natural, historic, cultural, and recreational characteristics, and to protect their free-flowing condition. This Act prohibits federal funding for dams or water projects that would adversely affect river values, requires a management plan to be developed for rivers in the system to address overall management and resource protection, development, and recreation. Management oversight of these rivers is varied and can include federal, state, and local partners depending upon the specific river segment designated.

As of 2006, the WSR system contained 165 rivers nationally (including Puerto Rico) covering approximately 11,000 miles (USFWS 2007a). There are eight segments of rivers designated as Wild and Scenic totaling just over 25 miles within the Covered Land area. **Table 3.4-34** provides a listing of the specific WSR segments and mileages within the Covered Land area.

Table 3.4-34: Wild and Scenic Rivers within the Covered Land Area

Name	States	Miles
Big and Little Darby Creek WSR	OH	5.11
Bluestone NSR	WV	.05
Clarion WSR	PA	2.67
Little Beaver Creek WSR	OH	2.19
Little Miami WSR	OH	1.35
Upper Delaware SRR	NY/PA	1.09
Musconetocong WSR	NJ	11.65
Lower Delaware WSR	NJ/PA	1.48
Source: USFWS 2006b, 2007b,d, USGS 2001		

3.4.7 Noise

Noise refers to a sound or sounds that are loud, unpleasant, unexpected, or undesired. Human responses to noise can vary depending on the time of day, sensitivity of the receptor (homes, schools, hospitals, etc.), the distance between the source of noise and the receptor, and the type of noise.

Sound is measured in decibels (dB), and is based on a logarithmic scale. This means that a 10dB increase corresponds to a 100 percent increase in perceived sound or noise. An A-weighted decibel scale (dBA) is commonly utilized to measure environmental noise or potential noise pollution, as it more effectively measures sounds that are perceptible to the human ear.

Sound levels are often reported in terms of day-night average sounds level (Ldn). The Ldn is the average noise level over a 24-hour period with the noise between the hours of 10PM and 7AM artificially increased by 10dB to compensate for the increase in sensitivity to noise events and the lower level of background noise during these night-time hours. An Ldn of 55dB is recognized by many federal agencies, including the EPA, as an outdoor limit for protecting public health and welfare in residential areas. An Ldn of 65dB is the noise level at which residential land use becomes questionable for structures with average or below average acoustic insulation. An Ldn exceeding 75dB is considered by many federal agencies to be unacceptable for residential areas (EPA 1974).

Overall, the issuance of the ITP does not specifically authorize projects that would directly affect potential noise receptive areas within a particular area of the Covered Land. However, as specific projects are undertaken, depending upon the nature of the activity, local noise ordinances, state noise regulations, or federal level permits or review may be required. As such, potential impacts on noise receptive areas would be

considered on a project-by-project basis, and may be subject to additional conditions of approval during future NEPA actions, tiered or otherwise.

Under the NGA, FERC regulations (18 CFR 380.12) require that a noise resource report be developed involving compressor facilities at new or existing stations and for all new liquid natural gas facilities. The purpose of this report is to identify effects of the project and mitigations for those effects (FERC 1987). FERC requires that new stations or new facilities at existing stations must not exceed an Ldn of 55dBA at any pre-existing noise-sensitive area (such as schools, hospitals, or residences). Specifically, according to 18 CFR § 380.12, environmental reports for NGA applications must:

- Quantitatively describe existing noise levels at noise-sensitive areas, such as schools, hospitals, or residences and include any areas covered by relevant state or local noise ordinances.
    - Report existing noise levels as the Leq (day), Leq (night), and Ldn and include the basis for the data or estimates.
    - For existing compressor stations, include the results of a sound level survey at the site property line and nearby noise-sensitive areas while the compressors are operated at full load.
    - For proposed new compressor station sites, measure or estimate the existing ambient sound environment based on current land uses and activities.
    - Include a plot plan that identifies the locations and duration of noise measurements, the time of day, weather conditions, wind speed and direction, engine load, and other noise sources present during each measurement.

- Provide a quantitative estimate of the impact of the project on noise levels at noise-sensitive areas, such as schools, hospitals, or residences.
- Include step-by-step supporting calculations or identify the computer program used to model the noise levels, the input and raw output data and all assumptions made when running the model, far-field sound level data for maximum facility operation, and the source of the data.
- Include sound pressure levels for unmuffled engine inlets and exhausts, engine casings, and cooling equipment; dynamic insertion loss for all mufflers; sound transmission loss for all compressor building components, including walls, roof, doors, windows and ventilation openings; sound attenuation from the station to nearby noise-sensitive areas; the manufacturer's name, the model number, the performance rating; and a description of each noise source and noise control component to be employed at the proposed compressor station. For proposed compressors the initial filing must include at least the proposed horsepower, type of compression, and energy source for the compressor.
- Far-field sound level data measured from similar units in service elsewhere, when available, may be substituted for manufacturer's far-field sound level data.
- If specific noise control equipment has not been chosen, include a schedule for submitting the data prior to certification.
- The estimate must demonstrate that the project will comply with applicable noise regulations and show how the facility will meet the following requirements:
    - The noise attributable to any new compressor station, compression added to an existing station, or any modification, upgrade or update of an existing station, must not exceed a day- night sound level (Ldn) of 55 dBA at any

pre-existing noise-sensitive area (such as schools, hospitals, or residences).

- o New compressor stations or modifications of existing stations shall not result in a perceptible increase in vibration at any noise-sensitive area.

- Describe measures and manufacturer's specifications for equipment proposed to mitigate impact to noise quality, including installation of filters, mufflers, or insulation of piping and buildings, and orientation of equipment away from noise-sensitive areas.

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Chapter 4 Environmental Consequences

4.1 Introduction

This chapter compares and contrasts the alternatives in Chapter 2, including the environmental consequences of the alternatives, the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources, which would be associated with the Proposed Action should it be implemented. The conclusions reached in this EIS are based on our analysis of impacts and the following assumptions:

- NiSource Covered Activities would occur at the same rate, location, and point in time for each of the alternatives;
- NiSource Covered Activities would be implemented as described in the MSHCP and Biological Assessment (BA); and
- NiSource would comply with all applicable laws and regulations.

Over the next 50 years, NiSource anticipates 904 acres of new disturbance and 18,505 acres of disturbance on previously disturbed land (most of which is vegetation maintenance) on an annual basis (see NiSource MSHCP Table 2.1). This equates to a total annual disturbance of approximately 0.2% of the total Covered Land (0.19% within the existing ROW and 0.0092% in areas outside of their existing ROWs). While the Covered Land boundary represents the area for which NiSource seeks incidental take coverage for its Covered Activities, only a very small portion of the Covered Land will actually be impacted by NiSource's Covered Activities. Table 2.1 in the MSHCP lists anticipated annual impacts within the Covered Land.

For purposes of analysis, activities were broken into four main categories: ROW Maintenance, O&M, Medium Capital Expansion Projects, and Large Capital Expansion Projects. ROW maintenance acreage estimates were based on historic and anticipated future budgets for this work, which translates into approximately 2,200 miles of ROW maintenance a year. O&M

acreage estimates were based on historic five-year average and anticipated future growth for this type of work across the pipeline system.

Four levels of impact durations were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction with the resource returning to preconstruction conditions almost immediately afterward. Short-term impacts would continue for up to 3 years following construction. Impacts were considered long-term if resources would require more than 3 years to recover. Permanent impacts would occur as a result of activities that modify resources to the extent that they would not return to pre-construction conditions during the life of a project, such as impacts to vegetation as a result of the construction and operations of an aboveground facility. We considered an impact to be significant if it would result in a substantial adverse change to the environment.

The nature of the Proposed Action, including the proposed Covered Land that comprise the affected environment, and the spatial and temporal uncertainty about future project locations, did not allow for site specific analyses. A comprehensive analysis of Covered Activities and their effect on species and species habitat was done for the MSHCP and for the appended Biological Assessment (BA). For the MSHCP, species and species habitat were evaluated using reasonable worst-case assumptions to predict the manner and extent of anticipated take, which we believe captures the range of possible effects into the future. Impacts associated with implementation of NiSource Covered Activities will be nearly identical under each of the alternatives, including the No Action Alternative. The scope of the analysis therefore covers the direct, indirect, and cumulative effect (i.e., impacts) of the proposed incidental take, and the avoidance, minimization and mitigation measures proposed from implementation of the MSHCP (Service MSHCP Handbook at 5-1 to 5-2).

As discussed in Chapter 1, neither the MSHCP nor ITP authorize the NiSource Covered Activities that may cause take. NiSource Covered Activities entail considerable involvement of other federal agencies in the authorization, approval, or permitting of Covered Activities. As such, the Cooperating Agencies will necessarily make separate and independent decisions regarding these future actions, consistent with their regulations and policies.

Further, as discussed in Section 1.5.3, the FERC has done a NEPA analysis on potential impacts of activities certificated under its Blanket Certificate Program, and the results were a "finding of no significant impact" (FONSI). As discussed elsewhere in this EIS, we adopt and incorporate FERC's NEPA analysis for its blanket certificate program by reference.

4.2 Impacts to Physical Resources

4.2.1 Surface Water

Analysis of surface water resources includes a discussion of potential impacts to natural water found above the ground surface as a result of NiSource Covered Activities, such as lakes, ponds, rivers, streams, springs, and other wetlands. All of the species in the MSHCP depend on surface water resources for some part of their life history, with the exception of the Madison cave isopod, a cave obligate species.

Alternative 1

For all alternatives, construction-related direct and indirect impacts to surface water resources could occur from future Covered Activities, especially earth-disturbing activities on Covered Land prone to erosion, and activities directly associated with wetlands, rivers and streams. As a result, there may be direct, indirect, and cumulative effects to species included in the MSHCP that rely on these resources. Examples of such activities include disturbance associated with clearing and grading of stream banks, in-stream trenching, trench dewatering, blasting, backfilling, and hydrostatic testing.

Impacts from such activities may arise due to reduced shading from tree clearing, which can increase water temperatures; temporary suspension of sediments from grading, trenching, and in-stream blasting, which can cause turbidity and affect dissolved oxygen concentrations and stream bottoms; and potential release of drilling fluids during Horizontal Directional Drilling (HDD), which could contaminate receiving waters. Uncontrolled erosion from rights-of-way treated with herbicides, fertilizers or pesticides could introduce these substances into receiving

waters. Similarly, leaks or spills of fuels and lubricants during right-of-way construction and maintenance could adversely affect surface water quality.

Depending on the season that NiSource conducts hydrostatic testing, withdrawal of test water from natural low flowing surface sources could alter stream velocities or flow, affecting organisms and/or water use downstream. Similarly, if commercial or private water sources are used it could limit supplies available for other uses. Discharging test water into a body of water significantly different in temperature and/or salinity could have temporary adverse effects on the receiving water. Improper storage of chemically pretreated test water or test water contaminated by oil and/or grease residues from the pipe could contaminate surface water, groundwater, and soils, and impacts certain bird and bat species. Inadequate use/installation of erosion control devices during the discharge of hydrostatic test water could erode soils in the immediate vicinity of the release. If such a failure occurs at or near a stream crossing, it could temporarily contaminate the stream.

NiSource's ECS (see Appendix B of the MSHCP) and individual project EM&CPs, outline specific requirements to minimize water-related impacts from construction and ROW maintenance, as well as construction of other facilities including wells, compressor stations, HDD locations, and measurement/regulation stations. These include:

- installation of equipment bridges,
- use of sediment traps for impounded water (or something similar) prior to trenching,
- use of sediment fence/filters for trench spoil,
- restricting use of herbicides or pesticides within 100-feet of a water body or wetland,
- spill prevention, containment and control measures which prohibit field storage of fuel within 100-feet of water bodies, and
- seasonal restrictions (related to cold water, cool water, and warm water fishery streams to include agency notification) during construction of water crossings.

In addition, NiSource is required to obtain and comply with other federal permits, as well as state and local authorizations, to protect surface water resources. As mandated by law, all required permits and authorizations must be in place before NiSource initiates its Covered Activities. For example, the USACE administers the Section 404 permit program that restricts the discharge of dredged or fill material into waters of the U.S., including wetlands, and establishes mitigation requirements for authorized impacts. The *National Pollutant Discharge Elimination System (*NPDES) stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more to obtain coverage under an NPDES permit for their stormwater discharges. NiSource must submit a Storm Water Pollution Prevention Plan (SWPPP) to the appropriate state agency (or EPA if no state program exists) for concurrence that the plan for construction activities are completed in a manner that minimizes erosion and runoff into receiving waters. Other permits that may apply include locally-administered floodplain development permits under the National Flood Insurance Program and various other local and state permits that may exist related to protecting water quality, surface water resources, and wetlands.

Finally, in locations where T&E species overlap with NiSource Covered Activities and surface water resources (primarily rivers and streams), NiSource already implements ESA-related measures (under Section 7 of the ESA) for protecting surface water quality. These ESA-related measures (i.e., best management practices, RPMs, terms and conditions) were developed for the purpose of protecting surface water quality for dependent T&E species (e.g., mussels, Nashville crayfish, Indiana bat, bog turtle, etc). While many of these protective measures are similar in design and outcome as the AMMs in the MSHCP, the extent and intensity of where and how they are implemented may not be the same, as the process used in the MSHCP involved using a reasonable worst-cast scenario from a T&E conservation perspective, and assumed species presence in suitable habitats. Therefore, surface water-dependent species would receive less protection under Alternative 1 (status quo) than under Alternatives 2 and 3, and no mitigation would be implemented.

Alternative 2

Under Alternative 2, additional species-specific AMMs were developed as part of the MSHCP process to further protect surface water-related species (e.g., bog turtle, mussels, Nashville crayfish)(see Chapter 6 of the MSHCP and the appended BA). These measures may have the incidental benefit of reducing or avoiding impacts to surface water resources above and beyond those provided in the ECS, or required by other regulatory agencies. We recognize, however, that these additional benefits may only accrue in those areas where the ESA-listed species occur or are presumed to occur. These AMMs, which may incidentally benefit surface water resources, can be summarized as follows:

- Avoiding construction of culverts or graveled ford across water bodies or riparian occupied habitat;
- Use of flumes to minimize flow disruption in stream habitat;
- Ensuring that upland work does not result in impacts to adjacent water habitats;
- Use of HDD techniques, where feasible, or other trenchless methods for pipeline construction

  or replacement across water habitats;
- Installing pipelines to a minimum depth at least 10-feet horizontally outside the high water line

  in riparian areas;
- Avoiding installation of pipelines or performing in-channel repairs within occupied water

  habitats;
- Working from a lay barge or temporary work bridge rather than operating heavy equipment

  in-stream;
- Removing equipment bridges as soon as practicable;
- Inspecting for and correcting bank destabilization associated with the pipeline within occupied

  water habitats;

- Ensuring that work within streams does not result in impacts to adjacent habitats or karst features;
- Avoiding work in channelizing streams; and
- Crossing perennial streams only during specified periods.

Compliance with NiSource's pre-existing ECS, the regulatory requirements related to USACE's Section 10 and/or 404 permits, the NPDES permit for construction projects, other state and local permits, along with the range of AMMs identified in the MSHCP (for both Alternatives 2 and 3), would minimize the potential for impacts to surface water resources associated with future Covered Activities.

NiSource mitigation measures, including long-term protection and restoration of riparian buffers on rivers and streams with Covered Species (e.g., clubshell mussel, fanshell mussel, sheepnose mussel, James spinymussel) and the Nashville crayfish; floodplain forest habitat for the benefit of Indiana bat; and wetland habitat for the benefit of bog turtle (see Tables 8.2.2-1 and 8.2.2-2 in MSHCP), should produce a net conservation benefit to surface water quality, resulting in benefits to a variety of terrestrial and aquatic organisms, including Covered Species. Riparian restorations that meet minimum NRCS standards for water quality and riparian corridors (see Appendix L of the MSHCP) will be designed to moderate surface water temperatures, reduce nutrient inputs, and reduce sediments and other contaminants along occupied streams, thereby improving the quality of the water and associated habitat for Covered Species and other organisms. Floodplain forest restoration for Indiana bats should improve surface water quality when developed land (e.g., agricultural production land) is converted back into forest habitat. Upland buffers placed around wetlands that support bog turtles should protect and improve the water quality in those wetlands and positively impact associated flora and fauna.

Alternative 3

Like Alternative 2, implementation of additional AMMs included as part of Alternative 3 will further protect water-dependent species (e.g., bog turtle, mussels, etc) and may have the

incidental benefit of reducing or avoiding impacts to surface water resources above and beyond those provided in the ECS or required by other regulatory agencies. Again, we recognize, however, that these additional benefits may only accrue in areas where the ESA-listed species occur. Compliance with NiSource's pre-existing ECS, the regulatory requirements related to USACE's Section 10 and/or 404 permits, the NPDES permit for construction projects, other state and local permits, along with the range of AMMs identified in the MSHCP, would minimize the potential for impacts to surface water resources associated with future pipeline activities.

Over the long-term, mitigation associated with Alternative 3 should produce many of the same benefits as Alternative 2, although to a slightly lesser degree. Under Alternative 2, NiSource would front-load all of their mitigation for O&M activities within the first seven years of MSHCP implementation (see Table 8.2.2-1 in MSHCP). Under Alternative 3, O&M mitigation will not be front-loaded. As a result of the front-loading mitigation, conservation benefits associated with mitigation will start accruing earlier, and over the long-term, exceed those benefits expected from Alternative 3.

Other types of mitigation may not get implemented at all, as NiSource may be unwilling to commit mitigation upfront for the reduced planning horizon (i.e., 10-years) or decide to pursue the status quo approach to ESA compliance (i.e., Section 7), where species avoidance and minimization would be about the same, but mitigation would cease, as mitigation under Section 7 of the ESA is not a legal requirement. If this were the case, mitigation and the associated conservation benefits under both Alternative 2 and 3 would be greatly diminished over what was proposed in the MSHCP.

4.2.2 Ground Water

Analysis of ground water resources includes a discussion of impacts to natural water found underneath the ground surface within the Covered Land, including aquifers, water supply wells, springs, and wellhead protection areas. MSHCP species dependent on ground water include the Madison cave isopod, Indiana bat, and bog turtle. Implementation of any of the alternatives,

including the No Action Alternative, is expected to result in minimal direct or indirect effects to local ground water resources in the Covered Land.

Alternative 1

In general, groundwater impacts associated with most NiSource Covered Activities would only occur where the local water table is near the surface. All such impacts would be temporary and localized. However, future NiSource activities, particularly construction activities and storage field operations, do have the potential to directly and indirectly impact local ground water resources, and NiSource's ECS (see Appendix B) currently outline strategies for minimizing these potential impacts. For instance, blasting that occurs during construction could potentially impact water quality and water quantities in wells and springs near construction work areas. Other potential impacts to groundwater may include variations in groundwater levels or turbidity due to trench excavation and dewatering in areas with shallow groundwater systems; or clearing and grading activities that might impact overland water flow and/or surface-to-groundwater infiltration rates. Such construction-related impacts are typically temporary as NiSource's standard practice (through ECS compliance) implements procedures for erosion controls, restoration of ground contours, and re-vegetation. Further, the majority of construction would involve shallow, temporary, and localized excavation. These potential impacts would be avoided or minimized by the use of construction techniques and mitigation described in NiSource ECS and individual project EM&CPs.

A NiSource activity that does have the potential to impact groundwater resources is hydraulic fracturing associated with storage well installation, operations, and maintenance. Hydraulic fracturing involves high pressure injection of water-based slurry into a well or wells to break up the underlying geologic formation and expand or recondition the storage capacity of a storage field (well). This technique is used by NiSource to enhance or recondition existing storage wells within the Covered Land. Typical depths of NiSource's storage field well fracturing is between 2,000-6,000-feet (NiSource 2010c), well under the groundwater supply commonly used for domestic or otherwise potable water supply. Because the impacts occur at these depths

below the surface, there is no anticipated impact to endangered species that live on or near the surface.

Hydraulic fracturing has been the subject of some public scrutiny in parts of the country that have experienced negative environmental consequences when the water is inadequately treated at disposal facilities and released into the environment. The injection water is high in salinity and total dissolved solids and must be properly treated prior to release. NiSource water disposal is completed at one facility in Lawrence County, Pennsylvania, for activities that would fall within the Covered Activities. This facility releases its treated water into the Shenango River and it has been determined that the affected stretch of river does not contain threatened or endangered mussels. It is important to note that there is a significant difference between utilizing the technique for enhancement of existing storage wells, as NiSource does, and the use of the technique for exploration of potential natural gas sources. The public interest and controversy has emerged due to activities associated with hydraulic fracturing for exploration, which has more potential for negative environmental effects due to its use of a much greater volume of water to form the slurry used to create the required pressure.

At issue with respect to groundwater is the potential for cross-contamination of shallow potable aquifer systems from deep well injection and flowback water. To address this potential, NiSource wells are constructed with steel casing grouted within the borehole annulus through these shallow aquifer zones to avoid any potential for interaction of deeper, poor quality formation water migrating up through the borehole annulus and into the potable aquifer. In addition, disposal of injection water used to accomplish the fracturing is done in accordance with federal, state, and local regulations. Most states associated with the Covered Land have comprehensive regulatory standards for hydraulic fracturing and provide a general prohibition against pollution of any surface or subsurface fresh water from well completion activities. Wells are regulated by state authorities and/or federal EPA underground injection rules, and fracturing activities must be in compliance with associated permits relative to use and disposal of injection water. The Service has concluded that the type of hydraulic fracturing that NiSource employs

will have no adverse impacts to listed species that occur within the Covered Land and therefore, no incidental take is authorized for this activity.

Alternative 2

Under Alternative 2, AMMs developed during the MSHCP process should further protect ground water resources above those currently employed under Alternative 1. For instance, AMMs were developed to protect potential recharge areas of cave streams and other karst features important to Indiana bats. These measures are in addition to relevant NGTS ECS standards such as Section III, Stream and Wetland Crossings, and Section IV, Spill Prevention, Containment and Control. For example, drilling within 0.5 mile of known or presumed occupied hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the hibernacula (e.g., outer drilling tube filled with concrete to ensure no modification to any karst encountered) (see related adaptive management discussion in Chapter 7 of the MSHCP). Equipment servicing and maintenance areas will be sited at least 300 feet away from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features.

As mitigation, NiSource will permanently protect important caves/karsts serving as Indiana bat hibernacula, including establishing a .25-mile buffer of protected habitat around the cave/karst opening (see Section 6.2.1.6 of the MSHCP). Ground water quality improvements could be realized as a result of conversion of previously developed land (e.g., croplands) to natural habitats (e.g., wetlands, prairies, savannas, forests) where ground water infiltration would be expected to increase. Restoring and developing wetlands and certain uplands for bog turtle and other species could increase water filtration and ground water recharge capabilities as well.

NiSource minimization and mitigation measures for Madison cave isopod should improve ground water resources, at least locally. Madison cave isopod sites containing surface karst features will be protected and restored (see Section 6.2.3.6 of the MSHCP). Protected sites must contain either a cave or spring known to provide habitat for the Madison cave isopod and

its immediate recharge area, or a minimum of five surface karst features and a 300-foot buffer around each feature.

Alternative 3

For Alternative 3, issuance of an ITP with a 10-year duration would produce no effects different than those in Alternative 2, other than mitigation benefits not being realized up-front as a result of NiSource implementing their O&M mitigation within the first seven years. Again, if NiSource were to decide not to renew their ITP after 10 years and decide to comply with ESA status quo, ground water benefits associated with mitigation would be reduced, as compensatory mitigation under the status quo is not a legal or regulatory requirement under the ESA.

4.2.3 Geology

Discussion of geologic resources includes surface and subsurface materials and their inherent properties, including topography, seismic characteristics, and soil stability within the Covered Land. MSHCP species potentially affected when impacts to geologic resources occur include the Indiana bat and Madison cave isopod.

Alternative 1

Potential disturbance and minimization of impacts to geologic resources would be similar under all alternatives. Long-term, NiSource Covered Activities would not materially alter geologic conditions within the Covered Land. NiSource would continue to follow required ECS and individual project EM&CPs as required.

Potential impacts to geologic resources would result primarily from pipeline construction activities. This includes temporary disturbance to slopes within the existing right-of-way resulting from grading and trenching operations. NiSource is required to minimize impacts to slopes by returning contours to pre-construction conditions.

Alternative 2

AMMs outlined in the MSHCP for the action alternatives have the potential to further minimize impacts to geological resources that support associated Covered Species. These include NiSource's commitment to clearly mark karst buffers until ground disturbing activities are completed, and using an inverted filter to bridge karst features when filling new sinkholes. Contaminants, including but not limited to oils, solvents, and smoke from brush piles, will be strictly controlled as provided for in the EMCS and ECS, Section II.C.2, and Section IV so the quality and quantity of karst resources are not affected.

Mitigation for Indiana bat and Madison cave isopod will provide long-term protection for some important karst features. Implementation of additional karst protective measures, such as upland buffers, may occur based on future site-specific environmental reviews of potential locations.

Alternative 3

Implementation of any of the alternatives is expected to result in minimal direct or indirect effect to local or regional geology, topography, or geological hazards in the Covered Land. The major difference between Alternative 3 and Alternative 2 is any benefits to geological resources as a result of O&M mitigation would not occur as rapidly, as NiSource would not front-load their O&M mitigation under Alternative 3 (see Tables 8.2.2-1 MSHCP).

4.2.4 Soils

The soils in the Covered Land are very diverse due to the variety of climates, parent material, vegetation, landforms, and age of surface materials. Throughout the Covered Land, six of the 12 NRCS soil orders are encountered, including Ultisols, Alfisols, Inceptisols, Entisols, Mollisols, and Histosols. Analysis of soil resources associated with NiSource Covered Activities within the Covered Land includes potential impacts to soil stability, soil erosion and soil contamination, including measures to avoid and/or minimize such impacts. All of the species in the MSHCP are directly and/or indirectly affected by soil resources in the Covered Land.

Alternative 1

The Covered Land traverses a variety of soil types and conditions, the majority of which have been previously disturbed by human activity. Construction activities, such as clearing, grading, trenching, and backfilling, could adversely affect soil resources by causing erosion, compaction, and degradation. Clearing removes protective vegetative cover and exposes soil to the effects of wind and rain, which could increase the potential for soil erosion. Grading, spoil storage, and equipment traffic can compact soil, reducing porosity and increasing runoff potential. Rock or fill material brought to the surface during trenching operations could impact soil productivity and hinder restoration of the right-of-way vegetation. Permanent impacts to soils would mainly occur at existing and proposed aboveground facilities, and within previously disturbed ROWs.

NiSource would implement measures to control erosion, enhance successful revegetation, and minimize any potential adverse impacts to soil resources. Specifically, potential soil impacts would be mitigated through measures such as topsoil segregation, temporary and permanent erosion control, and post-construction restoration and revegetation of construction work areas. Additionally, NiSource would implement spill prevention and clean-up plans during construction and operation to prevent and contain, if necessary, accidental spills of any material that may contaminate soils and to ensure that any inadvertent spills of fuel, lubricant, or solvents are contained and cleaned up in an appropriate manner.

NiSource's ECS (see Appendix B) establishes specific requirements to protect and maintain soil resources, including standards related to clearing, grading, trenching, restoration, and stabilization. For example, temporary erosion controls must be installed immediately before the initial disturbance of soil. Also, when grading or trenching occurs topsoil must be stripped and stockpiled separately for residential or agricultural work areas to prevent the mixing of topsoil and subsoil. In addition, the NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more to obtain coverage under an NPDES permit for their storm water discharges. Agencies provide concurrence that construction activities are completed in a manner that minimizes soil erosion and eventual impacts to receiving waters. Under this alternative however, the additional AMMs

outlined in the MSHCP which also serve to minimize impacts to soil resources (see below) would not be required as a condition of an ITP. Instead, implementation of such measures would likely vary, negotiated in the future on a project-by-project basis with affected Service Field Offices.

Alternative 2

AMMs implemented under Alternative 2 go above and beyond the status quo ECS requirements of Alternative 1. These include employing silt fences around construction areas and soil disturbance areas, using native material to backfill trenches, as well as refraining from blasting and drilling, within specified distances of potential occupied habitat (see Chapter 6 of the MSHCP for a complete list of AMMs). NiSource's spill prevention, containment and control measures outlined in the ECS help ensure that spills are contained within secondary containment structures and potential contact with soils limited.

Habitat-based mitigation for Indiana bat, mussels, and other species has the potential to restore and protect soil resources where land that is currently "developed" is converted back into land with a semi-permanent or permanent vegetative cover (e.g., forests, wetlands, grasslands)(see Tables 8.2.2-1 and 8.2.2-2 in MSHCP).

Alternative 3

NiSource's standard BMPs, regulatory requirements related to submission of SWPPPs for construction projects, and AMMs that have been included in the MSHCP should avoid and minimize potential direct and indirect impacts to soil resources associated with these future activities under each of the alternatives, including the No Action Alternative, resulting in minimal direct or indirect effects to local soil resources. However, any benefits to soil resources as a result of O&M mitigation would not occur as rapidly, as NiSource would not front-load their O&M mitigation under Alternative 3.

4.2.5 Climate

According to the EPA, long-term observations indicate that our climate may be changing. As reported, greenhouse gases are at increased levels in the atmosphere. Global mean temperatures have increased 1.2 to 1.4ºF in the last 100 years according to NOAA and NASA, with most of the warming occurring in recent decades. Other aspects of the climate also appear to be changing, such as rainfall patterns, snow and ice cover, and sea level (EPA 2009). Global and regional climate models predict warming and increased variability in the timing and type of precipitation. As a consequence of these changes, fire regimes are likely to be altered, which, in some parts of the country, may result in increased fire frequency and intensity. Climate change may also have some direct effects on productivity and biogeography as well as indirect effects on vegetation through changes in fire, insect, and disease disturbances (Carroll et al. 2003; Dale et al. 2001; Parry et al. 2007). Some ecological communities are projected to move upward in both elevation and latitude (Walther et al. 2002). Therefore, since climate change is likely to manifest itself through other changed circumstances like flooding (as discussed in detail below), this MSHCP will discuss climate change as it relates to the accelerated rate of warming.

Alternative 1

According to the American Meteorological Society, there are local and regional considerations that come into play when trying to project a pattern of global warming onto weather or climate conditions in a specific region. The American Meteorological Society explains that there are regional variations in the signature of climate change, with warming in the western U.S. but little or no annual temperature change occurring in the southeast U.S. in recent decades. Evidence for warming is also observed in seasonal changes with earlier springs, longer frost-free periods, longer growing seasons, and shifts in natural habitats and in migratory patterns of birds (American Meteorological Society 2007).

For the Covered Land, climate can vary substantially and is influenced by variations in elevation, topographic features, latitude, and proximity to the ocean. The potential for NiSource Covered Activities to influence or impact regional climate is considered extremely low.

NiSource's Covered Activities do not include extensive or large-scale de-vegetation, re-vegetation, de-watering, re-watering, or any other activity that could influence the regional climate within any portion of the Covered Land. Further, potential direct and indirect impacts on climatic resources, including climate change, cannot be quantified at this time.

Alternative 2

Aquatic and terrestrial biomes are effective biological "scrubbers" of atmospheric carbon, a major component of greenhouse gases. The Service regards protection and restoration of natural habitats important aspects of controlling carbon, both in terms of preventing loss of carbon currently stored in the terrestrial biosphere and as natural sequesters of carbon. The mitigation actions proposed in the MSHCP would preserve and restore additional land and water, and enhance carbon sequestration. For instance, for Indiana bat mitigation, NiSource may protect and restore up to 10,960 acres of forest land (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). These actions may contribute toward efforts to mitigate human-induced global climate changes, both in terms of preventing loss of stored carbon, and in carbon sequestration, although at a very small immeasurable scale.

Alternative 3

Any benefits to mitigate human-induced global climate change as a result of NiSource O&M mitigation would not occur as rapidly under this alternative, as NiSource would not be front-loading their O&M mitigation. Given the scale at which climate change is occurring, and the localized scale in which NiSource mitigation would occur, we would expect no material difference between Alternative 2 and Alternative 3.

4.2.6 Air Quality

Analysis of air quality includes a discussion of impacts to, or exceedance of, air quality standards as a result of the Proposed Action and associated Covered Activities. The ambient air quality in an area can be characterized in terms of compliance with the primary and

secondary NAAQS. The CAA, as amended, requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment.

Alternative 1

NiSource Covered Activities could impact air quality, though emissions generated by equipment during construction, and from the long-term operation of compressor stations. Impacts to air quality associated with these projects, while thought to be minor, could include short-term, local air quality degradation related to ground disturbance and/or internal combustion exhaust from heavy machinery or generators. NiSource compliance with ECS and requirements of other existing (for O&M) and future permits or approvals would likely reduce or eliminate the chance of air quality exceedance of NAAQS or local ordinances. Compliance with the CAA and NAAQS, as well as any additional state-specific regulations for air quality within the Covered Land, would occur on a project-by-project basis for those NiSource Covered Activities requiring additional state or federal approvals and including O&M.

Trees can reduce pollution by actively removing pollution from the atmosphere. Leaf stomata, the pores on the leaf surface, take in polluting gases which are then absorbed by water inside the leaf. Trees also act as filters by intercepting airborne particles. Particles are captured by the surface area of the tree and its foliage until they are either washed off by rainwater or blown off by winds. Tree cover can reduce the amount of harmful gasses and particulate matter in the air. This is particularly true for urban areas. In urban areas, trees have been shown to improve air quality, and to lower air temperatures, which can reduce energy use. NiSource Covered Activities, including ROW clearing, could reduce tree cover in local areas, reducing the beneficial effects the trees might have on air quality.

Alternative 2

Issuance of an ITP to NiSource would have little or no consequence to air quality, beyond benefits associated with mitigation. There were no AMMs developed for take species or MSHCP species that specifically targeted air quality concerns.

The mitigation actions proposed in the MSHCP would preserve and restore land and water, which could potentially improve air quality on local scales. NiSource may protect and restore up to 10,960 acres of forest land and associated habitats as mitigation for the Indiana bat (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). These actions may contribute toward improvements in air quality, as increasing the amount of tree cover in an area could help reduce harmful gasses and particulate matter in the air.

Alternative 3

Under Alternative 3, any improvements to air quality through potential mitigation actions would be roughly the same as Alternative 2, with one exception; the potential increase in tree cover as a result of NiSource mitigation would occur at a slower rate, as NiSource would not front-load their O&M mitigation in the first seven years after MSHCP implementation.

4.3 Impacts to Biological Resources

4.3.1 Vegetation

Analysis of vegetation includes a discussion of potential direct and indirect impacts on vegetation within the Covered Land as a result of the Proposed Action and the NEPA alternatives. All of the species in the MSHCP depend, either directly or indirectly, on the vegetation resources within the Covered Land.

Alternative 1

As stated in Chapter 2, the NiSource on-shore pipeline and storage field system equals approximately 15,562 miles of linear facilities, including twelve counties where potential storage fields most likely to be considered for expansions are found. With these counties and a buffer of one-half mile along the linear facilities, the NiSource Covered Land footprint equates to approximately 9,783,207 acres. In Appendix A of the MSHCP, NiSource provides annual acreage disturbance projections (see MSHCP Appendix A). Of the total anticipated disturbance within the Covered Land, approximately 95 percent of the disturbance would occur on existing

previously disturbed ROWs in the form of vegetation maintenance. The remaining 5 percent represents new disturbance from operations and maintenance activities or new construction projects. Over a 50-year period this acreage impact would be approximately 42,200 acres within the Covered Land or roughly 844 acres annually.

The most prevalent land-use type in the Covered Land is Deciduous Forest (49.30%), followed by Cultivated Crops (17.72%), Pasture/Hay (13.53%), and Developed – Open Space (6.47%). The remainder of the area is covered by eleven other types, none exceeding 3% of the total area. A description of each land-use-cover class is included in Table 3.2 in the MSHCP.

NiSource impacts to vegetation would depend on the type of vegetation affected, the rate at which the vegetation would regenerate, and the area and frequency of vegetation maintenance conducted during operations. Pipeline construction, including the removal of the existing pipeline, could cause cutting, clearing, and/or removal of existing vegetation. Following ROW construction, up to a 100-foot-wide permanent right-of-way would be maintained to operate and maintain the pipeline system. During ROW maintenance, trees and other woody material would be cut, generally chipped, and removed from the ROW. Where necessary, roots would be excavated and placed in a disposal area. Following construction, all of the workspaces would be seeded in accordance with applicable permits and landowner requests. After cleanup and reseeding of the ROW, the herbaceous components of the early successional-upland scrub-shrub cover type would regenerate quickly, typically within 1 to 3 years. Other vegetation types, such as woody-shrub lands, would take longer. Additionally, permanent impacts would occur in shrub lands located within the permanent easement, due to the periodic removal of woody vegetation during routine maintenance, which is on a seven-year cycle.

Construction in forest lands would permanently remove the tree canopy over the entire width of the construction ROW, which would change the structure of the underlying vegetation community. Trees growing on the permanent ROW would be controlled through vegetation maintenance, which would preclude their re-establishment into mature trees. The regrowth of trees would be permitted within temporary workspaces, but it may take decades before these trees resemble the forest vegetation that was present before construction. The clearing of trees

from the construction ROW could also have secondary effects. Soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures. Trees located on the edge of the ROW might be subject to mechanical damage to trunks and branches, and root impacts from soil disturbance and compaction, all of which could result in the decreased health and viability of some trees.

NiSource's ECS (in particular Section II) establishes specific standards related to vegetation clearing activities that take place prior to construction, as well as post-construction restoration of plant communities for upland and wetland areas, along with areas around water body crossings. The ECS also detail required vegetation management during normal ROW maintenance and monitoring (Section V). For instance, following construction, NiSource has an established protocol to begin restoration within six days of final grading, assuming weather and soil conditions allow. Restoration includes fertilizer and lime application (in upland areas) along with seeding and mulching of the ROW or well site area. NiSource has established specific application rates and seed mixes that must be followed, unless an existing ROW agreement, permit, or local, state, or federal agency has other site-specific requirements that must be met.

In general, NiSource Covered Activities involving major ground disturbance could have long-term impacts to vegetation; however, restoration of vegetative cover associated with ECS requirements and EM&CPs would reduce potential long-term negative impacts.

Under the No Action Alternative, AMMs in the MSHCP which serve to further avoid and minimize take of MSHCP species and habitat, would not occur, nor would mitigation. Implementation of RPMs with similar objectives would likely vary, given they would be dependent upon terms and conditions of project-specific permits or authorizations NiSource would receive through Section 7 (a)(2) consultations.

Alternative 2

Issuance of an ITP and implementation of the MSHCP would have minimal long-term direct or indirect impacts on vegetation within the Covered Land, given the requirements for restoration

and re-vegetation already in-place. The AMMs in the MSHCP include additional measures that will avoid and minimize potential impacts to vegetation, take and MSHCP species habitat, as well as other fauna. For example, in its MSHCP NiSource has committed to:

- Avoid stepping on hummocks and tussocks
- Avoid pulling woody vegetation out by the roots in identified habitat
- Place and timing restrictions on mowing
- Avoid dragging vegetation through occupied habitat
- Avoid burning brush piles within a specified distance of occupied habitat
- Re-vegetate disturbed habitat in accordance with the ECS
- Leave piles of woody debris along edge of ROW if clearing vegetation
- Avoid additional clearing of trees
- No woody vegetation or spoil disposal within occupied habitat
- Retain snags, dead/dying trees, and trees with exfoliating bark
- Maintain a diversity of open, herbaceous habitat
- Thoroughly clean all equipment prior to use to avoid inadvertent introduction of exotic species

NiSource's ECS, site-specific requirements already in place, and certain AMMs included in the MSHCP, are expected to minimize the potential for direct and indirect impacts to habitat and vegetation. Mitigation, primarily for Indiana bat, could produce a net gain in habitat (vegetation) restored and protected. NiSource may protect and restore up to 10,960 acres of forest land and associated habitats as mitigation for the Indiana bat (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). For mussels, NiSource has proposed to protect and restore land associated with riparian areas along streams and rivers (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP) for a purpose of improving water quality. Both of these actions

could provide also additional habitat for native wildlife, and mitigate for vegetation impacts due to NiSource Covered Activities.

Alternative 3

The environmental consequence of Alternative 3 would be the same as Alternative 2 with one exception: the amount of habitat protected and restored within the first seven years would be less under Alternative 3, as NiSource would not be mitigating “up-front” for O&M impacts. All of the AMMs and most of the mitigation would be the same as Alternative 2.

4.3.2 Wetlands

Analysis of wetlands includes a discussion of potential direct and indirect impacts on those transitional areas between terrestrial and aquatic systems in the Covered Land where water covers the land, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Species within the MSHCP most dependent on high quality wetlands include the bog turtle and Indiana bat.

Alternative 1

Primary impacts of pipeline construction and right-of-way maintenance activities on wetland resources would be the alteration of wetland vegetation. Other types of impacts could include temporary changes in wetland hydrology and water quality. Clearing, trenching, backfilling, and grading activities could temporarily impact wetlands. During construction, failure to segregate topsoil over the trench line could result in the mixing of the top soil with the subsoil. This disturbance could result in altered biological activities and chemical conditions in wetland soils and could affect the re-establishment and natural recruitment of native wetland vegetation after restoration. Compaction and rutting of soils during construction could result from the movement of heavy machinery and the transport of pipe sections within wetland areas. The resulting alteration of the natural hydrologic patterns could inhibit seed germination or increase the potential for siltation in wetlands. The discharge of storm water, trench water, or hydrostatic test water could result in silt-laden water entering a wetland and cause the release of chemical and

nutrient pollutants from sediments. Clearing activities around wetlands could temporarily affect the wetland's capacity to buffer flood flows and/or control erosion.

Under the No Action Alternative, NiSource would continue to implement construction, operations, and maintenance activities as it currently does by obtaining all individual permits and approvals, including Section 404 permits of the Clean Water Act. Section 404 of the CWA of 1972 established standards to minimize impacts to wetlands under the regulatory jurisdiction of the USACE. These standards require avoidance of wetlands where possible and minimization of disturbance where impacts are unavoidable to the degree practical. On a national level, jurisdictional wetlands include those wetlands subject to regulatory authority under Section 404 of the CWA as well as EO 11990 (Protection of Wetlands) for protection of Federal lands, programs, and activities. Many states also have state-level regulations that further protect wetland areas, including isolated wetlands not subject to federal regulations.

NiSource's ECS (Section III (B)) establish specific requirements to protect wetlands, including that all wetlands be marked by a professional prior to construction. In addition, the ECS establish standards related to crossing techniques, clearing, grading, trenching, blasting, backfilling, and restoration work within wetlands. Examples include working with appropriate government agencies to minimize the impacts of new construction or ROW maintenance in wetlands per Section 404 of the CWA and any state-specific regulations, installation of equipment bridges, segregating topsoil over the trench line in non-saturated wetlands to avoid mixing of topsoil and subsoil, restricting use of herbicides or pesticides within 100-feet of a wetland, restoration of pre-construction contours and elevations, revegetation, use of HDD construction as feasible, and prohibiting storage of hazardous materials within a wetland or within 100-feet of a wetland boundary.

NiSource's standard BMPs, regulatory requirements related to USACE's Section 10 and/or 404 permit, and other state and local permits that have been included in the MSHCP all serve to avoid and minimize the potential for direct or indirect impacts to wetland resources from future NiSource Covered Activities.

Alternative 2

For both action alternatives, potential impacts to wetlands would be avoided and minimized through implementation of species-specific AMMs (e.g., bog turtle). While site-specific, these measures will also have secondary benefits of reducing impacts to wetland resources. Some of the AMMs that will help protect wetland resources include:

- Abide by staging area location restrictions
- Ensure that all imported fill material is free from contaminants
- Use enhanced and redundant spill control for storage well activities in wetlands
- Avoid use of fertilizers within a specified distance of wetlands
- Avoid use of herbicides within a specified distance of wetlands
- Follow standard policies and procedures for herbicide use in proximity to wetlands
- Avoid stepping on hummocks and tussocks
- Avoid pulling woody vegetation out by the roots in identified habitat

NiSource's standard BMPs, regulatory requirements related to USACE's Section 10 and/or 404 permit, other state and local permits, and AMMs (for the action alternatives) all serve to minimize the potential for direct or indirect impacts to wetland resources from future NiSource activities.

Alternative 3

The environmental consequence of Alternative 3 would be the same as Alternative 2 with one exception: the amount of habitat protected and restored within the first seven years would be less under Alternative 3, as NiSource would not be mitigating "up-front" for O&M impacts. All of the AMMs and most of the mitigation would be the same as Alternative 2.

4.3.3 Wildlife and Fish

Analysis of wildlife and fish resources includes a discussion of direct and indirect impacts to non-ESA listed wildlife and fish species encountered within the Covered Land.

Alternative 1

Wildlife Resources

NiSource Covered Activities have the potential to impact a variety of non-listed wildlife species. A variety of wildlife could be impacted by clearing of vegetation; alteration of the landscape from scraping the ground, soil disturbance, and re-contouring; conflicts with vehicles; human presence; activities associated with trenching; increased predation from creating habitat “edge effects” and fragmentation. New construction and the clearing of ROW vegetation could reduce cover, nesting, and foraging habitat for some wildlife. The degree of impact would depend on the type of habitat affected and the rate at which vegetation regenerates after construction. During construction, more-mobile species would be temporarily displaced from the construction right-of-way and surrounding areas to similar habitats nearby. Some wildlife displaced from the right-of-way would return to the newly disturbed area and adjacent, undisturbed habitats after completion of construction. Less mobile species, such as small mammals, reptiles, amphibians, and nesting birds, may experience direct mortality or permanent displacement. Displacement of species could lead to increased competition for some resources. The clearing of vegetation on the construction ROW would reduce cover, foraging, breeding, and nesting habitat for some wildlife. The effect on species that rely on open landscapes would be short-term, as these areas would be reseeded and would likely recover within 1 to 3 years after construction.

Habitat areas comprising tree and shrub dominated vegetation may be affected on a longer-term basis. The effect of workspace clearing on forest-dwelling wildlife species (e.g., birds and bats) would be greater than on open habitat wildlife species since forested lands would take years and possibly decades to return to pre-construction condition in areas used for temporary workspace, and would be prevented from reestablishing on the permanent right-of-way. Soil-dwelling invertebrates could be impacted directly through movement of soil from one place to

another, resulting in some mortality and displacement. This could reduce the forage potential for insectivores that inhabit the area. Other animals could be indirectly affected through the reduction in seed banks, resulting in longer recovery times for vegetation that could provide forage, cover, and nesting habitat. The regional impact of these effects, however, would be minor due to the temporary nature of the effects and limited area affected by construction.

The impact on species that commonly inhabit agricultural lands would be relatively minor and temporary because these areas are regularly disturbed and would be replanted during the next growing season following pipeline installation. The effect on forest-dwelling wildlife species would be greater, as forested lands may take longer (more than 50 years) to return to preconstruction conditions. The impact on species using non-forested areas should be short-term because herbaceous lands, riparian vegetation, and vegetated portions of developed lands would recover relatively quickly.

Blasting may be required during construction. Blasting could result in the removal of adjacent habitat and the direct mortality or injury of wildlife species in the vicinity.

Most of the above mentioned impacts would be minimized by adherence to NiSource ECS. NiSource ECS include stipulations and standards related to mowing, clearing, grading, trenching, water body crossings, spill prevention, containment and control, and final restoration and stabilization.

Fishery and Aquatic Resources

The majority of waterbodies within the Covered Land support warmwater fisheries. No essential fish habitat, as defined by the Magnuson-Stevens Fishery Conservation and Management Act, would be affected by NiSource Covered Activities. Stream crossings and the clearing of ROW vegetation have the greatest potential for impacting fishery resources. Overall, these impacts would be minor due to the relatively small area of the waterbody that would be affected. Measures to avoid and minimize impacts to fishery and aquatic life would be similar to those designed to protect surface waters (see 4.2.1 above).

Stream crossings using open-cut, dry-ditch, and HDD have the potential to affect fish habitat. Open-cuts could increase turbidity and sedimentation in the crossing vicinity, potentially decreasing the dissolved oxygen, thereby potentially suffocating eggs and larvae of fish and invertebrates. Increases in siltation can impair aquatic plant growth, stress adult fish by damaging gill membranes, destroy the eggs of fish and other aquatic organisms, and degrade local spawning and nursery areas. Sedimentation can also displace the more mobile species and potentially smother benthic invertebrates, decreasing prey availability for fish. These effects could degrade the quality of the habitat, making it unsuitable for spawning and rearing activities. Impacts from open-cut construction would be temporary and limited to the crossing location and areas immediately downstream. Impacts would normally be limited to a few days, and generally no longer than one month after construction ends, depending on conditions at the crossing, the type and amount of suspended sediment, and other factors.

Dry-ditch methods, such as flume and dam-and-pump, could also be used to cross waterbodies. Both crossing methods would maintain water flow and decrease impacts from turbidity and sedimentation. Temporary impacts from sedimentation and turbidity would generally be limited to periods of active construction within a waterbody. Benthic invertebrates located in an area where water is diverted could experience direct adverse impacts. Larger, more mobile species would experience little to no impact through use of the flume or dam-and-pump method.

Use of HDD would likely avoid direct impacts on water bodies. However, in the event of a frac-out, or a release of drilling fluid during an HDD crossing, benthic invertebrates and fish eggs and larvae could be smothered and the more mobile species could be displaced. Bore crossings could also be used for small water body crossings and would avoid impacts on water bodies by allowing the pipeline to be installed underneath the water body without disturbing the bank or bed.

Some NiSource new construction may require blasting activities in or adjacent to perennial water bodies. If in-stream blasting is required, aquatic organisms close to blasting activities could be injured or killed. Temporary and minor impacts on aquatic resources from blasting activities would be expected. However, the preparation for blasting may displace many aquatic

organisms from the immediate vicinity of blasting activities. NiSource would immediately remove all blasted rock from the area to prevent any obstruction or slowing of stream flows.

NiSource ECS contain measures that would minimize construction impacts on fish and aquatic habitat. Temporary erosion control structures, such as silt fences and straw bales, would be installed immediately after vegetation removal, and rootstock would be left in the ground where possible to promote re-vegetation. Erosion and sediment control measures would prevent sediment from leaving the construction site and entering water bodies. Impacts on fisheries and aquatic resources from erosion would also be minimized by limiting the amount of time that construction activities would take within a water body. The season in which construction takes place can influence the degree of impacts associated with in-stream activities. Construction during periods of sensitive fish activity (i.e., spawning and migration) could have a greater impact on fish than construction during other periods.

The withdrawal of hydrostatic test water has the potential to affect aquatic species from entrainment and loss of prey organisms, as well as through the loss of fish and invertebrates during early life stages. The intakes for these withdrawals would be screened and located off the stream bottom to minimize the intake of large or benthic organisms and sediment. Impacts on fisheries and aquatic life from hydrostatic test water withdrawals and discharge would be limited by NiSource adhering to its ECS.

Fuels and other hazardous materials could spill or leak from storage containers, equipment working in or near streams, or fuel transfers. Any spill that reaches a water body could be detrimental to the aquatic life. The chemicals released during spills could have acute, direct effects on fish, or could have indirect, chronic effects such as altered behavior, changes in physiological processes, or changes in food sources. Large spills also could cause the direct mortality of species within the water body and indirect effects on the local food chain through ingestion of contaminated prey.

Alternative 2

Under Alternative 2, in addition to NiSource ECS, NiSource would implement species-specific avoidance and minimization measures, which would also benefit non-listed wildlife and fishery resources. For example, NiSource has committed to:

- Place and timing restrictions on mowing;
- Leave piles of woody debris along edge of ROW if clearing vegetation (where appropriate);
- Avoid additional clearing of trees;
- No woody vegetation or spoil disposal within occupied habitat;
- Retain snags, dead/dying trees, and trees with exfoliating bark;
- Maintain a diversity of open, herbaceous habitat; and
- Thoroughly clean all equipment prior to use to avoid inadvertent introduction of exotics

The mitigation actions proposed in the MSHCP would preserve and restore land and water, which would improve habitat for native wildlife and fish on local scales. NiSource may protect and restore up to 10,960 acres of forest land and associated habitats as mitigation for the Indiana bat (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). For mussels, NiSource has proposed to protect and restore land associated with riparian areas along streams and rivers (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). Both of these actions could provide additional habitat for native wildlife and fish at local scales.

Alternative 3

The environmental consequence of Alternative 3 would be the same as Alternative 2 with one exception: the amount of habitat protected and restored within the first seven years would be less under Alternative 3, as NiSource would not be mitigating “up-front” for O&M impacts. All of the AMMs and most of the mitigation would be the same as Alternative 2.

4.3.4 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–711) and EO 13186 (66 FR 3853), which serve to protect migratory birds from adverse impacts. The EO was enacted, in part, to ensure that the environmental analysis of a federal action evaluates the impacts of that action on migratory birds. It states that emphasis should be placed on species of concern, priority habitat, and key risk factors. It also prohibits the taking of migratory birds without authorization from FWS. Destruction or disturbance of a migratory bird nest, or any eggs or young contained within it, is also a violation of the MBTA. We note that EO 13186 requires federal agencies to avoid or minimize negative impacts on migratory bird populations and to restore and enhance the habitat of migratory birds, as practicable. The EO also requires a federal agency to identify where an unintentional “take” is likely to have a measurable negative effect on migratory bird populations.

On March 30, 2011, the FERC and the Service signed a Memorandum of Understanding on the Conservation of Migratory Birds (MOU). The MOU confirms that these agencies will carefully analyze FERC-regulated pipeline, transmission and other energy development projects that might impact migratory birds, and that mitigation may be required where any such impact might arise. The MOU was drafted to implement Executive Order (EO) 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds. The stated purpose of the MOU is to focus on "avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration [between the agencies] by identifying areas of cooperation."

Alternative 1

NiSource Covered Activities have the potential to adversely affect migratory birds. One hundred and fourteen species of migratory birds of conservation concern potentially occur within the Covered Land (Appendix D). Four species: the Eskimo Curlew, Ivory-billed Woodpecker, Kirtland’s Warbler, and Whooping Crane, are considered imperiled at a global scale, and are listed as Endangered by the Service. Six additional species: the Brown Pelican, Least Tern,

Piping Plover, Red-cockaded Woodpecker, Roseate Tern, and Wood Stork are also listed as Endangered by the Service. The remaining 103 species are declining within portions of their range; being possibly endangered, threatened, or at least monitored at a state level. While the species in Appendix D are the migratory species at greatest risk within the Covered Land, the MBTA provides protection for all migratory birds; thus additional migratory species not listed within the table would also potentially be affected by the project.

Primary impacts of NiSource Covered Activities on migratory birds include the loss and alternation of habitat associated with vegetation removal. Clearing and grading could remove nesting and foraging habitat, and could destroy occupied nests resulting in the destruction of eggs and mortality of young and unfledged birds. Construction could also temporarily displace birds into adjacent habitats, which could increase the competition for food and other resources. This in turn could increase stress, susceptibility to predation, and impact reproductive success.

Construction outside existing previously disturbed ROWs could cause habitat fragmentation, especially in forested areas. Fragmentation can alter bird species composition because biophysical conditions near the forest's edge can significantly differ from those found in the center or core of the forest. As a result, edge species could recruit to the fragmented area and native species that occupy interior habitats could be displaced. The disturbance of these areas could create a long-term impact on some forest interior bird species, although at local scales. Conversion of intact forested habitats to early successional stages and the increase in forest edge that results could adversely affect forest interior bird species by increasing rates of nest predation, parasitism, or interspecific competition; reducing pairing success; and inhibiting migration, dispersal, foraging, and other movements of species that are hesitant to cross openings. The breeding success of some forest interior bird species has been shown to be limited by the size of available unbroken forest tracts. Additional loss of forest habitat in tracts of already marginal size, in particular where the pipeline would traverse smaller isolated woodlots, could further reduce breeding success of forest interior birds.

Activities occurring before July 15 could overlap with the nesting seasons for many migratory birds. Construction during this time could cause direct and indirect impacts on the species that

occupy the area. Direct effects would be from the loss or disturbance of nesting trees, nests, and young; unfledged birds would likely be lost as habitat is removed. Indirect effects would be associated with the noise created by construction, as well as by human presence. Indirect effects would not likely cause significant impacts to non-nesting birds, as they likely would be temporarily displaced and would return once construction in that area is completed. Construction activities occurring adjacent to nesting individuals could result in nest abandonment, which would subsequently result in the chilling or mortality of eggs and young, or premature fledging and ejection from the nest.

Improper storage of chemically pretreated test water or test water contaminated by oil and/or grease residues from the pipe could contaminate surface water, groundwater, and soils, and impact certain bird species.

Alternative 2

The additional measures outlined in Chapter 2 for migratory birds should further minimize impacts above the status quo. Further, AMMs designed for Take and MSHCP species, such as Indiana bat timing restrictions for tree clearing, would also have beneficial effects for many bird species whose ranges overlap with Indiana bats. These additional benefits may not accrue under the No Action Alternative. Instead, implementation of such measures, including any mitigation to protect migratory bird species habitat, would likely vary given they would be dependent upon terms of individual project-specific environmental reviews.

NiSource proposed mitigation for take species has the potential to benefit a number of migratory bird species that occur in the areas ultimately protected and/or restored as mitigation, namely forest land and associated habitats, floodplain forests, and riparian areas. NiSource may protect and restore up to 10,960 acres of forest land and associated habitats as mitigation for the Indiana bat (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). For mussels, NiSource has proposed to protect and restore land associated with riparian corridors (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). Riparian corridors are considered important habitats for many migrating land birds, especially given the current pressures of

climate change. The management of north/south riparian corridors will likely be an important transitional habitat as migratory bird species shift their ranges northward.

Alternative 3

The environmental consequence of Alternative 3 would be the same as Alternative 2 with one exception: the amount of mitigation within the first seven years would be less under Alternative 3, as NiSource would not be mitigating "up-front" for O&M impacts. All of the AMMs and most of the mitigation would be the same as Alternative 2, over the long-term.

4.3.5 Bald and Golden Eagles

As stated previously in Chapter 3, golden eagles are not known to nest within the Covered Land. Bald eagles however may nest, roost, and forage in and around the Covered Land. Bald eagles nesting within the Covered Land can occur anywhere between October in the deep South to May in the Northeast, with full incubation and fledging lasting between four and five months.

The bald eagle was formerly a federally listed species, but was delisted in 2007 due to recovery of the population. However, the species retains protection under the Bald and Golden Eagle Protection Act (BGEPA), which prohibits the taking of eagles, their eggs, or their nests. In 2007, the Service developed and published National Bald Eagle Management Guidelines (Guidelines) to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the Bald and Golden Eagle Protection Act (BGEPA) may apply to their activities. The Guidelines are intended to help minimize impacts, particularly where they may constitute "disturbance," which is prohibited by the BGEPA. For more information on the National Bald Eagle Management Guidelines see (http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf).

Alternative 1

NiSource Covered Activities could temporarily affect aerial foraging and predatory activities if construction occurs along waterbodies when roosting eagles are present. Disturbance could change foraging patterns or remove preferred roosting trees. Individual eagles could find other suitable roosts in similar habitat surrounding the area, and eagles would be expected to return to the area when construction activity has ceased. Given the linear nature of projects and the short timeframe in which waterbody construction would occur, we believe these impacts would be minor. However, in the past FWS has expressed concern over potential noise impacts on nesting bald eagles potentially located within the Covered Land. FWS has recommended that NiSource identify the location of bald eagle nests in the vicinity of the Covered Land. FWS further stated that the use of available current and reliable nesting surveys is acceptable. However, if surveys are not available, NiSource should conduct surveys of bald eagles in the Covered Land. FWS recommended that where nests are located in the vicinity of the pipeline, National Bald Eagle Management Guidelines (Guidelines) must be followed. According to these Guidelines, construction of roads and other linear utilities should be conducted outside the nesting season.

Crossing waterbodies using the HDD method may cause noise impacts to nesting bald eagles prior to the time that the eagles have fledged. Foraging bald eagles are anticipated to return to the area once construction and HDD crossings have been completed; however, an increase in noise near nesting bald eagles may cause nest abandonment and subsequent mortality of eggs and young. FWS has developed Guidelines that would minimize impacts to bald eagle nests by implementing site-specific buffers and limiting loud, disruptive construction activities (including open-cut and HDD construction methods) to periods outside of the nesting season. NiSource has agreed to adhere to the Guidelines in the presence of known or newly encountered active nests and would limit construction activities in the vicinity of active bald eagle nests, as recommended by FWS, to periods outside of the nesting season.

Since bald eagles are no longer listed under the ESA, NiSource no longer consults under Section 7 of the ESA with the Service on bald eagles. In the past, NiSource would contact an

appropriate Service Field Office through formal/informal consultation under Section 7 to receive guidance on bald eagle management for their planned activities. Now that bald eagles are no longer federally listed and consultation under Section 7 is no longer warranted, NiSource has adopted as part of its operations the Service's Guidelines. Presently, while conducting project reviews for federally listed species, NiSource also determines if its projects will affect bald eagle nesting, foraging, and roosting areas. If effects might occur, NiSource attaches appropriate avoidance measures from the Guidelines to the project's EM&CP and implements them during the activity. In the unlikely event that the avoidance measures cannot be implemented for a project, NiSource will obtain an appropriate permit from the Service before commencing the activity. Adherence to the Guidelines benefits NiSource by helping it avoid violations of the law, and also benefits bald eagles by ensuring NiSource activities do not harm and/or disturb eagles that may be present near a NiSource project area. With the implementation of FWS Guidelines to avoid disturbance to the bald eagle, we believe impacts on the bald eagle from NiSource Covered Activities are minimal.

Alternative 2

Under this Alternative, NiSource will adhere to the Guidelines and process described above. The main difference between Alternative 1 and Alternative 2 is the mitigation that will potentially occur for the take species in the MSHCP which could provide ancillary benefits to bald eagles. For instance, for Indiana bats, NiSource has proposed to protect and restore up to 10,960 acres of forest land. For mussels, NiSource has proposed to protect and restore land associated with riparian areas along streams and rivers (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). Both of these actions could provide additional habitat for bald eagles, as bottomland/riparian areas are important to nesting, roosting, and foraging bald eagles.

Alternative 3

Potential types of impacts to bald eagles under Alternative 3 are identical to those discussed above for Alternative 2, although the duration of the future impacts and level of take anticipated is logically reduced commensurately (generally to 1/5 the level as discussed in the MSHCP).

The potential conservation benefit associated with NiSource's Conservation Program would also be reduced based on the shorter duration of the MSHCP implementation, particularly the long-term benefits associated with the "front-loading" of the mitigation for all O&M activities within the first seven years of implementation associated with Alternative 2.

4.3.6 T&E and Candidate Species

The following provides a discussion and analysis of potential impacts to fish, wildlife, and plant species under the jurisdiction of the Service and listed as either threatened, endangered, or candidate species known or suspected to occur within the Covered Land.

Forty-three species from nine taxonomic groups were originally analyzed in the MSHCP. Since that original analysis, one of the candidate species (sheepnose) was listed as endangered and the Lake Erie watersnake was delisted, making the total number 42. They include six mammals, one bird, one reptile, two amphibians, six fish, two crustaceans, 17 freshwater mussels, four insects, and three plants. The list includes ten species for which NiSource is requesting incidental take authorization from the Service. Those include the Indiana bat, bog turtle, James spinymussel, Northern riffleshell mussel, Nashville crayfish, clubshell mussel, fanshell mussel, Madison cave isopod, American burying beetle, and sheepnose mussel. The remaining 32 species do not require take authorization, as take will be avoided either because NiSource has agreed to implement avoidance measures or the species was determined to be absent from the Covered Land.

In addition to the 42 species analyzed in the MSHCP, 46 additional threatened, endangered, or candidate species potentially occur within the Covered Land (defined as non-MSHCP Species). Of these 46 non-MSHCP species, NiSource Covered Activities could adversely affect 10, making the total number of species potentially adversely affected by NiSource Covered Activities 20 (see Table 4.3.1). However, NiSource is only seeking incidental take authorization for 10 species (i.e., Take Species).

Table 4.3.1: Species potentially impacted by NiSource Covered Activities

Common Name	Scientific Name	Federal Status	Species Included in the MSHCP?	Incidental Take Requested ?
Mammals				
Indiana bat	*Myotis sodalis*	E	Yes	Yes
Insects				
American burying beetle	*Nicrophorus american us*	E	Yes	Yes
Reptiles				
Bog turtle	*Glyptemys muhlenbergii*	T	Yes	Yes
Eastern massasauga rattlesnake	*Sistrurus catenatus catenatus*	C	No	No
Fish				
Diamond darter	*Crystallaria cincotta*	PE	No	No
Roanoke logperch	*Percina rex*	E	No	No
Mollusks				
Clubshell mussel	*Pleurobema clava*	E	Yes	Yes
Fanshell mussel	*Cyprogenia stegaria*	E	Yes	Yes
James spinymussel	*Pleurobema collina*	E	Yes	Yes
Northern riffleshell	*Epioblasma torulosa rangiana*	E	Yes	Yes
Sheepnose	*Plethobasus cyphyus*	E	Yes	Yes
Dwarf wedgemussel	*Alasmidonta heterodon*	E	No	No
Pink mucket pearlymussel	*Lampsilis orbiculata*	E	No	No
Rabbitsfoot	*Quadrula cylindrica*	PT	No	No
Rayed bean	*Villosa fabalis*	E	No	No
Snuffbox	*Epioblasma triquetra*	E	No	No
Spectaclecase	*Cumberlandia monodonta*	E	No	No
Crustaceans				
Nashville crayfish	*Orconectes shoupi*	E	Yes	Yes
Madison Cave isopod	*Antrolana lira*	T	Yes	Yes
Plants				
Northeastern bulrush	*Scirpus ancistrochaetus*	E	No	No

The Services Biological Assessment (appended) and Biological Opinion (incorporated by reference) contain a full analysis of all threatened, endangered, or candidate species potentially affected by NiSource Covered Activities within the Covered Land. The Biological Opinion responds to the Service requirement for intra-Service consultation on the issuance of a Section 10(a)(1)(B) permit pursuant to Section 7 of the ESA.

Alternative 1

Section 7 of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of a federally listed threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat of a federally listed species. Federal agencies are required to consult with the Service to determine whether any federally listed or proposed species or any critical or proposed critical habitat may occur in a project area, and to determine the potential effects of the Proposed Actions on these species or critical habitats. To comply with Section 7 of the ESA, NiSource has acted as a “non-federal representative” and assisted the federal agencies conducting informal consultations with the Service. Under this alternative, federal agency (FERC, USACE, USFS, NPS, Service) Section 7 consultations associated with future NiSource projects would continue to occur on a project-by-project basis.

The Service’s primary federal action is issuance of the section 10(a)(1)(B) permit (incidental take permit; ITP) and associated implementation of the MSHCP. In conjunction with the primary action, the MSHCP involves federal actions by the U.S. Army Corps of Engineers (Corps), federal Energy Regulatory Commission (FERC), U.S. Forest Service (USFS), National Park Service (NPS), and multiple National Wildlife Refuges.

Common with all alternatives, NiSource’s ECS have established methods to minimize overall impacts, including to wildlife, of construction and O&M activities. The ECS standards include stipulations and standards related to mowing, clearing, grading, trenching, water body crossings, spill prevention, containment and control, and final restoration and stabilization.

Under the No Action Alternative, the additional AMMs outlined in the MSHCP that also serve to avoid and/or minimize impacts to threatened, endangered, or candidate species or their habitats would not be required as a condition of the ITP. Instead, ESA compliance through formal Section 7 consultation would require some variation of these AMMs to protect species or habitat, depending on the nature of the specific proposed. One primary difference between ESA compliance through Section 7 vs Section 10 (i.e., Alternatives 2 and 3), is the requirement that NiSource must fully compensate, through mitigation, for all impacts associated with incidental take.

Alternative 2

Alternative 2 would entail the Service issuing NiSource an ITP for 10 species. Table 4.3.3 provides summary information on Take and MSHCP species. Table 4.3.6 provides summary information on non-MSHCP species. Information in each table is organized relative to: 1) species name, 2) Federal status, 3) location within the Covered Land; 4) Covered Activities potentially causing impacts, 5) potential species impacts, 6) mandatory and non-mandatory AMMs, and 7) mitigation.

This section also provides a description of “general” AMMs (Table 4.3.3) that NiSource and the Service have developed to be implemented in conjunction with future NiSource Covered Activities. These AMMs would need to be employed in order for those future activities to be in compliance with the ITP and assure incidental take coverage for NiSource relative to the MSHCP species. These AMMs are in addition to species-specific AMMs, which can be found in Chapter 6 of the MSHCP, Appendix F of the MSHCP, and Appendix E of this document.

MSHCP Species

Of the 42 species covered in the MSHCP, 23 “No Effect” determinations have been made, including: Blackside dace, Braun’s rock cress, Cumberland bean pearlymussel, Cumberland snubnose darter, Delmarva fox squirrel, Dromedary pearlymussel, Gulf sturgeon, Karner blue butterfly, Louisiana pearlshell, Maryland darter, Mead’s milkweed, Mitchell’s satyr butterfly, Pale liliput pearlymussel, Pitcher’s thistle, Puritan tiger beetle, Purple cat’s paw pearlymussel, Scioto

madtom, Shenandoah salamander, Slackwater darter, Tan riffleshell, West Indian manatee, White cat's paw pearlymussel, and White wartyback pearlymussel. These No Effect determinations were based on our examination of the species proximity to anticipated future disturbance from NiSource Covered Activities.

For the remaining 19 species in the MSHCP (Table 4.3.4), implementation of AMMs (Table 4.3.3) will avoid take for nine of these species. These species include; Birdwing pearlymussel, Cheat mountain salamander, Cracking pearlymussel, Cumberland monkeyface pearlymussel, Gray bat, Interior least tern, Oyster mussel, Louisiana black bear, and Virginia big-eared bat. These determinations were made by the Service (USFWS 2007e) and based on species ranges and known occurrences relative to the Covered Land, the types and anticipated impacts of NiSource Covered Activities, and through the development and implementation of mandatory species-specific AMMs. For the remaining 10, NiSource could minimize, but not fully avoid take. Given this, NiSource has requested incidental take authorization for 10 species. Table 4.3.2 below is a summary of the type and amount of incidental take requested. Species-specific AMMs for MSHCP species are described in detail in Chapter 6 of the MSHCP, Appendix F of the MSHCP, and in Appendix E of this document.

Table 4.3.2: Summary of Incidental Take Requested over 50 years

Species	Summary of Take Requested
Indiana bat	Incidental take is requested for 69,900 acres of summer and/or spring staging/fall swarming habitat that could support up to 2,584 Indiana bat individuals.
Bog turtle	Incidental take is requested for impacts to turtles and habitat at 25 sites
Madison Cave isopod	Incidental take is requested for two populations within 2,764.5 acres of Madison Cave isopod habitat
Clubshell mussel	Incidental take is requested for up to 166 acres of clubshell mussel habitat
Northern riffleshell mussel	Incidental take is requested for up to 165.3 acres of northern riffleshell mussel habitat
Fanshell mussel	Incidental take is requested for 283.2 acres of fanshell mussel habitat
James spinymussel	Incidental take is requested for up to 12.8 acres of James spinymussel habitat
Sheepnose mussel	Incidental take is requested for up to 250.4 acres of sheepnose mussel habitat
Nashville crayfish	Incidental take is requested for up to 4.0 acres of Nashville crayfish habitat
American burying beetle	Incidental take is requested for 4 American burying beetle individuals

Take calculations vary by species. For terrestrial species, take numbers were calculated based on both the projected impact acres over the 50-year permit term as well as anticipated disturbance to individuals over the permit term, regardless of the type of disturbance. For aquatic species, take numbers were derived based on three factors (estimated crossings) relating to water body disturbance over the permit term, including the likelihood of one new construction looping project, one replacement of the existing pipeline, and other additional activity impacts (e.g., stabilization, removal) over the 50-year permit term. This take calculation assumes, however, that the three crossings (factors) in play would occur at a time interval sufficient to allow for full re-colonization to pre-disturbance densities. Chapter 6 of the MSHCP provides a detailed explanation of the take assessment process, as well as an impact of the take analysis.

It was recognized that absent a specific time and location of future NiSource Covered Activities within the Covered Land, coupled with the 50-year permit duration, the MSHCP does not predict take with absolute spatial and temporal certainty. It does however assume a “worst-case

scenario" which in all likelihood will result in an overestimate of take. Species conservation frameworks and threats analysis tables in Appendix E provide a detailed analysis of activities and impacts to NiSource Take Species.

Where take is anticipated, the MSHCP provides for mitigation to compensate for the impact of the take. Mitigation includes, but is not limited to, permanent protection of habitat, habitat enhancement, restoration, and management to achieve and/or maintain specific biological characteristics; and species propagation and reintroductions. The MSHCP does not prescribe where on the landscape these mitigation actions will take place, but it does provide parameters and criteria to ensure that appropriate mitigation occurs.

Table 4.3.3: Summary of Avoidance & Minimization Measures (AMMs) for MSHCP Species

Habitat and Occupation Surveys	
A1	Determine habitat suitability for the species, or assume potential presence
A2	Survey to determine presence/absence within identified suitable habitat
Measures to Avoid and Minimize Impacts to Species	
B1	Bait the species away from the project area
B2	Trap and relocate species away from the project area
B3	Species education for operators, employees, and contractors
B4	Avoid activities involving long-term noise disturbance >75db within specified distance
B5	Strict control of "bear attractants" such as use of "bear-proof" waste disposal containers
B6	Designated critical habitat within ROW maintained to NGTS ECS env. sensitive area standards
B7	Remove buildings during winter months, or after a survey year round
Prepare an Environmental Management & Construction Plan	
C1	Prepare an Environmental Management & Construction Plan
Stream Bed Construction Methods	
D1	Consider HDD or other trenchless methods for installation or replacement across habitat
D2	Install pipelines to a minimum depth at least 10-feet past the high water line in riparian areas
D3	Do not install In-Channel repairs within occupied habitat
D4	Work from a lay barge or temporary work bridge rather than operate heavy equipment in-stream
D5	Remove equipment bridges as soon as practicable
D6	Inspect for and correct bank destabilization associated with the pipeline within occupied habitat
D7	Ensure that work within streams does not result in impacts to adjacent habitats or karst features

D8	Avoid channelizing streams
D9	Cross perennial streams only during specified periods
D10	Use Dry-Ditch Dam and Pump methodology
Stream Bank Conservation	
E1	Do not construct culverts or stone access roads across waterbody/riparian occupied habitat
E2	Use sufficient half pipes to minimize flow disruption in stream habitat
E3	Ensure that upland work does not result in impacts to adjacent water habitats
Timing Restrictions	
F1	Timing restrictions to minimize impact
F2	Avoid construction activities after sunset in occupied habitat
Pipeline Abandonment	
G1	Pipeline abandonment specifications
Contaminants	
H1	Site staging areas location restrictions
H2	Ensure that all imported fill material is free from contaminants
H3	Use enhanced and redundant spill control for storage well activities in occupied habitat
H4	Avoid use of fertilizers within a specified distance of occupied habitat
H5	Avoid use of herbicides within a specified distance of occupied habitat
H6	Follow standard policies and procedures for herbicide use in proximity to occupied habitat
H7	Refuel equipment, check for leaks each day, and control contaminants as per the ECS
H8	Use tanks rather than waste pits to store waste fluids
H9	Contaminants should be controlled as provided for in the EMCS and ECS.
Withdrawal and Discharge of Water	
I1	Avoid discharging hydrostatic testing water from new pipe directly into occupied habitat
I2	Avoid drawing hydrostatic testing water directly from occupied habitat
I3	Discharge hydrostatic testing water down gradient or >300-feet upland from occupied habitat
I4	Use best available water withdrawal/discharge impact avoidance techniques
I5	Avoid discharging hydrostatic testing water from existing pipe directly into occupied habitat
Travel and Access Roads	
J1	Avoid driving across identified habitat
J2	Route new access roads a specified distance from occupied habitats
J3	With landowner consent, block access roads and ROWs leading to occupied habitat
Exotic Species	
K1	Thoroughly clean all equipment prior to use to avoid inadvertent introduction of exotics
Vegetation Management	
L1	Avoid stepping on hummocks and tussocks
L2	Avoid pulling woody vegetation out by the roots in identified habitat
L3	Restrictions on mowing
L4	Avoid dragging vegetation through occupied habitat
L5	Avoid burning brush piles within a specified distance of occupied habitat
L6	Re-vegetate disturbed habitat in accordance with the ECS

L7	Leave piles of woody debris along edge of ROW if clearing vegetation
L8	Avoid additional clearing of trees
L9	No woody vegetation or spoil disposal within occupied habitat
L10	Retain snags, dead/dying trees, and trees with exfoliating bark
L11	Maintain a diversity of open, herbaceous habitat
Routing Criteria and Construction	
M1	Avoid constructing bell holes and trenches in habitat areas
M2	Route new projects to avoid occupied or potential habitats
Soil and Geology Impacts	
N1	Employ silt fences around construction/soil disturbance areas within occupied habitat
N2	Blasting within a specified area of occupied habitat must ensure karst integrity is maintained.
N3	No HDD within the potential habitat zone
N4	Clearly mark karst feature buffers until ground disturbing activities are completed
N5	Use an inverted filter to bridge karst when filling new sinkholes
N6	Trenches to be backfilled using native material to specified depth where applicable
N7	Minimize alteration of existing grade and hydrology of existing surface karst features
N8	Drilling conducted in manner that will not compromise structural integrity of habitat/habitat features or alter hydrology
N9	Ensure restoration of pre-existing topographic contours after ground disturbance.

The majority of the AMMs listed above are mandatory and must be applied to all Covered Activities. However, as previously discussed, there is a sub-group of AMMs that NiSource determined cannot feasibly be implemented in every instance due to location, technical or engineering feasibility, potential adverse impacts to other species, project timelines, customer needs, or effectiveness. NiSource has stated that a decision regarding these “non-mandatory” AMMs will be made on a case-by-case basis, and these evaluation processes will be reported to the Service in its annual report.

NiSource has stated that species-specific AMMs (Appendix E) supplement (and supersede if an inconsistency is noted) those BMPs included within NiSource’s ECS documents and do not substitute for NiSource’s already required pre-construction planning and project implementation specifications. Rather, the information gathered during the pre-construction planning and project implementation phases will be used to determine actual project impacts on MSHCP Species and used as the basis for the mitigation program, for situations where take would occur.

Table 4.3.4: Impacts to Species Analyzed in the Species (i.e., "Take" and "MSHCP" Species")

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mammals	Gray bat *Myotis grisescens*	MSHCP	Endangered	**Not likely to adversely affect** in Adair, Allen, Carter, Clark, Estill, Fayette, Garrard, Greenup, Lee, Letcher, Lincoln, Madison, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Powell, and Rowan counties, KY; and Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson counties, TN.	Not applicable	Not applicable	**Mandatory**: A1, A2, B3, D6, D7, H1, H5, H7, J3, L5, L6, L9, N2, N3 **Non-Mandatory**: D1, D3, D4, D5, D9, F2, G1, L8	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mammals	Indiana bat *Myotis sodalis*	Take	Endangered	**Impacts likely** throughout the entire Covered Land footprint in Indiana, Kentucky, Ohio, Pennsylvania, Tennessee, and West Virginia; and in Allegany, Garret, and Washington counties, MD; Hunterdon, Morris, and Warren counties, NJ; Orange and Rockland counties, NY; and Albemarle, Alleghany, Augusta, Botetourt, Clarke, Frederick, Giles, Greene, Lexington, Lexington City, Madison, Page, Rockbridge, Rockingham, Shenandoah, Warren, Waynesboro City, and Waynesboro counties, VA[1]	Tree clearing associated with a wide variety of activities, tree side-trimming, access roads maintenance and construction, equipment operation, well plugging, presence of the pipeline corridor, construction and maintenance of waste pits, and herbicide application	Direct impacts due to tree removal, crushing bats, increased predation, entrapment, noise, and chemical contaminants, which may kill/wound/ harm/harass if they are present during the work. Indirect impacts due to loss or degradation of roosting, foraging, and travel corridor habitats along the ROW (harassment).	**Mandatory**: A1, B3, C1, D6, D7, F1, H1, H5, H7, H9J3, L5, L6, L8, L9, N2, N8, N9 **Non-Mandatory**: A2, B4, D8, L10	Protect and manage summer habitat; protect priority 1 & 2 hibernacula and associated spring staging/fall swarming habitat; and restore and maintain optimal habitat conditions in degraded caves and/or mines.

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mammals	Louisiana black bear *Ursus americanus luteolus*	MSHCP	Threatened	**Not likely to adversely affect** in East Carroll, Franklin, Iberia, Madison, Richland, and St. Mary parishes, LA; and Humphreys, Issaquena, Sharkey, Warren, and Washington counties, MS. **No effect** in Avoyelles and St. Landry Parish, LA	Not applicable	Not applicable	**Mandatory**: A1,B3,B4, B5, B6, L2, L3, L6, L8 **Non-Mandatory**: F1	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
	Virginia big-eared bat *Corynorhinus townsendii virginianus*	MSHCP	Endangered	**Not likely to adversely affect** in Bath, Carter, Estill, Jackson, Lee, Madison, Menifee, Montgomery, Morgan, Owsley, Powell, and Rowan counties, KY; Augusta, Bland, Giles, Rockingham, and Shenandoah counties, VA; and Fayette, Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker counties, WV.	Not applicable	Not applicable	**Mandatory**: A1, A2, B3, B6, D6, D7, H1, H5, H7, H8, J3, L5, L9, L11, N2, N3 **Non-Mandatory**: F2, M2	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Birds	Interior least tern *Sterna antillarum*	MSHCP	Endangered	**Not likely to adversely to affect** in East Carroll Parish, LA; and Issaquena, County, MS. **No effect** in Grant and Madison parishes, LA; and Warren and Washington counties, MS.	Not applicable	Not applicable	**Mandatory**: A2, D6, F1, H1, **Non-Mandatory**: D1, G1	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Reptiles	Bog turtle *Glyptemys muhlenbergii*	Take	Threatened	**Impacts likely** in New Castle County, DE; Baltimore, Cecil, and Harford counties, MD; Gloucester, Hunterdon, Morris, Salem, and Warren counties, NJ; Orange and Rockland counties, NY; and Adams, Bucks, Chester, Cumberland, Delaware, Lancaster, Lehigh, Monroe, Montgomery, Northampton, and York counties, PA.	Vehicle operation, vegetation management (mowing), vegetation management (herbicide application), temporary and permanent access road construction, vehicle operation, minor spill event, vegetation management (clearing), ROW (trenching - digging, blasting, dewatering, grading), wetland crossings (trenching - digging, blasting, dewatering, clearing, grading)	Habitat loss, degradation and fragmentation, chemical contaminants, loss of individuals, hydrologic changes, isolation, illegal collection and trade	**Mandatory**: A1, A2, C1, D1, D7, E3, F1, G1, H4, H5, H6, H7, I1, I2, I3, I4, J1, L1, L2, L3, L4, L5, L6, M1, M2, N1	O&M impacts: Habitat restoration and enhancement within ROW if possible. If not possible, off-ROW restoration and management will occur on a 1:1 basis. New Construction or conventional replacement methods: Protect and restore (as needed) bog turtle sites. Priority given to sites within a complex versus isolated sites.

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Amphibians	Cheat Mountain salamander *Plethodon nettingi*	MSHCP	Threatened	**Not likely to adversely affect** in Grant, Pendleton, Pocahontas, Randolph, and Tucker counties, WV.	Not applicable	Not applicable	**Mandatory**: A1, A2, D1, D8, G1, H1, H4, H5, H6, H7, I1, I2, I3, J2, L3, L4, L5, L6, L7, L8, M2, N1 **Non-Mandatory**: J1, L2	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Crustaceans	Madison Cave isopod *Antrolana lira*	Take	Threatened	**Impacts likely** in Augusta, Clarke, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties, and the City of Waynesboro, VA.	Construction grading, trenching (digging, blasting), access road construction (temporary and permanent), wetland crossings (digging, blasting), HDD (removed as activity in range of this species), minor spill, pipeline abandonment	Loss, degradation, and/or Fragmentation of habitat due to collapsing or filling in subsurface features and/or altering sub-surface water quality and/or quantity. The changes in habitat would render them temporarily to permanently unsuitable for future use by the Madison Cave isopod and may prevent movements among or between populations. Any Madison Cave isopods present in the zones of impact would likely be killed by smothering or poisoning.	**Mandatory**:A 1,A2,B3, D7, H1, H4, H5, H6, H7, I1, I2, I3,I4, I5, N2, N3, N4, N5, N7 **Non-Mandatory**: J3	Mitigation to be completed prior to commencing the activity causing the impact: protect key parcels (containing surface karst features) and restore surface karst features (if needed) within the immediate recharge areas of another known Madison Cave isopod occurrence

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
	Nashville crayfish *Orconectes shoupi*	Take	Endangered	**Impacts likely** in Davidson and Williamson counties, TN.	Pipeline corridor presence, tree clearing, mechanical repair in upland or wet- land areas, instream stabilization, existing road maintenance, culvert replacement, clearing and ground disturbance for cathodic protection, removal of abandoned pipe, tree, shrub, and herbaceous clearing, grading, regrading, water discharge related to hydrostatic testing, fertilizer application, temporary and permanent access roads, installation and removal of water diversion structures and equipment in stream, minor frac-out, and minor spill events	Sedimentation, riparian tree removal, crushing, altered flow, increased water temperature, substrate removal, sedimentation, chemical contaminants, facilitation of invasive species	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, D10, F1, H1, H2, H4, H5, I1, I2, I3, I4, J1, N6 **Non-Mandatory**: E1, G1,	O&M and Upland Disturbance: Restore and protect riparian buffers within identified priority areas New Construction and Repair at Stream Crossings: Restore, protect and enhance potential habitat within identified priority areas

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mollusks	Birdwing pearlymussel *Lemiox rimosus*	MSHCP	Endangered	**Not likely to adversely affect** in Maury County, TN.	Not applicable	Not applicable	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I4, K1 **Non-Mandatory**: D4, E1, F1, G1, I1, I2, J1	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
	Clubshell mussel *Pleurobema clava*	Take	Endangered	**Impacts likely** in Franklin, Madison, and Pickaway counties, OH; Armstrong and Clarion counties, PA; and Braxton, Clay, and Doddridge counties, WV **No effect** in Dekalb and Marshall counties, IN; Allen, Bath, Bracken, Mason, Pendleton, and Robertson counties, KY; Coshocton, Defiance, Delaware, Fairfield, Greene, Hancock, Trumbull, Tuscarawas, and Union counties, OH; Cattaraugus County, NY; Hardin County, TN; and Kanawha and Lewis counties, WV.	Pipeline corridor presence, vehicle operation, access road culvert replacement, access road maintenance, off-ROW clearing, mechanical repair and fill in ROW, in-stream stabilization, tree clearing, herbicide application, hydrostatic testing, pipe-line abandonment, well abandonment, wet ditch crossing activities, access road construction, grading, HDD, hydrostatic testing, re-grading, fertilizer application, erosion control devices, herbaceous and woody vegetation clearing, stream bank contouring, installation and removal of stream crossing structures, trenching related impacts, waste pits, minor spill events, in-stream stabilization, and vegetation disposal.	Sedimentation, chemical contaminants, increased water temperature, crushing, substrate compaction, altered flow, burying substrate, entrapment, water level reduction, introduction of invasive species, loss of habitat	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, I1, I2, I3, I4, K1 **Non-Mandatory**: D4, E1, G1, J1	See Table 4.3-5

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mollusks	Cracking pearlymussel *Hemistena lata*	MSHCP	Endangered	**Not likely to adversely affect** in Hardin, Maury, and Wayne counties, TN.	Not applicable	Not applicable	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I4, K1 **Non-Mandatory**: D4, E1, F1, G1, I1, I2, J1	Not applicable
	Cumberland monkeyface pearlymussel *Quadrula intermedia*	MSHCP	Endangered	**Not likely to adversely affect** in Maury County, TN	Not applicable	Not applicable	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I4, K1 **Non-Mandatory**: D4, E1, F1, G1, I1, I2, J1	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
	Fanshell mussel *Cyprogenia stegaria*	Take	Endangered	**Impacts likely** in Bracken, Nicholas, Pendleton, and Robertson counties, KY; Coshocton, Meigs, Morgan, Muskingum, and Washington counties, OH; Hardin County, TN; and Jackson and Kanawha counties, WV. **No effect** in Allen, Barren, Boyd, Carter, Greenup, Lawrence, Lewis, Mason, Monroe, and Powell counties, KY; and Wood County, WV	Pipeline corridor presence, vehicle operation, access road culvert replacement, access road maintenance, off-ROW clearing, mechanical repair and fill in ROW, in-stream stabilization, tree clearing, herbicide application, hydrostatic testing, pipeline abandonment, well abandonment, wet ditch crossing activities, access road construction, grading, HDD, hydrostatic testing, re-grading, fertilizer application, erosion control devices, herbaceous and woody vegetation clearing, stream bank contouring, installation and removal of stream crossing structures, trenching, waste pits, minor spill events, in-stream stabilization, and vegetation disposal.	Sedimentation, chemical contaminants, increased water temperature, crushing, substrate compaction, altered flow, burying substrate, entrapment, water level reduction, and introduction of invasive species	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I1, I2, I3, I4, K1 **Non-Mandatory**: D4, E1, G1, J1	See Table 4.3-5

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mollusks	James spinymussel *Pleurobema collina*	Take	Endangered	**Impacts likely** in Albemarle, Alleghany, Botetourt, Goochland, Greene, Orange, Powhatan, and Rockbridge counties, VA. **No effect** in Giles County, VA; and Monroe County, WV	Pipeline corridor presence, vehicle operation, access road culvert replacement, access road maintenance, off-ROW clearing, mechanical repair and fill in ROW, in-stream stabilization, tree clearing, herbicide application, hydrostatic testing, pipeline abandonment, and well abandonment, dry-ditch crossing activities, access road construction, grading, horizontal directional drill (HDD), hydrostatic testing (withdrawal and discharge), re-grading, fertilizer application, erosion control devices, herbaceous and woody vegetation clearing, stream bank contouring, installation and removal of stream crossing structures, trenching related impacts, waste pits, minor spill events, and vegetation disposal.	Sedimentation, chemical contaminants, increased water temperature, crushing, substrate compaction, altered flow, burying substrate, entrapment, water level reduction, and introduction of invasive species	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, F1, H1, H2, H3, H4, H5, H6, I1, I2, I3, I4, K1 **Non-Mandatory**: D4, E1, G1, J1	See Table 4.3-5

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mollusks	Northern riffleshell mussel *Epioblasma torulosa rangiana*	Take	Endangered	**Impacts likely** in Pickaway, County, OH; Armstrong and Clarion counties, PA; and Kanawha County, WV. **No effect:** in De Kalb County, IN; Bath, Pendleton, and Rowan counties, KY; Franklin, Madison, and Union counties, OH; and Braxton and Clay counties, WV.	Pipeline corridor presence, vehicle operation, access road culvert replacement, access road maintenance, off-ROW clearing, mechanical repair and fill in ROW, in-stream stabilization, tree clearing, herbicide application, hydrostatic testing, pipeline abandonment, well abandonment, wet ditch crossing activities, access road construction, grading, HDD, hydrostatic testing (withdrawal and discharge), re-grading, fertilizer application, erosion control devices, herbaceous and woody vegetation clearing, stream bank contouring, installation and removal of stream crossing structures, trenching related impacts, waste pits, minor spill events, in-stream stabilization, and vegetation disposal	Sedimentation, chemical contaminants, increased water temperature, crushing, substrate compaction, altered flow, burying substrate, entrapment, water level reduction, and introduction of invasive species	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I1, I2, I3, I4, K1 **Non-Mandatory**: D4, E1, G1, J1	See Table 4.3-5

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
	Oyster mussel *Epioblasma capsaeformis*	MSHCP	Endangered	**Not likely to adversely affect** in Maury County, TN. **No effect** in Monroe County, KY	Not applicable	Not applicable	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I4, K1 **Non-Mandatory**: D4, E1, F1, G1, I1, I2, J1	Not applicable

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Mollusks	Sheepnose mussel *Plethobasus cyphyus*	Take	Endangered	**Impacts likely** in Bath, Boyd, Bracken, Clark, Fayette, Greenup, Lewis, Madison, Mason, Nicholas, Pendleton, and Rowan counties, KY; Sunflower County, MS; Adams, Brown, Clermont, Gallia, Lawrence, Meigs, Scioto, and Washington counties, OH; and Cabell, Jackson, Mason, Wayne, and Wood counties, WV. **No effect**: in Garrard County, KY; Humphreys County, MS; and Athens, Coshocton, and Morgan counties, OH.	Pipeline corridor presence, vehicle operation, access road culvert replacement, access road maintenance, off-ROW clearing, mechanical repair and fill in ROW, in-stream stabilization, tree clearing, herbicide application, hydrostatic testing, pipeline abandonment, well abandonment, wet ditch crossing activities, access road construction, grading, HDD, hydrostatic testing (withdrawal and discharge), regrading, fertilizer application, erosion control devices, herbaceous and woody vegetation clearing, stream bank contouring, installation and removal of stream crossing structures, trenching related impacts, waste pits, minor spill events (major spill events are addressed outside the context of the MSHCP), in-stream stabilization, and vegetation disposal	Sedimentation, chemical contaminants, increased water temperature, crushing, substrate compaction, altered flow, burying substrate, entrapment, water level reduction, and introduction of invasive species	**Mandatory**: A2, B2, C1, D1, D2, D3, D5, D6, E2, H1, H2, H3, H4, H5, H6, I1, I2, I3, I4, K1 **Non-Mandatory**: D4, E1, G1, J1	See Table 4.3-5

Group	Common/ Scientific Name	Species Type	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Species Impacts due to Covered Activities	AMMs[1]	Mitigation[2]
Insects	American burying beetle *Nicophorus americanus*	Take	Endangered	**Impacts likely** in Athens, Morgan, and Perry counties, OH. **No effect** in Lafayette County, MS; and Gloucester County, NJ; and Hocking and Vinton counties, OH.	Off ROW clearing including tree clearing, shrub clearing, herbaceous vegetation clearing, grading, temporary access roads, and permanent access roads	Habitat degradation, chemical contaminants, reduction in carrion prey base, and increased interspecific competition	**Mandatory**: A1, B2 **Non-Mandatory**: A2, B1	Within first 3 years of MSHCP implementation: Captive propagation and release, monitoring of release and its success, follow up surveys the next spring.

[1]See Table 4.3.3 (above) for a listing of general AMMs and Appendix E for species-specific AMMs
[2]See MSHCP for specific details regarding Mitigation

Based on the analysis in the MSHCP, BA, and BO, we make the following conclusions regarding potential impacts to MSHCP species in (Table 4.3.4). Note, for nine of the 19 species in that table, NiSource will avoid take through implementation of the avoidance measures in Table 4.3.3. In addition, for some of the take species, NiSource may, in coordination with the appropriate Service Field Office, elect to do “pre-project surveys” with the goal of establishing the surveyed species is absent from the project area. In these situations, the FWS may agree, that based on the results of the survey, NiSource Covered Activities would have no effect on those species.

Indiana Bats

We expect that the overall level of take of Indiana bats will be relatively low, and not result in significant population-level impacts. The Service reached this conclusion based on: 1) take of Indiana bats in winter hibernacula is not anticipated; 2) take of winter habitat is not anticipated; and 3) no direct take is anticipated in known summer maternity habitat (pups or adults) or known spring staging/fall swarming habitat of Priority 1 and 2 hibernacula.

NiSource has proposed mitigation for their impacts to Indiana bats in the MSHCP. The mitigation package includes: the purchase (i.e., fee title or easement) and protection (i.e., gating) of either 126 or 252 acres surrounding one or two P1 or P2 hibernacula and the protection (i.e., fee title or easement) of between 8,907 and 10,960 acres of known maternity colony habitat. The protection of hibernaculum also includes the development and implementation of a Hibernaculum Protection Plan to address threats (e.g., unauthorized human entrance). We believe this type and amount of mitigation will fully compensate for the impact of the take from NiSource’s Covered Activities on populations within and associated with the Covered Lands. We conclude that the Proposed Action of issuing NiSource an ITP for 50-years does not pose a significant risk to the viability of the Indiana bat, and will not result in measurable population declines or losses in the Covered Lands. Because we do not expect the impacts to have population-level effects, we do not expect that the Proposed Action will

appreciably reduce the likelihood of both the survival and recovery of the species as a whole. Therefore, we conclude that the Proposed Action is not likely to jeopardize the continued existence of the species.

Bog Turtle

Take of bog turtles from NiSource activities would occur primarily from impacts directly associated with new construction of pipeline and related facilities across occupied habitat. The NiSource MSHCP provides the following estimation of take numbers (Chapter 6, p. 73-78), which we endorse (after slight modification) and incorporate here.

For looping (10 sites), conventional replacement (5 sites), and new construction (5 sites) projects, a small number of turtles (0-5 per site) may be missed during pre-construction surveys and wounded or killed. All turtles at the sites are expected to experience some harassment/harm in the form of a temporary reduction in reproductive success due to disturbance during construction, and habitat loss/degradation.

In addition, O&M activities may impact bog turtles at 25 sites through: 1) general vehicle use may result in 0-2 turtles wounded or killed per site; 2) mowing may result in one turtle wounded or killed per round of vegetation management for every 20 sites mowed (every seven years for a total of 9 bog turtles spread across 25 sites); 3) herbicide use may result in one turtle harassed/harmed (non-lethal) per round of vegetation management (every seven years for a total of 7 turtles/site); and 4) all bog turtles at one site may be harassed or harmed (non-lethal) during a minor spill event.

For the 5 sites with no anticipated ground-disturbing work, a total of 0-3 bog turtles are anticipated to be wounded or killed, and an additional 7 bog turtles harassed or harmed (non-lethal) over the life of the MSHCP. For the 20 additional sites where ground-disturbing work is anticipated, a total of 0-8 bog turtles may be wounded or killed over the life of the MSHCP, and all turtles at the sites will experience a temporary reduction in reproductive success. It is possible that a small bog turtle site could be extirpated due to ground-disturbing activities.

We agree with the assessment of beneficial impacts associated with mitigation discussed in the MSHCP and the following is a summary of that discussion. There are two forms of mitigation for impacts to bog turtles included in the MSHCP. For impacts at an estimated 20 bog turtle sites (see below) associated with construction (ground disturbance) activities and all future non-ground-disturbing O&M at those sites, NiSource will either permanently protect and restore a bog turtle site to optimal habitat or protect an existing site with optimal bog turtle habitat. The mitigation projects are in line with Recovery Action 2.3.3, 6.4.1, and 7.2. To mitigate for impacts to bog turtles associated with an additional 5 sites where only non-ground disturbing O&M activities are anticipated, NiSource will either protect and restore an off-site bog turtle wetland or conduct habitat restoration and long-term management (life of the permit) of the wetland impacted. Off-ROW habitat restoration will expand the amount of high quality nesting, basking, and foraging habitat which is expected to result in increased survival and reproductive success of the population. This will also serve to decrease the likely concentration of bog turtles within the ROW which will further reduce risk of future impacts to individual turtles from O&M.

NiSource actions should have no effect on the illegal collection or trade of the bog turtle. However, NiSource can contribute to the conservation needs of the species through the additional survey efforts planned, the management of bog turtle sites along the existing ROW, and permanent protection and restoration of bog turtle sites as part of their mitigation package.

NiSource is anticipated to impact 25 (or 4%) of known bog turtle sites range-wide. As discussed above, NiSource actions may adversely and beneficially affect bog turtles. The most significant adverse effects are associated with looping, replacement, and new alignment projects. However, NiSource has committed to avoid bog turtle habitat through routing and HDD whenever possible and will conduct pre-construction surveys to move bog turtles out of the way. Even with this commitment, we anticipate that some turtles will be killed and if this occurs at a wetland with a small, isolated population, this site may be extirpated. The vegetation management activities conducted on NiSource ROWs may also result in impacts to small numbers of turtles but is anticipated to be beneficial to the local populations overall. In addition, NiSource is anticipated to protect and restore 25 sites.

The number of known populations in the Recovery Units crossed by the NiSource project theoretically meets the conservation needs of the species (once sufficient populations are protected). When considering this, the potential loss of one known population of bog turtles would not measurably reduce our ability to continue to meet the conservation needs of the species. Therefore, we conclude that this project will not reduce the likelihood of survival and recovery of the bog turtle.

Madison Cave Isopod

We expect the overall level of take of MCI will be low. There are no known MCI sites within the Covered Land, and only one MCI site (Limekiln Cave) is located within ½-mile of the Covered Land. For our analysis, we assumed that one additional new MCI site will likely be found within the Covered Land, and along with Limekiln Cave, may be impacted during the 50-year life of the permit. We do not anticipate that impacts will significantly impact the Limekiln Cave population, given its distance from the Covered Land. We do anticipate that take of individuals from the unknown population may occur, and there is a potential for extirpation of one unknown population within the Covered Land.

To mitigate for impacts to MCI associated with the Limekiln Cave, NiSource will protect and restore a minimum of 25 acres around the Limekiln Cave. If that is not possible, NiSource will follow mitigation requirements for unknown occurrences. To mitigate for impacts to MCI associated with one unknown occurrence, NiSource will protect key parcels (minimum of 25 acres) in the drainage area immediately around a known MCI site. NiSource will restore 300-foot buffers around each karst feature on the parcel. This will protect the surface karst features from future disturbance which is very important in areas with high development threats.

We do not expect the Proposed Action to reduce the likelihood of survival and recovery of the MCI rangewide, or expect the Proposed Action to appreciably reduce the likelihood of both the survival and recovery of the species as a whole. Therefore, we conclude that the Proposed Action will not jeopardize the continued existence of the species.

Clubshell Mussel

Of the 17 known populations of clubshell, including eight stable/reproducing populations, NiSource has the potential to affect five; three of which are considered stable/reproducing populations (Allegheny River, Little Darby Creek, and Elk River) and two (Meathouse Fork and Big Darby Creek) are unknown. Because the status of the Meathouse Fork population is unknown and because NiSource crosses Meathouse Fork multiple times upstream of where the remaining clubshell population is likely located, the Service will require NiSource to implement dry-ditch techniques when working in Meathouse Fork to significantly limit downstream sediments. The Allegheny and Elk River populations cover many river miles and it is unlikely that NiSource activities would significantly affect these populations. NiSource crosses near the mouth of Little Darby Creek and downstream of the one individual found in Big Darby Creek - population level impacts in these streams are therefore also unlikely. The likelihood of any population being extirpated outright is small given the Service required actions, and the AMMs and BMPs implemented by NiSource. Therefore, after reviewing the current status of the species, the environmental baseline for the Covered Land, and the potential cumulative effects, it is our opinion that the Proposed Action is not likely to jeopardize the continued existence of the clubshell mussel. No critical habitat has been designated for this species; therefore, none will be affected.

Where take of mussels cannot be avoided, NiSource will employ mitigation to fully compensate for the impact of the take. For impacts to habitat wherever HCP or non-HCP mussels occur, NiSource will restore the disturbed stream bed and riparian area within its ROW resulting from its activities. Restoration will occur during the same construction season (next appropriate planting season for riparian restoration) as impacts unless there are extenuating circumstances and the Service is informed of those issues. The basic restoration will be conducted in accordance with standard industry specifications as defined in the ECS and required by FERC and other relevant regulatory agencies. This will involve, at a minimum, restoration of any impacts to the depth, flow, channel bottom, and/or banks as nearly as practical back to the pre-

activity condition. Vegetation restoration must be with site-appropriate native species. As the initial step in compensatory mitigation, NiSource will enhance the restored stream substrate within the construction zone to habitat that is optimal for the mussel species. This would typically involve either replacement or importation of clean, appropriately sized material for mussel re-colonization. NiSource will also enhance, where feasible, any pre-construction deficiencies associated with the depth, flow, bank stability, or riparian vegetation that would be detrimental to mussel recolonization, survival, and reproduction. This enhancement serves as one component of NiSource's overall mitigation program.

A second step in mitigation for mussel impacts is mitigation to compensate for sediment producing and other indirect impact producing activities (Aggregate Take). Mitigation for Aggregate Take will take the form of habitat protection/restoration. The protection or restoration of riparian habitat is designed to reduce the sediment impacts to mussel species by buffering occupied streams. The Service expects this to result in improved survival and reproduction of mussels in the mitigation area.

Last, for all species, NiSource has the option described in AMM #1 to relocate mussels as part of a stream crossing project. If the relocation is successful, as discussed in AMM #1, the following mitigation is required in addition to the enhancement and aggregate take mitigation described above. Find, relocate, and monitor the impacted species and other mussels within the assemblage impacted by the project to a suitable site upstream or downstream of the impact zone, and restore riparian habitat at the site of relocation, or at an upstream location as near to the mussel relocation site as possible, at a 1:1 ratio of the acreage amount of in-stream habitat impacted.

If NiSource chooses not to relocate mussels, additional mitigation is required specific to each species. For Clubshell, based on the impact of take, the mitigation amount required is a 1.5:1 ratio of the acreage amount of instream habitat impacted by stream crossing(s) of the Allegheny River (PA), the Elk River (WV), or Little Darby Creek (OH) (stable populations). For impacts to

Big Darby Creek (OH) or Meathouse Fork (WV), the 1.5:1 mitigation ratio will be increased by a multiplier of 1.5 to compensate for greater impacts to small isolated populations that may have less resilience. For impacts to streams not listed here, NiSource, in coordination with the Service, will determine whether the population is stable and recruiting or small and isolated and apply the appropriate mitigation ratios. For all riparian restoration, a multiplier of 3 will be used to account for the time it takes riparian restorations to mature, stabilize, and become fully functional.

Northern Riffleshell

There are 13 northern riffleshell populations currently identified and four known reproducing populations. NiSource would potentially affect only one of the four known reproducing populations (the large Allegheny River population). Two other reproducing populations are completely outside of the covered lands. NiSource has the potential to affect one population where reproduction is uncertain (Big Darby Creek) and one population that may or may not be extant (Elk River). Local impacts are possible to the Allegheny River population, but not to the larger population of millions of animals - the persistence and reproductive potential of this population should not be affected. The Elk River population is apparently very small and may already be extirpated. If, however, that population exists at a very low density in the vicinity of the pipeline, NiSource activities could result in significant impacts. NiSource activities may affect northern riffleshell in Big Darby Creek in Ohio. There are two augmented populations (two release sites) in Big Darby Creek in Franklin County, Ohio. They cover several miles of stream (in part upstream of the NiSource crossing) where it is unlikely that there would be population level impacts. The distribution of the northern riffleshell, which is focused in Pennsylvania, Ohio, and Kentucky within the NiSource Covered Lands has an additional population center in Canada/Michigan. The Elk River population in West Virginia may already be extirpated, but significant impacts could occur from multiple crossings of the Elk River if the population is extant, although impacts to the habitat would be minor and of short duration. The recovery plan (USFWS 1994) documents the Elk River drainage as necessary for recovery of the species. The 5-Year Review (USFWS 2008) indicates, however, that it is doubtful that this

criterion can be met because of a lack of understanding of the reasons for decline in the Elk River population of northern riffleshell. The existing Elk River population may no longer be relevant to recovery of this species. Therefore, after reviewing the current status of the species, the environmental baseline for the Covered Land, and the potential cumulative effects, it is our opinion that the Proposed Action, as proposed, is not likely to jeopardize the continued existence of the northern riffleshell mussel. No critical habitat has been designated for this species; therefore, none will be affected.

Mitigation for northern riffleshell follows that for clubshell except for new construction impacts where mussels are not relocated. In these instances, there will be two avenues to mitigation. Mitigation Option A will directly and immediately increase mussel populations by reintroducing captive-reared individuals to suitable habitat, or adding tothem to existing populations. Long-term population gains are also expected to accrue from reproduction of introduced mussels. The goal will be to establish a stable mitigation site(s) that over time foster northern riffleshell reproduction and expand. NiSource will be permitted to mitigate for impacts at one or more sites that occur within any 4-digit Hydrologic Unit at a mitigation site within that 4-digit Hydrologic Unit provided a suitable mitigation site as agreed to by the Service is available. NiSource must ensure a ratio of 2.5:1 mussels introduced into suitable stream as defined below for each mussel taken (either documented or estimated) from the Allegheny River or Big Darby Creek and a ratio of 2.5:1(x1.5):1 ratio for mussels taken in the Elk River to compensate for the variable impact of take of that population. A multiplier of 1.5 is used for all mitigation to compensate for the failure of some of the introduced animals to survive the transplanting process, however, NiSource will ensure through follow-up surveys that the mitigation site (s) maintain at minimum the number of mussels that reflect the baseline ratio of mussels restored to those taken (i.e., in the case of impacts to a stable/recruiting population, 2.5:1; and in the case of impacts to a small isolated population 3.75:1).

Mitigation Option B will fully compensate for the impact of take by protecting and restoring the riparian zones that moderate water temperature, provide nutrient inputs, and reduce sediments

and other contaminants along occupied streams, thereby improving the quality of the habitat. NiSource expects this to translate into increased survival and reproduction of mussels in the mitigation area. Protect and restore protect riparian buffers associated with occupied northern riffleshell habitat. Because of the impact of take on this species, the mitigation amount required is a 2.5:1 ratio of the acreage amount of instream habitat impacted by stream crossing (s) of the Allegheny River (PA) or Big Darby Creek (OH). For stream crossings of the Elk River (WV), the 2.5:1 mitigation ratio will be increased by a multiplier of 1.5 to compensate for greater impacts to small isolated populations that may have less resilience. For impacts to streams not listed here, NiSource in coordination with the Service will determine whether the population is stable and recruiting or small and isolated and apply the appropriate mitigation ratios. For all riparian restoration, a multiplier of 3 will be used to account for the time it takes riparian restorations to mature, stabilize, and become fully functional.

Fanshell Mussel

NiSource has the potential to affect two stable, reproducing populations of fanshell mussels (Muskingum River and NiSource has the potential to affect two of the stable, reproducing populations (Muskingum River and Licking River in Kentucky), two small, possibly non-reproducing populations (Tygart's Creek and Barren River), and the population in the Ohio River where the status is largely unknown. NiSource activities would potentially affect five of the approximately 13 known populations. It is possible that NiSource activities could impact one of the strongholds of the fanshell mussel in the Licking River in Kentucky. The extent of the fanshell in the lower Licking River suggests population level impacts would be unlikely. NiSource has the potential to impact a downstream segment of the fanshell population in the Muskingum River. NiSource will not affect the larger population that extends miles upstream of the NiSource crossings. NiSource makes seven crossings of the Ohio River between Ohio and Kentucky and Ohio and West Virginia. Populations of fanshell are known to persist in the Ohio, but population levels and densities are largely unknown. Although there will be multiple crossings, NiSource would affect the persistence or reproduction of the fanshell population of the Ohio River. The recovery plan indicates the need for three populations in Kentucky

tributaries to the Ohio. In 1991, the Tygart's Creek and Barren River populations were considered small and non-reproducing and may now be extirpated. Since the impacts to these populations and their status are both uncertain, and since NiSource activities are not expected to cause serious degradation of habitat, while NiSource activities could cause take in these streams, it does not seem likely that NiSource activities will impede recovery of this species. After reviewing the current status of this species, the environmental baseline for the Covered Land, and the potential cumulative effects, it is our opinion that the Proposed Action, as proposed, is not likely to jeopardize the continued existence of fanshell mussels. No critical habitat has been designated for this species; therefore, none will be affected.

Mitigation for fanshell follows the same pattern as for other mussels except for take from new construction. Mitigation for new construction will require NiSource to protect and restore riparian buffers adjacent to occupied fanshell habitat. Because of the impact of take on this species, the mitigation amount required is a 1.5:1 ratio of the acreage amount of instream habitat impacted by stream crossing(s). For impacts to Muskingum River (Ohio), Walhonding River (Ohio), Tygart's Creek (Kentucky), or the Barren River (Kentucky) the 1.5:1 mitigation ratio will be increased by a multiplier of 1.5 to compensate for greater impacts to small isolated populations that may have less resilience. For impacts to streams not listed here, NiSource in coordination with the Service will determine
whether or not the population is stable and recruiting or small and isolated and apply the appropriate mitigation ratios. For all riparian restoration, a multiplier of 3 will be used to account for the time it takes riparian restorations to mature, stabilize, and become fully functional.

James Spiny Mussel

JSM has a limited range, confined to the James and Roanoke River watersheds (Dan and Mayo Rivers) in Virginia and North Carolina. NiSource would potentially affect three known populations (considered small, isolated, or non-reproducing) and one population of unknown status, therefore potentially affecting four of the 21 known populations. NiSource would not directly impact any of the most robust remaining populations (Johns Creek, South Fork Potts

Creek, Mill Creek, and the Roanoke River drainage, nor the large, recently discovered population at Dicks Creek/Oregon Creek). NiSource makes 79 stream crossings within the Covered Lands in the James watershed. It is possible that some of the un-surveyed streams contain populations of JSM as evidenced by the discovery in 2010 of the Dicks Creek/Oregon Creek population. NiSource activities therefore could affect some currently unknown JSM populations, however, NiSource's agreement to implement all stream crossings using dry-ditch methodology and a mandatory time of year restriction (15 May to 31 July) designed to avoid the peak reproductive period would minimize population level impacts. Therefore, after reviewing the current status of this species, the environmental baseline for the Covered Land, and the potential cumulative effects, it is our opinion that the Proposed Action, as proposed, is not likely to jeopardize the continued existence of the James spiny mussel. No critical habitat has been designated for this species; therefore, none will be affected.

Mitigation for take of JSM from new construction is to protect and restore riparian buffers associated with occupied JSM habitat (coordinate with the Service and the Virginia Department of Game and Inland Fisheries about documented occurrences). Because of the impact of take on this species, the mitigation amount required is a 2.0:1 ratio of the acreage amount of instream habitat impacted by stream crossings affecting stable/recruiting populations (none at the time of issuance of the ITP). For stream crossings of all other JSM streams the mitigation ratio will be increased by a multiplier of 1.5 to compensate for greater impacts to small isolated populations that may have less resilience. In addition, a multiplier of 3.0 will be applied to habitat that is only protected and not restored.

Sheepnose Mussel

There are multiple stable or improving sheepnose populations outside of the NiSource impact area and two stable or improving populations within the general area of NiSource covered lands that would not be impacted by NiSource because of agreements to HDD these streams or because of the location of crossings relative to the populations. Of the 11 populations thought to be stable or improving, six are completely outside of the NiSource covered lands. There is the

possibility for take in the Allegheny, Muskingum, and Big Sunflower Rivers should HDD not be practical and should those populations extend into the crossing areas, but we would not expect population-level impacts. Take is likely from two declining populations (Kentucky and Licking Rivers) and there is some potential for NiSource to have population-level impacts on sheepnose in the Kentucky River, depending on the exact location and number of animals, and the actual level of impacts. Because this population is likely to be of limited importance to the species, NiSource activities will not preclude survival or recovery of the sheepnose. Therefore, after reviewing the current status of this species, the environmental baseline for the Covered Land, and the potential cumulative effects, it is our opinion that the Proposed Action, as proposed, is not likely to jeopardize the continued existence of the sheepnose mussel. No critical habitat has been designated for this species; therefore, none will be affected.

Mitigation for new construction impacts to sheepnose requires protection and restoration of riparian buffers adjacent to occupied sheepnose habitat. Because of the impact of take on this species, the mitigation amount required is a 2.0:1 ratio of the acreage amount of instream habitat impacted by stream crossing(s) of the Ohio River (Kentucky, Ohio, West Virginia), Muskingum River (Ohio), and the Big Sunflower River (Mississippi) (stable populations). For impacts to Kentucky River (Kentucky), Licking River (Kentucky), and Walhonding River (Ohio) the 2.0:1 mitigation ratio will be increased by a multiplier of 1.5 to compensate for greater impacts to small isolated populations that may have less resilience. For impacts to streams not listed here, NiSource in coordination with the Service will determine whether the population is stable and recruiting or small and isolated and apply the appropriate mitigation ratios. For all riparian restoration, a multiplier of 3 will be used to account for the time it takes riparian restorations to mature, stabilize, and become fully functional.

Nashville Crayfish

The existing NiSource pipeline, plus the one-mile corridor, bisects the Mill Creek Watershed. As such, NiSource Covered Activities have the potential to impact Nashville crayfish in the

mainstem of Mill Creek and six tributary streams. However, we do not anticipate population level impacts because NiSource has agreed to utilize dry-ditch techniques for all stream crossings. Impacts to individuals and habitat therefore should be limited to small reaches of stream at the crossing area. Therefore, based on our estimation of the current population sizes, our assumptions concerning the reproductive potential of Nashville crayfish, and the expected minimal long-term impacts to habitat, it seems unlikely that either mainstem or tributary populations would be significantly impacted by NiSource Covered Activities. As such, after reviewing the current status of this species, the environmental baseline for the Covered Land, and potential cumulative effects, it is our opinion that the Proposed Action, as proposed, is not likely to jeopardize the continued existence of the Nashville crayfish. No critical habitat has been designated for this species; therefore, none will be affected.

As with mussels, in all cases where direct take (stream crossings) occur, NiSource will restore the streambed and will restore the riparian area within the ROW disturbed as a result of its activities. The restorations will be conducted in accordance with ECS, AMMs, and requirements of FERC and other relevant action agencies. This will involve at minimum restoration of any impacts to the depth, flow, channel bottom, or banks as nearly as practical back to the pre-impact condition. Vegetation restoration must be with site-appropriate native species. As the initial step in compensatory mitigation, NiSource will also enhance the restored site to promote additional conservation of Nashville crayfish (at minimum this will include the addition of slab rock at a minimum size per slab of 1.6 square feet Walton 2008) within the 75 feet formerly enclosed by the coffer dams). The Service expects the enhancement of the substrate to result in more opportunities for recruitment of Nashville crayfish by providing suitable sheltering habitat.

Take of Nashville crayfish is anticipated to occur in two ways. First, the impact which may result from direct loss of individuals or habitat from stream crossings activities employed to install new pipeline, or repair or replace existing pipeline. Mitigation will entail restoration, enhancement, and protect potential of Nashville crayfish stream bed and riparian habitat within one of the

priority areas identified by Withers (2009) Indian Creek, Mill Creek upstream of downtown Nolensville or Bittick Creek an unnamed tributary to Mill Creek, or another priority stream identified in collaboration with the Service on a 1:1 basis with the Nashville crayfish habitat area affected by its activities equaling a minimum of 4.0 acres. This equates to streambed and riparian restoration, enhancement, and protection for a length of 3,485 linear feet.

The second kind of take is aggregate, which would result primarily from sedimentation from non-aquatic activities within the watershed, and secondarily from loss of riparian habitat, and other similar comparatively minor and indirect impacts. NiSource will implement mitigation for Aggregate Take in its entirety in conjunction with the first new construction project for which mitigation is required to ensure adequate and timely compensation for O&M activities in the watersheds where impacts would likely occur over the life of the ITP. It will use habitat protection/restoration as the mitigation option. The protection or restoration of riparian habitat is designed to reduce the sediment impacts to Nashville crayfish by buffering occupied streams. The total riparian area protected to mitigate for aggregate take will be 0.4 acre.

American burying beetle

We expect the overall take of American burying beetles (ABBs) will be low and not result in significant population-level impacts. Most of NiSource's existing facilities (e.g., ROW, compressor stations, appurtenant facilities) within the affected populations range is currently not suitable habitat. Where there is suitable habitat, the density of beetles are low, and these densities are anticipated to remain low, even with ongoing population augmentation efforts. The low density of beetles in suitable habitat reduces the potential for NiSource to directly (and unknowingly) encounter and harm individuals during their Covered Activities. Further, NiSource has proposed mitigation for their impacts to ABB in the form of a reintroduction program. This program will help bolster the reintroduction efforts directed at this population, and reduce the impact of any take from NiSource Covered Activities. We conclude that the proposed impacts from NiSource Covered Activities do not pose a significant risk to the viability of the ABB, and

will not result in measurable population declines or losses in the Covered Land. Therefore, we do not expect the Proposed Action to appreciably reduce the likelihood of survival and recovery of the ABB, and therefore conclude it is not likely to jeopardize the continued existence of the species.

Non-MSHCP Species

As discussed in Chapter 3, 46 Non-MSHCP Species that had the potential to be present in the Covered Land were also analyzed for potential impacts. Table 4.3.7 summarizes the results of our analysis. Appendix F contains species-specific impact tables relative to Covered Activities/Sub-Activities, stressors, range of species responses, management options (AMMs/BMPs), and likely affects. Table 4.3.5 below outlines AMMs for Non-MSHCP Species that are not likely to be adversely affected by NiSource's Covered Activities (total number = 32). Table 4.3.6 below outlines AMMs for MSHCP Species that are likely to be adversely affected by NiSource's Covered Activities (total number = 10). These AMMs largely made use of the AMMs developed for the MSHCP Species (Table 4.3.3 above and Appendix E). However, in some circumstances additional AMMs/BMPs have been added based on research identified in species' recovery plans and management plans aimed at further minimizing, or in some cases, avoiding impacts. For the remaining four (4) Non-MSHCP Species, the Service determined NiSource Covered Activities would have No Effect on the species.

Table 4.3.5 Summary of Avoidance and Minimization Measures (AMMs) for Non-MSHCP Species that are <u>not likely to be adversely affected</u> by NiSource Covered Activities.

Species	Location	AMM #	AMM Description
Fat pocketbook, Fluted Kidney shell pearlymussel, Orangefoot pimpleback pearlymussel, Ring pink mussel, Rough pigtoe, Slabside pearlymussel	See Table 4.3.7.	AMM-1	Implement the HCP mussel AMMs for all projects in areas specified for these species.
Red-cockaded Woodpecker	Calcasieu, Catahoula, Evangeline, Grant, La Salle, and Rapides parishes, Louisiana and Southampton and Sussex counties, Virginia	AMM-1	For prolonged operations and maintenance activities (e.g., >2 hours) within existing ROWs that traverse mature (greater than 60 years of age), pine-dominated forests containing sparse hardwood understory or midstory within Calcasieu, Catahoula, Evangeline, Grant, La Salle, and Rapides parishes, Louisiana and Southampton and Sussex counties, Virginia, conduct work between August 1 and April 14th or conduct surveys following FWS survey guidance.
Red-cockaded Woodpecker	Calcasieu, Catahoula, Evangeline, Grant, La Salle, and Rapides parishes, Louisiana and Southampton and Sussex counties, Virginia	AMM-2	For new construction activities that traverse mature (greater than 60 years of age), pine-dominated forests containing sparse hardwood understory or midstory within Calcasieu, Catahoula, Evangeline, Grant, La Salle, and Rapides parishes, Louisiana and Southampton and Sussex counties, Virginia, conduct surveys following FWS Service survey guidance.
Red-cockaded Woodpecker	Calcasieu, Catahoula, Evangeline, Grant, La Salle, and Rapides Parishes, Louisiana and Southampton and Sussex counties, Virginia	AMM-3	<u>FWS Service survey guidance for RCW</u> <u>Step 1</u>. Determine the presence/absence of suitable potential foraging or nesting habitat by correctly following the Survey Protocol described in Appendix 4 (pp. 288-290) of the Recovery Plan for the Red-cockaded Woodpecker - Second Revision (2003). These habitat surveys will be accepted for the life of NiSource's Incidental Take Permit Maintain survey reports (including entering both positive and negative findings in a GIS database to which the Service will have access). Potential <u>nesting</u> habitat present? • If no, is suitable <u>foraging</u> habitat present?

Species	Location	AMM #	AMM Description
			o If no, document for future NiSource activities and annual compliance report[1] and no further RCW AMMs are needed. o If yes and will be impacted, conduct an additional survey effort to identify any suitable nesting habitat within 0.5 miles of the project area to determine if there could be potential use of that impacted foraging habitat by groups outside of the project area. ▪ If no suitable nesting habitat is present within 0.5 miles of the project area, document for future NiSource activities and annual compliance report and no further RCW AMMs are needed. ▪ If suitable nesting habitat is present, conduct surveys for cavity trees (Step 2) or coordinate with the Service • If yes, conduct surveys for cavity trees (Step 2) or coordinate with the Service <u>Step 2</u>. Active cavity trees found? • If no, document for future NiSource activities and annual compliance report[1] and no further RCW AMMs are needed. Submit both positive and negative survey reports to the Service Field Office in the state in which the surveys were conducted. • If one or more active cavity trees are found: o For projects on existing ROWs- a foraging analysis (Step 3) should be conducted to determine whether sufficient amounts of foraging habitat will remain for each group post-project. o For new construction, further coordination/consultation with the Service is needed. <u>Step 3</u>. Adequate foraging habitat remaining post-project? (Adequate foraging habitat is described in Appendix 5 (pp. 292-294) of the Recovery Plan for the Red-cockaded Woodpecker - Second Revision (2003). • If yes, document for future NiSource activities and annual compliance report[8] and follow AMM 2. • If no, further coordination/consultation with the Service is needed. 1. Conduct operations and maintenance activities that may disturb RCW (i.e., would create a novel noise

Species	Location	AMM #	AMM Description
			disturbance or any activity that would be ≥ 2 hours duration) within existing ROWs that traverse mature (greater than 60 years of age and 10 inches dbh), pine-dominated forests containing sparse hardwood understory or midstory in RCW parishes/counties between August 1 and April 14. Survey reports should include the following details: 1. survey methodology including dates, qualifications of survey personnel, size of survey area, and transect density; 2. pine stand characteristics including number of acres of suitable nesting and/or foraging habitat, tree species, basal area and number of pine stems 10 inches or greater per acre, percent cover of pine trees greater than 60 years of age, species of dominant vegetation within each canopy layer, under-story conditions and species composition (several representative photographs should be included); 3. number of active and inactive RCW cavity trees observed and the condition of the cavities (e.g., resin flow, shape of cavity, start-holes); 4. presence or absence or RCWs; and 5. topographic quadrangle maps which illustrate areas of adequate RCW nesting and/or foraging habitat, cluster sites, and cavity tree locations relative to proposed construction activities.
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the NiSource Covered Lands area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and	AMM-1	When within WVNFS habitat within the Monongahela National Forest, implement the Land and Resource Management Plan Forest-Wide Management Direction for WVNFS (TE63 to TE66).

Species	Location	AMM #	AMM Description
	Tucker counties, West Virginia) The majority of the WVNFS population centers within the NiSource MSHCP Covered Lands are found within the Monongahela NF.		
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the NiSource MSHCP Covered Lands are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the NiSource MSHCP Covered Lands are found within the Monongahela NF.	AMM-2	Employ all practical measures to minimize the area of disturbance when conducting O&M activities in occupied or potential habitat.

Species	Location	AMM #	AMM Description
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the NiSource MSHCP Covered Lands are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the NiSource MSHCP area Covered Lands are found within the Monongahela NF.	AMM-3	Avoid aerial application of herbicides within mapped WVNFS habitat.

Species	Location	AMM #	AMM Description
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the NiSource MSHCP Covered Lands are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-4	When possible select routes that avoid tree clearing in suitable habitat.
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the NiSource MSHCP area Covered Lands are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia)	AMM-5	When working within WVNFS habitat, all work will occur within existing ROW and a 25-foot temporary workspace without further consultation.

Species	Location	AMM #	AMM Description
	The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.		
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-6	No new access roads will be constructed within WVNFS habitat without further consultation.

Species	Location	AMM #	AMM Description
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-7	No new storage well pits will be constructed within WVNFS habitat without further consultation
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to Covered Lands the NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia)	AMM-8	Employ all practical measures to minimize the area of disturbance when conducting construction activities in occupied or potential habitat.

Species	Location	AMM #	AMM Description
	The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.		
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-8	Avoid tree removal between April 1 and September 15 to avoid felling of potential nest trees (i.e., trees greater than 5 inches diameter at breast height) in occupied or potential habitat when young WVNFS may be present in nests.

Species	Location	AMM #	AMM Description
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-9	Re-vegetate all disturbed WVNFS habitat within the non-permanent ROW with appropriate native species (red spruce).
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia)	AMM-10	Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary.

Species	Location	AMM #	AMM Description
	The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.		
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties, West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.	AMM-11	Establish an adequate number of nest boxes. Use 15 nest boxes per 50 acres of tree clearing and 1 box for each additional 5 acres.
West Virginia northern flying squirrel	The known WVNFS population centers which that overlap or are in close proximity to the Covered Lands NiSource MSHCP area are: • Cheat Mountain (Pocahontas and Randolph counties, West Virginia) • Spruce Knob/Laurel Fork (Pendleton, Pocahontas, and Randolph counties,	AMM-12	Comply with the WVNFS Management Direction from the Monongahela National Forest Plan (USFS 2006), as follows: TE63: Suitable habitat shall be determined using maps collaboratively produced by the Forest, USFWS, and WVDNR. These maps shall be reviewed during watershed or project analysis and refined when Forest, USFWS, and WVDNR biologists determine that suitable habitat is or is not present. All verified capture sites shall be included in the suitable habitat maps. TE64: Suitable habitat shall be considered occupied. Vegetation management activities in suitable habitat shall only be conducted

Species	Location	AMM #	AMM Description
	West Virginia) • Blackwater Canyon/Dolly Sods (Grant, Randolph, and Tucker counties, West Virginia) The majority of the WVNFS population centers within the Covered Lands NiSource MSHCP area are found within the Monongahela NF.		after consultation with USFWS, and: a) Under an Endangered Species Act Section 10 research permit to determine the effects of an activity on WVNFS or to determine activities that would contribute to the recovery of the species, or b) To improve or maintain WVNFS or other TEP species habitat after research has demonstrated the beneficial effects of the proposed management, or c) When project-level assessment results in a no effect or may affect, not likely to adversely affect determination, or d) To address public safety concerns. TE65: New developed recreation facilities, such as visitor centers or campgrounds, shall not be constructed in suitable habitat. Smaller facilities—such as foot trails, trailheads, picnic sites, ¼ acre vistas—may be constructed if they result in a no effect or may affect, not likely to adversely affect determination. TE66: Development of federal gas and oil is generally allowed as long as: (a) it remains within the limits projected in the 1991 Environmental Assessment Oil and Gas Leasing and Development and (b) protection measures for WVNFS are developed through consultation with the USFWS prior to Forest Service approval of operations.
Spotfin chub	Portions of the Buffalo River system, including the Rush branch and Grinder's Creek, in Lewis County, Tennessee.	AMM-1	Where species may be present, either avoid the habitat or conduct all activities with implementation of the HCP mussel AMMs.
Pygmy madtom	Duck River, Tennessee	AMM-1	Where species may be present, either avoid the habitat or conduct all activities with implementation of the HCP mussel AMMs.
Pygmy madtom	Duck River, Tennessee	AMM-2	NiSource will only use HDD for new crossings on the Duck River.
Virginia spiraea	Portions of McDowell, Mercer, Raleigh, Summers, Upshur, and Wyoming	AMM-1	Conduct surveys for Virginia spiraea prior to construction of new alignment or ground- disturbing (e.g., pipeline replacement) activities through riparian vegetation in modeled suitable habitat

Species	Location	AMM #	AMM Description
	counties, West Virginia. Overall, the Covered Lands intersect with approximately 44,768 acres of mapped suitable habitat. However, not all potential habitat within the covered lands is likely to be occupied by the species. We believe that new occurrences are most likely to be found in counties with known occurrences or within connected patches of modeled suitable habitat and estimate there is approximately 18, 029 acres of potential habitat for the species within the Covered Lands.		areas within McDowell, Mercer, Raleigh, Summers, Upshur, and Wyoming counties, West Virginia. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office.
Virginia spiraea	Portions of McDowell, Mercer, Raleigh, Summers, Upshur, and Wyoming counties, West Virginia. Overall, the covered lands intersect with approximately 44,768 acres of mapped suitable habitat. However, not all potential habitats within the covered lands are likely to be occupied by the species. We believe that new occurrences are most likely to be found in counties with known occurrences or within connected patches of modeled suitable habitat and estimate there is approximately 18, 029 acres of potential habitat for the species within the Covered Lands.	AMM-2	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Eastern prairie fringed orchid	The NiSource project may affect this species in Portions of Clark, Holmes, Lucas, Ottawa, Sandusky and Wayne Counties in	AMM-1	Route new ROW alignments to avoid impacts to the one known population of eastern prairie fringed orchid in Augusta County, Virginia, and the one known population at the intersection of Wayne and Holmes counties, Ohio.

Species	Location	AMM #	AMM Description
	Ohio; and Augusta County in Virginia. There are no known occurrences within the ROW proper in Ohio or Virginia. There is one occurrence at the intersection of Wayne and Holmes counties, Ohio, and one occurrence at the edge of the covered lands in Augusta County, Virginia. We believe that it is likely that populations may occur within the Covered lands given the presence of at least two populations within the covered lands. While no known populations will be impacted by the NiSource project, we conclude that NiSource activities could conceivably result in impacts to unknown populations of this species.		
Eastern prairie fringed orchid	The NiSource project may affect this species in Portions of Clark, Holmes, Lucas, Ottawa, Sandusky and Wayne Counties in Ohio; and Augusta County in Virginia. There are no known occurrences within the ROW proper in Ohio or Virginia. There is one occurrence at the intersection of Wayne and Holmes counties, Ohio, and one occurrence at the edge of the covered lands in Augusta County, Virginia. We believe that it is likely that populations may occur within the covered lands given the presence of at least two populations within the covered lands. While no known populations will be	AMM-2	Conduct surveys for eastern prairie fringed orchid prior to construction of new alignment or >1 acre of ground- disturbing (e.g., pipeline replacement) activities on existing ROWs in Clark, Holmes, Lucas, Ottawa, Sandusky and Wayne counties in Ohio; and in modeled suitable habitat in Augusta County in Virginia. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.

Species	Location	AMM #	AMM Description
	impacted by the NiSource project, we conclude that NiSource activities could conceivably result in impacts to unknown populations of this species.		
Eastern prairie fringed orchid	The NiSource project may affect this species in portions of Clark, Holmes, Lucas, Ottawa, Sandusky and Wayne Counties in Ohio; and Augusta County in Virginia. There are no known occurrences within the ROW proper in Ohio or Virginia. There is one occurrence at the intersection of Wayne and Holmes counties, Ohio, and one occurrence at the edge of the covered lands in Augusta County, Virginia. We believe that it is likely that populations may occur within the covered lands given the presence of at least two populations within the covered lands. While no known populations will be impacted by the NiSource project, we conclude that NiSource activities could conceivably result in impacts to unknown populations of this species.	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Leafy prairie-clover	Portions of Davidson, Maury, Williamson, and Wilson counties, Tennessee, along with the potential discovery of undocumented extant pockets of the species within its historic range in Sumner County, Tennessee. There are no known occurrences in ROWs or Covered Lands but there is suitable habitat	AMM-1	Conduct surveys for leafy prairie-clover (in cedar glade areas only) prior to construction of new alignment or ground- disturbing (e.g., pipeline replacement) activities on existing ROWs between Interstate 40 and Interstate 24 in Davidson County, Tennessee. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be coordinated with the local FWS field office and survey results provided to the

Species	Location	AMM #	AMM Description
	within the ROW between Interstate 40 and Interstate 24 in Davidson County Tennessee.		local FWS field office.
Leafy prairie-clover	Portions of Davidson, Maury, Williamson, and Wilson counties, Tennessee, along with the potential discovery of undocumented extant pockets of the species within its historic range in Sumner County, Tennessee. There are no known occurrences in ROWs or Covered Lands but there is suitable habitat within the ROW between Interstate 40 and Interstate 24 in Davidson County Tennessee.	AMM-2	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Running buffalo clover	Portions of Bourbon, Campbell, Clark, Fayette, Madison, and Montgomery Counties, Kentucky; Brown, Clermont, and Lawrence counties, Ohio; and Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties; West Virginia. Additionally, the potential for rediscovery of the species within portions of its historic range exists in Jackson County, Kentucky and Monongalia County, WV.	AMM-1	Route new ROW alignments to avoid impacts to six known populations of running buffalo clover within covered lands in Augusta (1) and Hocking (1) counties in Ohio, and Preston (2), Brooke (1), and Tucker (1) counties in West Virginia.
Running buffalo clover	Portions of Bourbon, Campbell, Clark, Fayette, Madison, and Montgomery counties, Kentucky; Brown, Clermont, and Lawrence counties, Ohio; and Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties; West Virginia. Additionally, the	AMM-2	Conduct surveys in modeled suitable habitat for running buffalo clover prior to construction of new alignment or >>1 acre ground disturbing (e.g., pipeline replacement) activities on existing ROWs in Bourbon, Campbell, Clark, Fayette, Jackson, Madison, and Montgomery counties, Kentucky; Brown, Clermont, and Lawrence Counties, Ohio; and Monongalia, Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties West Virginia. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area

Species	Location	AMM #	AMM Description
	potential for rediscovery of the species within portions of its historic range exists in Jackson County, Kentucky and Monongalia County, West Virginia.		could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.
Running buffalo clover	Portions of Bourbon, Campbell, Clark, Fayette, Madison, and Montgomery counties, Kentucky; Brown, Clermont, and Lawrence counties, Ohio; and Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties; West Virginia. Additionally, the potential for rediscovery of the species within portions of its historic range exists in Jackson County, Kentucky and Monongalia County, West Virginia.	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Globe (Short's) Bladderpod,	Portions of its current range in Bourbon, Fayette, and Madison counties, Kentucky. This species is not found in the Covered lands in Tennessee. The species is also not found within existing ROWs.	AMM-1	Conduct surveys for Globe bladderpod prior to construction of new alignments in Bourbon, Fayette, and Madison counties, Kentucky. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. If the species is present, NiSource will design project subactivities to avoid impacts via consultation with the Service. If adverse effects would be likely, NiSource would need to reinitiate consultation with the Kentucky Ecological Services Field Office. NiSource has agreed to avoid all activities in the area specified. If the area cannot be avoided, consultation will need to be reinitiated for this species. -Globe (Short's) Bladderpod Avoidance Area: All areas designated by the Kentucky Natural Heritage Database.
Leedy's Roseroot,	One location in Schuyler County, New York.	AMM-1	Avoid all activities in the area specified for this species. If the area cannot be avoided, consultation will need to be reinitiated for this species. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field

Species	Location	AMM #	AMM Description
			office. Avoidance Area: Area designated by the NY Heritage Database, with a 50 meter buffer on all sides.
Northern Monkshood,	One location in Hocking County, Ohio. Populations in these areas would be found in association with shaded or partially shaded cliffs and talus slopes in Ohio.	AMM-1	Avoid all activities in the area specified for this species. If the area cannot be avoided, consultation will need to be reinitiated for this species. Surveys should be coordinated with the local FWS field office. Avoidance Area: Crane Hollow State Nature Preserve, Laurel Township, Hocking County, Ohio.
Small whorled Pogonia	Portions of Califon Borough, Hunterdon County, and Morris County, New Jersey; Hocking County, Ohio; and Botetourt, Fairfax, Giles, Henrico, Madison, Rockbridge, and Prince William counties, Virginia. Small whorled pogonia does not occur in any of the storage field expansion counties and will not be impacted by those activities. There are no known occurrences in ROWs or the entire covered lands in New Jersey or Virginia. Small whorled pogonia is not anticipated to occur in existing ROWs; therefore, activities that are wholly contained within the existing ROW should not affect this species.	AMM-1	NiSource has agreed to avoid all activities in the area specified. If the area cannot be avoided, consultation will need to be reinitiated for this species. - Avoidance Area: Camp OtyOkwa, Benton Township, Hocking County, Ohio.
Small whorled Pogonia	Portions of Califon Borough, Hunterdon County, and Morris County, New Jersey; Hocking County, Ohio; and Botetourt, Fairfax, Giles, Henrico, Madison, Rockbridge, and Prince William Counties, Virginia.	AMM-2	Conduct surveys for small whorled pogonia prior to construction of new alignment in upland forest in Califon Borough, Hunterdon County, and Morris County, New Jersey; Centre and Chester, Greene, Monroe, and Montgomery counties, Pennsylvania and in modeled suitable habitat in Botetourt, Fairfax, Giles, Henrico, Madison, Rockbridge, and Prince William counties, Virginia. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If

Species	Location	AMM #	AMM Description
	Small whorled pogonia does not occur in any of the storage field expansion counties and will not be impacted by those activities. There are no known occurrences in ROWs or the entire covered lands in New Jersey or Virginia. Small whorled pogonia is not anticipated to occur in existing ROWs; therefore, activities that are wholly contained within the existing ROW should not affect this species.		suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office.
Small whorled Pogonia	Portions of Califon Borough, Hunterdon County, and Morris County, New Jersey; Hocking County, Ohio; and Botetourt, Fairfax, Giles, Henrico, Madison, Rockbridge, and Prince William Counties, Virginia. Small whorled pogonia does not occur in any of the storage field expansion counties and will not be impacted by those activities. There are no known occurrences in ROWs or the entire covered lands in New Jersey or Virginia. Small whorled pogonia is not anticipated to occur in existing ROWs; therefore, activities that are wholly contained within the existing ROW should not affect this species.	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Short's goldenrod	Populations in these areas would be found in association with cedar glades or other glade-like habitats (e.g. road rights-of-way, roadside ledges, rocky	AMM-1	Avoid execution of project activities in those areas representing suitable habitat.

Species	Location	AMM #	AMM Description
	or over-grazed pasture, old fields), forest edges, or unmaintained fencerows. Based on specific land use, portions of the project corridor in Nicholas and Robertson counties do not contain suitable habitat for Short's goldenrod and can be excluded from this effects analysis. These areas would include residential, industrial, and commercial sites; agricultural fields used for row-crop production; wetlands; and dense forest.		
Short's goldenrod	Populations in these areas would be found in association with cedar glades or other glade-like habitats (e.g. road rights-of-way, roadside ledges, rocky or over-grazed pasture, old fields), forest edges, or unmaintained fencerows. Based on specific land use, portions of the project corridor in Nicholas and Robertson counties do not contain suitable habitat for Short's goldenrod and can be excluded from this effects analysis. These areas would include residential, industrial, and commercial sites; agricultural fields used for row-crop production; wetlands; and dense forest.	AMM-2	If NiSource cannot avoid areas with suitable habitat, conduct pre-disturbance presence/absence surveys prior to construction of new alignment or >1 acre of ground disturbing (e.g., pipeline replacement) activities on existing ROWs within those areas to determine if the species is present. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. If the species is present, NiSource will design project subactivities to avoid impacts via consultation with the Service. If adverse effects would be likely, NiSource would need to reinitiate consultation with the Kentucky Ecological Services Field Office.
Short's goldenrod	Populations in these areas would be found in association with cedar glades or other glade-like habitats (e.g. road rights-of-way, roadside ledges, rocky or over-grazed pasture, old fields), forest edges, or	AMM-3	Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

Species	Location	AMM #	AMM Description
	unmaintained fencerows. Based on specific land use, portions of the project corridor in Nicholas and Robertson counties do not contain suitable habitat for Short's goldenrod and can be excluded from this effects analysis. These areas would include residential, industrial, and commercial sites; agricultural fields used for row-crop production; wetlands; and dense forest.		
Shale barren rock cress	Portions of Alleghany, Augusta, Botetourt, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties in Virginia; Greenbrier, Hardy, and Pendleton counties in West Virginia. There is one occupied site in Alleghany County, Virginia (on the George Washington National Forest) within the Covered Lands and two additional sites ¼ mile from the Covered Lands. We believe that it is likely that other populations may occur within the covered lands in Virginia and West Virginia.	AMM-1	Avoid impacts to known population(s) of shale barren rock cress within Covered Lands (one currently within George Washington National Forest).
Shale barren rock cress	Portions of Alleghany, Augusta, Botetourt, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties in Virginia; Greenbrier, Hardy, and Pendleton counties in West Virginia. There is one occupied site in Alleghany County, Virginia (on the George Washington National Forest) within the Covered Lands and two additional	AMM-2	NiSource will conduct surveys in modeled suitable habitat for shale barren rock cress prior to construction of new alignment or ground disturbing (e.g., pipeline replacement) activities ≥1 acre on existing ROWs in xeric shale areas 1099-2500 feet in elevation on 20 degree south- to southwest-facing slopes in Alleghany, Augusta, Botetourt, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties, Virginia, and Greenbrier, Hardy, and Pendleton counties, West Virginia. Where the species is present, NiSource will avoid the habitat. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be

Species	Location	AMM #	AMM Description
	sites ¼ mile from the Covered Lands. We believe that it is likely that other populations may occur within the covered lands in Virginia and West Virginia.		coordinated with the local FWS field office and survey results provided to the local FWS field office.
Shale barren rock cress	Portions of Alleghany, Augusta, Botetourt, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties in Virginia; Greenbrier, Hardy, and Pendleton counties in West Virginia. There is one occupied site in Alleghany County, Virginia (on the George Washington National Forest) within the Covered Lands and two additional sites ¼ mile from the Covered Lands. We believe that it is likely that other populations may occur within the covered lands in Virginia and West Virginia.	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.
Smooth coneflower	Portions of Albermarle, Alleghany, Augusta, Botetourt, Chesterfield, Clarke, Culpeper, Frederick, Giles, Goochland, Louisa, Mecklenburg, Orange, Page, Powhatan, Rockbridge, Rockingham, Shenandoah, and Warren counties, Virginia. Overall, the covered lands intersect with 32,770 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW in the above-listed counties. There are no known occurrences	AMM-1	Conduct surveys in modeled suitable habitat for smooth coneflower prior to construction of new alignment or ground-disturbing (e.g., pipeline replacement) activities ≥1 acre on existing ROWs in Albermarle, Allegheny, Augusta, Botetourt, Chesterfield, Clarke, Culpeper, Frederick, Giles, Goochland, Louisa, Mecklenburg, Orange, Page, Powhatan, Rockbridge, Rockingham, Shenandoah, and Warren counties, Virginia. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office.

Species	Location	AMM #	AMM Description
	along the existing ROW in Virginia. However, the ROW provides suitable habitat for the species and most of the ROW has not been surveyed for smooth coneflower. There are also no known occurrences within the broader covered lands in Virginia; however, we believe that it is likely that populations may occur within the covered lands given the amount of suitable habitat.		
Smooth coneflower	Portions of Albermarle, Alleghany, Augusta, Botetourt, Chesterfield, Clarke, Culpeper, Frederick, Giles, Goochland, Louisa, Mecklenburg, Orange, Page, Powhatan, Rockbridge, Rockingham, Shenandoah, and Warren Counties, Virginia. Overall, the covered lands intersect with 32,770 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW in the above-listed counties. There are no known occurrences along the existing ROW in Virginia. However, the ROW provides suitable habitat for the species and most of the ROW has not been surveyed for smooth coneflower. There are also no known occurrences within the broader covered lands in Virginia; however, we believe that it is likely that populations may occur within	AMM-2	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.

Species	Location	AMM #	AMM Description
	the covered lands given the amount of suitable habitat.		
Michaux's sumac	Portions of Brunswick, Chesterfield, Dinwiddie, Greensville, Mecklenburg, and Sussex counties, Virginia. Overall, the covered lands intersect with approximately 20,314 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW within these counties.	AMM-1	Conduct surveys in modeled suitable habitat for Michaux's sumac prior to construction of new alignment or ground- disturbing (e.g., pipeline replacement) activities ≥1 acre on existing ROWs in Brunswick, Chesterfield, Dinwiddie, Greensville, Mecklenburg, and Sussex counties, Virginia. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.
Michaux's sumac	Portions of Brunswick, Chesterfield, Dinwiddie, Greensville, Mecklenburg, and Sussex Counties, Virginia. Overall, the covered lands intersect with approximately 20,314 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW within these counties.	AMM-2	Avoid impacts to newly discovered upland plant populations or further consultation with the Service will be needed.
Sensitive joint-vetch	Portions of Chesterfield, Fairfax, Henrico, Isle of Wight, Prince George, Prince William, Suffolk, and Surry counties, Virginia. Logan Township, Gloucester County, New Jersey. Overall, the covered lands intersect with 2,433 acres of suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that	AMM-1	Route new ROW alignments to avoid historic location of sensitive joint-vetch in Logan Township, Gloucester County, New Jersey (beginning approx. 75°23'22.992"W, 39°46'51.094"N).

Species	Location	AMM #	AMM Description
	the species occurs in previously unsurveyed portions of the ROW in the above-listed counties. There are also no known occurrences within the broader covered lands in Virginia; however, we believe that it is likely that populations may occur within the covered lands given the amount of suitable habitat.		
Sensitive joint-vetch	Portions of Chesterfield, Fairfax, Henrico, Isle of Wight, Prince George, Prince William, Suffolk, and Surry counties, Virginia. Logan Township, Gloucester County, New Jersey. Overall, the covered lands intersect with 2,433 acres of suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW in the above-listed counties. There are also no known occurrences within the broader covered lands in Virginia; however, we believe that it is likely that populations may occur within the covered lands given the amount of suitable habitat.	AMM-2	Conduct surveys in modeled suitable habitat for sensitive joint-vetch prior to construction of new alignment or ground- disturbing (e.g., pipeline replacement) activities within close proximity to tidal wetlands on existing ROWs in Chesterfield, Henrico, Fairfax, Prince George, Prince William, Isle of Wight, Suffolk, Surry counties, Virginia. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.
Sensitive joint-vetch	Portions of Chesterfield, Fairfax, Henrico, Isle of Wight, Prince George, Prince William, Suffolk, and Surry counties, Virginia. Logan Township, Gloucester County, New Jersey. Overall, the covered lands intersect with 2,433 acres of	AMM-3	Route new ROW alignments to avoid impacts to known population of swamp pink within Covered Lands in Augusta County, Virginia.

Species	Location	AMM #	AMM Description
	suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW in the above-listed counties. There are also no known occurrences within the broader Covered Lands in Virginia; however, we believe that it is likely that populations may occur within the Covered Lands given the amount of suitable habitat.		
Swamp pink	Portions of Woolwich Township, Gloucester County, Mount Olive, Roxbury, and Randolph townships, Morris County, and Salem County, New Jersey; and Albemarle, Augusta, Botetourt, Fairfax, Greene, Henrico, Prince George, Rockbridge, Rockingham, and Page counties, Virginia. Overall, the Covered Lands intersect with approximately 5,097 acres of potential habitat in Virginia and 2,379 acres in New Jersey. There are no known occurrences in the ROW proper in New Jersey or Virginia; however, two sections of pipeline intersect historic populations of swamp pink in New Jersey. There are no swamp pink occurrences within the broader Covered Lands in New Jersey but there is one extant occurrence within the Covered Lands in Augusta County, Virginia. Given the historic and extant	AMM-1	Route new ROW alignments to avoid impacts to known population of swamp pink within Covered Lands in Augusta County, Virginia.

Species	Location	AMM #	AMM Description
	occurrences, we believe that additional populations may occur within the Covered Lands.		
Swamp pink	Portions of Woolwich Township, Gloucester County, Mount Olive, Roxbury, and Randolph townships, Morris County, and Salem County, New Jersey; and Albemarle, Augusta, Botetourt, Fairfax, Greene, Henrico, Prince George, Rockbridge, Rockingham, and Page counties, Virginia. Overall, the Covered Lands intersect with approximately 5,097 acres of potential habitat in Virginia and 2,379 acres in New Jersey. There are no known occurrences in the ROW proper in New Jersey or Virginia; however, two sections of pipeline intersect historic populations of swamp pink in New Jersey. There are no swamp pink occurrences within the broader Covered Lands in New Jersey but there is one extant occurrence within the Covered Lands in Augusta County, Virginia. Given the historic and extant occurrences, we believe that additional populations may occur within the covered lands.	AMM-2	Conduct surveys for swamp pink prior to construction of new alignment or ground disturbing (e.g., pipeline replacement) activities within 100 feet of forested wetlands on existing ROWs in Woolwich Township, Gloucester County, Mount Olive, Roxbury, and Randolph townships, Morris County, and West Deptford, East Greenwich, and Woolwich townships, Salem County, New Jersey, and in modeled suitable habitat in Rockbridge, Henrico, Botetourt, Rockingham, Greene, Fairfax, Prince George, Albemarle, Chesterfield, Augusta, Page counties, Virginia. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office.
Swamp pink	Portions of Woolwich Township, Gloucester County, Mount Olive, Roxbury, and Randolph townships, Morris County, and Salem County, New Jersey; and Albemarle,	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.

Species	Location	AMM #	AMM Description
	Augusta, Botetourt, Fairfax, Greene, Henrico, Prince George, Rockbridge, Rockingham, and Page counties, Virginia. Overall, the Covered Lands intersect with approximately 5,097 acres of potential habitat in Virginia and 2,379 acres in New Jersey. There are no known occurrences in the ROW proper in New Jersey or Virginia; however, two sections of pipeline intersect historic populations of swamp pink in New Jersey. There are no swamp pink occurrences within the broader Covered Lands in New Jersey but there is one extant occurrence within the Covered Lands in Augusta County, Virginia. Given the historic and extant occurrences, we believe that additional populations may occur within the Covered Lands.		
Virginia sneezeweed	Portions of Augusta, Botetourt, Page, Rockbridge, and Rockingham Counties, Virginia. Overall, the Covered Lands intersect with approximately 600 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW within the above-listed counties. There are five known occurrences within the broader Covered Lands in Virginia. Given the nearby occurrences, we believe that	AMM-1	Route new ROW alignments to avoid impacts to known population of Virginia sneezeweed within covered lands in Augusta, Botetourt, Page, Rockbridge, and Rockingham counties, Virginia.

Species	Location	AMM #	AMM Description
	it is likely that other populations occur within the Covered Lands in Virginia.		
Virginia sneezeweed	Portions of Augusta, Botetourt, Page, Rockbridge, and Rockingham counties, Virginia. Overall, the Covered Lands intersect with approximately 600 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW within the above-listed counties. There are five known occurrences within the broader Covered Lands in Virginia. Given the nearby occurrences, we believe that it is likely that other populations occur within the Covered Lands in Virginia.	AMM-2	Conduct surveys in modeled suitable habitat for Virginia sneezeweed prior to construction of new alignment or >> 1 acre ground disturbing (e.g., pipeline replacement) activities within close proximity to sinkhole ponds on existing ROWs in Augusta, Rockbridge, Botetourt, Rockingham, Page counties, Virginia. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.
Virginia sneezeweed	Portions of Augusta, Botetourt, Page, Rockbridge, and Rockingham Counties, Virginia. Overall, the Covered Lands intersect with approximately 600 acres of mapped suitable habitat. There are no known occurrences within the ROW proper in Virginia; however, it is possible that the species occurs in previously unsurveyed portions of the ROW within the above-listed counties. There are five known occurrences within the broader Covered Lands in Virginia. Given the nearby occurrences, we believe that it is likely that other populations occur within the	AMM-3	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.

Species	Location	AMM #	AMM Description
	Covered Lands in Virginia.		
Pondberry	Sharkey and Sunflower counties, Mississippi. While no known populations will be impacted by the NiSource MSHCP, surveys for this species are incomplete and NiSource activities Covered Activities may impact unknown populations.	AMM-1	Conduct surveys for pondberry prior to construction of new alignment or ground disturbing (e.g., pipeline replacement) activities within 100 feet of bottomland hardwood wetlands on existing ROWs in Sharkey and Sunflower counties, Mississippi. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period.
Pondberry	Sharkey and Sunflower counties, Mississippi. While no known populations will be impacted by the MSHCP project, surveys for this species are incomplete and NiSource activities Covered Activities may impact unknown populations.	AMM-2	Avoid impacts to newly discovered populations or further consultation with the Service will be needed.

Table 4.3.6 Summary of Best Management Practices (BMPs) for Non-MSHCP Species that are <u>likely to be adversely affected</u> by NiSource Covered Activities.

Non-HCP Mussels **Rabbitsfoot, Rayed Bean, Spectaclecase, Dwarf Wedgemussel, Pink Mucket, Snuffbox**
Determination without BMPs: LAA
Determination with BMPs: LAA
Ranges: See Table 4.3.7
<u>General BMPs</u> • Implement the HCP mussel AMMs for all projects in areas specified for these species. <u>Species-specific BMPs</u> Rabbitsfoot • Implement HDD at Little Darby Creek, if not practicable, survey and translocate mussels. • Make all Killbuck Creek crossings using dry-ditch. • Implement HDD at Muskingum River crossings, if not practicable, survey and translocate mussels. Rayed Bean

- Implement HDD at Allegheny if practicable, if not survey and translocate mussels.
- Implement HDD at Elk River crossings if practicable, if not survey and coordinate with WV Field Office on avoiding impacts to introduced population, use dry-ditch techniques and translocate mussels.

Spectaclecase
- None specified.

Dwarf Wedgemussel
- Cross all tributaries to Delaware River in Sullivan County, New York using dry-ditch techniques.
- Implement HDD at the Neversink River crossing if practicable, if not survey and translocate mussels.

Pink Mucket
- Implement HDD at Elk River crossings if practicable, if not survey and coordinate with WV Field Office on avoiding impacts to introduced population, use dry-ditch techniques and translocate mussels.

Snuffbox
- Implement HDD at Allegheny River crossing if practicable, if not survey and translocate mussels.

- Implement HDD at Elk River crossings if practicable, if not survey and coordinate with WV Field Office on avoiding impacts to introduced population, use dry-ditch techniques and translocate mussels.
- Implement HDD at Kanawha River crossings if practicable, if not survey and translocate mussels.
- Implement HDD at Little Kanawha River crossings if practicable, if not survey and translocate mussels.
- Implement dry-ditch crossing of Fish Creek, Fishing Creek, Leading Creek, Upstream Crossings (Rowan-Bath County Line) of Licking Creek, Meathouse Fork, Olentangy River, Tygart's Creek, and West Fork Little Kanawha River.

Roanoke logperch
Determination without BMPs: LAA
Determination with BMPs: LAA
Range: Portions of the Nottaway River system, including portions of Stony and Sappony Creeks, along with other tributaries in Brunswick, Dinwiddie, Greensville, Mecklenburg, Southampton, and Sussex Counties, Virginia.
<u>BMPs</u> • Implement the AMMs for the mussel species from the MSHCP for all activities within identified streams. • No in-stream work 15 March – June 30 of any year. Instream work will be conducted during the low flow period of any year, 1 August through 31 October, when possible.
Northeastern bulrush
Determination without BMPs: LAA

Determination with BMPs: LAA (in PA) (implementation of BMPs allows for NLAA determinations in WV and VA)
Range: Portions of Washington County, Maryland; Adams, Bedford, Cambria, Centre, Clinton, Cumberland, Franklin, Fulton, Lehigh, Monroe, and Northampton Counties in Pennsylvania; Alleghany, Augusta, Botetourt, Rockbridge, Rockingham, and Shenandoah Counties in Virginia; and Hardy County in West Virginia.
BMPs There is one known occurrence within the existing ROW in Centre County, Pennsylvania and two additional occurrences within the covered lands in Centre and Franklin Counties, Pennsylvania. We believe that it is likely that other populations may occur within the covered lands in Virginia and West Virginia. • Avoid all activities in known and presumed occupied habitat. If the area cannot be avoided, consultation will need to be reinitiated for this species. • Conduct surveys in modeled suitable habitat for Northern bulrush prior to construction of new alignment or ground disturbing (e.g., pipeline replacement) activities within wetlands within identified counties. Survey protocols should be coordinated with the local FWS field office and survey results provided to the local FWS field office. If suitable habitat is absent, adverse effects would be avoided and that area could be excluded from any future consultation. If suitable habitat is present but the species is absent, the survey would be valid for 5 years and further consultation would not be required for that period. • Avoid all activities in newly discovered populations or further consultation with the Service will be needed.
Eastern Massasauga snake
Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: See Table 4.3.7
BMPs Surveys (1) Eastern massasauga rattlesnake (EMR) presence will be assumed in areas where it has been previously detected and those locations will be classified as Occupied Habitat. In identified habitat (known and modeled) where EMR have not been previously detected surveys can be conducted to determine if suitable habitat is present and/or the presence/absence of the subspecies. Surveys will follow the most current FWS-approved protocol and will be coordinated in advance with the local FWS office. If an adequate survey effort does not identify suitable habitat, the BMPs will not be mandatory. Habitat suitability surveys will expire in 10 years, but may be used for potentially longer based on site-specific evaluation by the Service. If an adequate presence/absence survey effort does not indicate EMR presence, the site will be classified as unoccupied habitat and the BMPs will not be mandatory. Negative presence/absence surveys will expire in 10 years, but may be used for potentially longer based on site-specific evaluation by the Service. A copy of the survey outcome and reports will be included in the annual report submitted to the Service.

Pre-Construction Planning: Preparation of an Environmental Management & Construction Plan

(2) A detailed Environmental Management and Construction Plan (EM&CP) will be prepared for any project potentially impacting occupied EMR habitat. The plan will incorporate the relevant requirements of the ECS and include site-specific details particular to the project area and potential impacts. Waterbody crossings will be considered as "high-quality" for the purpose of preparing this plan regardless of the actual classification. The plan will be strongly oriented towards minimizing stream bed and riparian disturbance (including minimization of tree clearing within 50 feet of the crossing), preventing downstream sedimentation (including redundant E&S devices as appropriate), and weather monitoring by the Environmental Inspector to ensure work is not begun with significant precipitation in the forecast. The EM&CP will include plans to minimize impacts to wetlands, including the potential use of HDD for new pipelines. Wetland construction/restoration plans will include measures necessary to prevent invasive species establishment unless the wetland is already infected with invasives. These measures include those described in detail in the ECS, Section III Stream and Wetland Crossings pp. 15 – 24 (see especially B.8. Restoration) and Section V Maintenance pp. 27-29. The plan will further focus on minimizing and avoiding impacts to the upland areas, including all relevant BMPs to minimize and avoid physical disturbance and direct injury/harm of individuals (e.g., weather, vehicle use). In areas of known multiple massasauga road kills, the plan will consider the need for seasonal activity restrictions. The plan will be approved in writing by NiSource Natural Resources Permitting (NRP) personnel prior to project implementation and will include a tailgate training session for all onsite project personnel to highlight the environmental sensitivity of the habitat and any BMPs (e.g. overall awareness, minimizing vehicle activity and speed control, etc.) which must be implemented.

Timing of Actions and Associated Generic AMMs Related to Earth Disturbance

(3) Operate vehicles/equipment, clearing trees, etc., in known/presumed occupied EMR habitat between October 31 - March 15 and when (1) the ground is frozen and (2) air temperatures are less than 45°F. During this time, under these conditions, EMR are most likely underground and will not be impacted by these activities.

(4) Do not use large equipment or perform earth-moving activities, water withdrawal/discharge for hydrostatic testing, or other activities that substantially affect the ground or water levels in potential EMR hibernacula areas. This requires a site evaluation to delineate likely hibernation areas. Avoidance measures may include, but are not limited to, re-routing of pipeline and appurtenance facilities, boring or drilling, and timing/weather-related restrictions. Measures will be set on a site-specific basis, based on local habitat conditions (in site specific EM&CP).

(5) Strictly control and minimize vehicle activity of NiSource staff in known/presumed occupied EMR habitat. Speed limits at NiSource facilities and access roads should be <10 MPH (should be set in the EM&CP).

(6) Conduct patrols, vegetative maintenance, etc., by foot whenever possible. Do not drive across

streams or in wetlands areas. Do not drive across known or presumed occupied streams or wetlands – walk these areas or visually inspect from bank and use closest available bridge to cross stream.

(7) In known/presumed occupied EMR habitat, ensure that upland work (including access roads) does not result in impacts (altered hydrology) to adjacent wetlands.

Mowing & Vegetation Removal

(8) Do not burn brush piles along ROW within known/presumed EMR habitat during the active season (March 15-October 30). Where possible, leave brushpiles in place or transport them off-site for disposal. If they must be burned, burn on the same day they are created if during the active season or they can be burned anytime during the hibernation season.

(9) Attempt to mow ROWs in presumed occupied EMR habitat during the hibernation season between October 31 - March 15 and when air temperatures are less than 45°F. Herbicides can be used during any time of the year. If mowing must be done during the active season, implement the following:

a. An open platform mower, sickle mower, or flail mower are recommended because they create little if any suction that can increase the risk of mower-related snake mortality. Blade height must be set at a minimum of 6 inches.
b. A qualified individual must walk and roughly “clear” the area before mowing begins. This individual must also walk the area following mowing to check the area for EMR.
c. Conduct mowing in accordance with the attached schedule developed by the Ohio DNR as much as reasonably practical. If harmed EMR are found during the follow-up walkover, implement requirements of BMP #10.

(10) Mow ROWs in known occupied EMR habitat during the hibernation season between October 31 - March 15 and when air temperatures are less than 45°F. Herbicides can be used during any time of the year. The mowed area will be reduced to 10 feet centered on the pipeline. If mowing must be done during the active season, implement the following:

a. Spot mow, as opposed to full-site mowing, wherever possible.
b. Use a sickle mower with a height setting of not less than 12 inches.
c. A qualified individual must walk and roughly “clear” the area before mowing begins. This individual must also walk the area following mowing to check the area for EMR.
d. Timing and daytime conditions must minimize the potential for EMR to be active, with mowing done according to the attached schedule developed by the Ohio DNR.

Routing Criteria (replacements, loops, new ROWs, access roads)

(11) Do not route new construction projects, such as pipelines, appurtenant facilities, or access roads, through known/presumed occupied habitat.

(12) Where activities in known/presumed occupied habitat cannot be avoided, install new or replacement pipelines and utility lines and performing major repairs under the wetlands and streams using horizontal directional drilling (HDD) or other trenchless methods rather than open trenching. Drilling should be carefully undertaken and a plan should be in place to minimize and address the risk of in-water disturbance due to frac-outs. The plan should also specifically reference species resources in the vicinity of the crossing as a key conservation concern and include specific measures identified in the ECS, from standard industry practices, or other mutually agreed upon practices to protect this resource. The plan will also include a frac-out impact avoidance plan which will evaluate the site in terms not only of feasibility of conducting HDD, but likelihood of large scale frac-out and its effects on this species and actions to address a large scale frac-out in occupied habitat. If, after detailed engineering studies (e.g., geotechnical, physiological, topographical, and economic studies), it is determined (and agreed to by NRP) that HDD is not feasible, a report will be prepared and included in the annual report submitted to the Service. If wetland or waterbody avoidance through rerouting or HDD is not feasible, all guidelines for open trench wetland crossings found in the NiSource ECS must be strictly adhered to.

(13) Install pipeline to the minimum depth described in the ECS and maintain that depth at least 10 feet past the high water line to avoid exposure of pipeline by anticipated levels of erosion based on geology and watershed character. These conditions and the response will be documented in the EM&CP and provided as part of the annual report to the Service.

(14) For known or presumed occupied waterbodies, pipeline replacement projects (non FERC 7c) shall be done in the following manner (in order of priority/preference):

a. Abandon line in place and conduct HDD or horizontal bore to install pipe under known/presumed occupied wetlands between September 15 - May 15 to avoid any potential impact to snakes during the active season. Route to avoid potential hibernacula areas, or

b. Use conventional construction practices in known/presumed occupied wetlands between May 15 - September15 to avoid impacts to hibernating snakes. Narrow or reconfigure the work area (uplands/wetlands) to avoid impacts to active snakes. Follow all applicable active-season BMPs.

(15) For known or presumed occupied habitat, new construction projects (FERC 7cstorage wells, looping projects, etc.) shall be done in the following manner (in order of priority/preference):

a. Route projects to avoid known/presumed occupied habitat. If site-specific analysis indicates that site restoration or enhancement could compensate for the impacts from new facilities then they may be considered; or

b. Conduct HDD or horizontal bore to install pipe under known/presumed occupied wetlands between September 15 - May 15 to avoid any potential impact to snakes during the active

season. Route to avoid potential hibernacula areas; or

c. Use conventional construction practices in known/presumed occupied wetlands between May 15 - September 15 to avoid impacts to hibernating snakes. Narrow or reconfigure the work area (uplands/wetlands) to avoid impacts to active snakes.

Measures to minimize direct impacts to massasaugas during the active season

(16) Before initiating any activity within an area of extreme sensitivity for EMR, including but not limited to earthmoving and/or construction within the project limits, all potential EMR habitat must be encircled with a snake-proof barrier (silt fencing or metal flashing, at least 30 inches high above ground) that prevents snakes from crossing over or under the barrier. [DO NOT use synthetic mesh material in construction of the snake-proof barrier.] The barrier should be buried at least 6 inches below the surface and the trench backfilled to support the barrier and prevent animals from burrowing under the barrier. The integrity of this barrier must be ensured throughout the period of activity, and breaches of the barrier must be repaired promptly. The snake-proof barrier must be in place at least 15 days prior to any activities occurring on the site. The snake-proof barrier can only be in place between April 15 and September 15 to ensure that access to their hibernacula and seasonal migratory movements are not impeded. Any EMR found within the area enclosed by the snake-proof barrier are to be captured using cover boards (sheet metal) placed within the area and/or funnel traps placed along the fencing. Captured EMR are to be moved to the outside of the project limits, but no further than 1,000 feet from their point of capture. The capture-removal of EMR should be conducted several times daily for a minimum of 14 days prior to initiating any activity within the project limits. After 14 days of EMR capture-removal, activities may begin in the area enclosed by the snake-proof barrier, so long as the integrity of the barrier is maintained. The 14 day EMR capture-removal does not have to be completed on consecutive days, but must be done over a period of less than 28 days. The barrier should only be breached for a few minutes at a time to move equipment into and out of the area; the barrier must then be immediately put back in place. Should the integrity of the barrier be compromised for more than 24 hours, it will be necessary to repeat the 14 days of snake capture-removal. Furthermore, on the ground outside of the snake-proof barrier, cover boards (sheet metal) must be placed around the perimeter as protection for EMR trying to access the project area. The cover boards should be placed parallel to the fence with no more than 25 feet between each sheet. This work must be done by a FWS approved contractor and all work must be approved by FWS prior to initiation.

(17) Employ a snake monitor when working in known/presumed occupied areas for projects that will require earth moving or use of large equipment. The number of monitors required will be in proportion to the size of the active work area. If EMR are found in the work area, construction activities in the vicinity will cease and the monitor will mark their locations on a topographic map and record GPS coordinates. A qualified EMR surveyor will be promptly engaged to survey the construction area and confirm that EMR are no longer present. If the EMR is found, the surveyor will take basic physical measurements of the handled snakes, and potentially insert PIT tags. The surveyor will then move the snake, unharmed outside the work limits. All work within the

vicinity should temporarily cease until the snake is moved to ensure the safety of the snake and workers. The appropriate land manager and FWS office must be notified immediately.

(18) Minimize the time required for activities in known/presumed occupied EMR habitat during the active season (March 15-October 31). Projects should be designed to be completed as quickly as possible. All measures regarding expedited water body crossings will be fully implemented in known/presumed EMR habitat.

Contaminants

(19) As described in the ECS section on "Spill Prevention, Containment and Control," site staging areas for equipment, fuel, materials, and personnel at least 100 feet from the waterway, if available, to reduce the potential for sediment and hazardous spills entering the waterway. If sufficient space is not available, a shorter distance can be used with additional control measures (e.g., redundant spill containment structures, on-site staging of spill containment/clean-up equipment and materials). If a reportable spill has impacted occupied habitat:

a. follow spill response plan;
b. call the appropriate Service Field Office to report the release, in addition to the National Response Center (800-424-8802).

(20) Ensure all imported fill material is free from contaminants (this would include washed rock or other materials that could significantly affect the pH of the stream) that could affect the species or habitat through acquisition of materials at an appropriate quarry or other such measures.

(21) For storage well activities, use enhanced and redundant measures to avoid and minimize the impact of spills from contaminant events in known or presumed occupied streams. These measures include waste pit protection and a spill response plan. These measures will be included in the EM&CP prepared for the activity.

(22) Do not use fertilizers within 100 feet of known or presumed occupied habitat. Fertilizer will not be applied if weather (e.g., impending storm) or other conditions (e.g., faulty equipment) would compromise the ability of NiSource or its contractors to apply the fertilizer without impacting presumed occupied
EMR habitat. The EM&CP prepared for this activity (AMM #2 above) will document relevant EPA guidelines for application.

(23) Concrete coating activities will not take place within 300 feet of any wetland.

Water Withdrawal/Discharge

(24)Do not withdraw water from wetlands in known/presumed EMR habitat for hydrostatic testing. Hydrostatic test water and/or water for storage well O&M will not be obtained from known or presumed occupied streams unless other water sources are not reasonably available. Water

from known or presumed occupied streams will be withdrawn in a manner that will not visibly lower the water level as indicated by water level height on the stream channel bank. Employ appropriately sized screens, implement withdrawal rates, and maintain withdrawal point sufficiently above the substrate to minimize impacts to the species.

(25) Do not discharge hydrostatic test water directly into known or presumed occupied habitat. Discharge water in the following manner (in order of priority and preference):

a. Discharge water down gradient of occupied habitat unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.
b. If those circumstances occur, discharge water into uplands >300 feet from occupied habitat unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.
c. If those circumstances occur, discharge water as far from occupied habitat as practical and utilize additional sediment and water flow control devices (Figures 6A&B, 7, 8, 14A&B; ECS) to minimize effects to the waterbody.

Restoration & Invasive species

(26) Re-vegetate all disturbed EMR habitat with appropriate native species. Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary.

(27) Ensure that all measures for the conservation of topsoil from the ECS are fully implemented in EMR habitat.

(30) Clean all equipment following established guidelines to remove exotic or invasive species before entering a watershed. It is important to follow these guidelines even if work is not occurring in the immediate vicinity of this species since, once introduced into a watershed; invasive species could move and eventually affect the federally listed species. During hydrostatic testing, do not draw water from another source (wetland or waterbody) and discharge it into wetlands or waterbodies in occupied or presumed habitat.

(28) Ensure that all fill material is free from exotic or invasive species.

Other measures:

(29) Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to EMR.

(30) Due to the high threat of persecution/collection, do not advertise the presence of EMR other than to NiSource staff and its contractors. All NiSource staff will be educated about the EMR prior to beginning work at a site and will be given instructions on what to do if they encounter a snake.

(31) Any activities, including but not limited to erosion control and revegation, will not use any synthetic mesh material or due to the danger of trapping EMR.

(32) From March 15-October 31, use tanks to store waste fluids to ensure no loss of EMR by entrapment or exposure to toxins in waste pits within known/presumed occupied EMR habitat.

Diamond darter
Determination without BMPs: LAA
Determination with BMPs: NLAA – LAA
Range: Elk River, WV.
BMPs **Evaluating Presence of Species in NiSource Action Areas** 1. Due to the rarity of the species and the difficulty associated with documenting species presence even in known occupied areas, all areas of the Elk River within the covered lands will be assumed to be occupied by the diamond darter and all AMMs will be followed. Coordination with the US Fish & Wildlife Service (Service) 2. Prior to any activity that could directly affect diamond darters or their habitat (such as a pipeline replacement or stabilization of the river banks) NiSource will prepare a detailed EM&CP as described below and coordinate with the Service as detailed in the attached flowchart. Pre-Construction Planning: Preparation of an EM&CP 3. A detailed EM&CP will be prepared for any activity with potential effects (e.g., stream bank disturbance, impacts to riparian habitat, activities causing sediment) within 100 feet of the ordinary high water mark of occupied habitat. The plan will incorporate the relevant requirements of the NGTS ECS and include site-specific details particular to the project area and potential impact. The Elk River will be considered “high-quality” (as defined in the ECS) for the purpose of preparing this plan regardless of the actual classification. The plan will avoid streambed disturbance if possible and be strongly oriented towards minimizing any riparian disturbance (including minimization of tree clearing within 25 feet of the ordinary high water mark of the Elk River), preventing downstream sedimentation (including redundant erosion and sediment control devices, which would be designed to protect aquatic resources as appropriate), and weather monitoring by the Environmental Inspector to ensure work is not begun with significant precipitation in the forecast. This detailed site-specific and engineered plan will also include any realignment to avoid impacts to high quality foraging and spawning habitats. The EM&CP will identify the full-time Environmental Inspector for the project and include his qualifications relevant to aquatic and fisheries ecology. The plan will comprehensively address all activities needed to complete the work and minimize take of

diamond darters in occupied habitat including using dry-ditch crossing techniques for intermittent streams leading to diamond darter habitat. Decisions on locations of line replacements and construction alternatives will be made in accordance with the attached flow chart. The plan will include planting native, riparian woody vegetation in all disturbed areas within 25 feet of the ordinary high water mark of the Elk River after construction is completed. The EM&CP will also include a sediment control component for uplands that drain to and impact occupied habitat. Detailed erosion control plans will be developed specific to slopes greater than or equal to 30 percent leading directly to occupied habitat. In areas with less than a 30 percent slope, ECS and AMM erosion control measures protective of fish and mussels will be implemented. The Service's West Virginia Field Office will be notified at least five days prior to the initiation of activities in or under the Elk River. The plan will be approved in writing by NiSource NRP personnel prior to project implementation and will include a tailgate training session for all on-site project personnel to highlight the environmental sensitivity of the habitat and any diamond darter AMMs that must be implemented.

Streambed Construction

4. For activities in occupied habitat, install replacement pipelines and major repairs under the river bottom using HDD or other trenchless methods rather than open trenching unless the crossing evaluation report prepared in accordance with MSHCP Section 5.2.1.1 and Appendix J indicates otherwise. Drilling should be carefully undertaken and a plan should be in place to minimize and address the risk of in-stream disturbance due to frac-outs. The plan should also specify diamond darters in the vicinity of the crossing as a key conservation concern and include specific measures identified in the NGTS ECS, from standard industry practices, or other mutually agreed-upon practices to protect this resource. The plan will also include a frac-out impact avoidance plan which will evaluate the site in terms not only of feasibility of conducting HDD, but the likelihood of large scale frac-out and its effects on diamond darters, and actions to address a large scale frac-out in occupied habitat. The plan should also consider the potential effects on diamond darters if drilling fluids are released into the environment and include measures to immediately minimize and remediate any adverse effects. No in-stream (or under stream) activities will be conducted between January 1 and July 31. The plan must contain all information required for a FERC Section 7c filing at a minimum. The plan will specify that the Service's West Virginia Field Office will be immediately notified in the event of a frac-out.

If, after detailed engineering studies (e.g., geotechnical, physiological, topographical, and economic), it is determined (and agreed to by NRP personnel) that an HDD or other alternative methods that avoid instream impacts are not feasible, a report will be prepared and included in the EM&CP to be submitted to the Service during the consultation process. If other alternative are not feasible, NiSource will utilize a dry-ditch crossing technique as described in the ECS beginning on page 15 and Figures 18 and 19. The dry crossing will be

designed to minimize the amount of instream habitat that will be disturbed and will be installed in the following manner:

a. Install pumps or flumes to transport water past the construction site.
b. Install upstream dam.
c. Commence water transport past the construction site.
d. Install downstream dam.
e. Relocate (to the extent practical) mussels and fish to upstream location.
f. Pump water from construction site to upland area.
g. Dig trench, install pipe, and backfill.
h. Remove downstream dam.
i. Remove upstream dam.
j. Remove water transport equipment.

No in-stream activities will be conducted between January 1 and July 31. Clean 1 to 2-inch gravel will be used for the final one-foot of fill in the backfilled trench. The EM&CP will also include results from discussions with the US Army Corps of Engineers regarding flow minimization from Sutton Dam during in-stream construction activities.

5. Install pipeline to the minimum depth described in the ECS and maintain that depth at least 10 feet past the high water line to avoid exposure of pipeline by anticipated levels of erosion based on geology and watershed character. Additional distance may be required should on-site conditions (i.e., outside bend in the waterbody, highly erosive stream channel, anticipated future upstream development activities in the vicinity, etc.) dictate a reasonable expectation that the stream banks could erode and expose the pipeline facilities. Less distance may be utilized if terrain or geological conditions (long, steep bank or solid rock) will not allow for a 10-foot setback. These conditions and the response thereto will be documented in the EM&CP and provided as part of the annual report to the Service.

6. All repair activities that have the potential to cause turbidity in the Elk River will be done using dry techniques typically consisting of placing a coffer dam (typically sand bags) around the area requiring repair, pumping the water out of the coffer dam, and completing the repair.

7. As part of the routine pipeline inspection patrols, visually inspect all stream crossings in occupied habitat at least yearly for early indications of erosion or bank destabilization associated with or affecting the pipeline crossing that is resulting, or would before the next inspection cycle, likely result in sediment impacts to diamond darter habitat beyond what would be expected from background stream processes. If such bank destabilization is observed, it will be corrected in accordance with the ECS. Follow-up inspections and

restabilization will continue until the bank is stabilized (generally two growing seasons).

Stream Bank Conservation

8. Do not construct culvert and stone access roads and appurtenances (including equipment crossing) across the Elk River or within its riparian zone.

9. For equipment crossings of small streams that are tributaries of and within ½ mile of the Elk River, use half pipes of sufficient number and size that both minimize impacts to stream bed and minimize flow disruption to both upstream and downstream habitat (ECS, Figure 22).

Pipeline Abandonment

10. Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to the diamond darter.

Contaminants

11. As described in the ECS section on “Spill Prevention, Containment and Control,” site staging areas for equipment, fuel, materials, and personnel at least 300 feet from any waterway within the Elk River watershed, if available, to reduce the potential for sediment and hazardous spills entering the waterway. If sufficient space is not available, a shorter distance can be used with additional control measures (e.g., redundant spill containment structures, on-site staging of spill containment/clean-up equipment and materials). If a reportable spill has impacted occupied habitat: a). follow spill response plan, b). call the Service West Virginia Field Office (304-636-6586) to report the release; and c). call the National Response Center (800-424-8802).

12. Ensure all imported fill material to be used in projects in the vicinity of the Elk River are free from contaminants (this would include washed rock or other materials that could significantly affect the pH of the stream) that could affect the species population or habitat through acquisition of materials at an appropriate quarry or other such measures.

13. For storage well activities, use enhanced and redundant measures to avoid and minimize the impact of spills from contaminant events within the Elk River watershed. These measures include, for example, waste pit protection, redundant spill containment structures, on-site staging of spill containment/clean-up equipment and materials, and a spill response plan provided to the Service as part of the annual report. These measures will be included in the EM&CP prepared for the activity.

14. Do not use fertilizers or herbicides within 100 feet of the Elk River. Fertilizer and herbicides will not be applied if weather (e.g., impending storm) or other conditions (e.g., faulty equipment) would compromise the ability of NiSource or its contractors to apply the fertilizer or herbicide without impacting presumed occupied diamond darter habitat. The EM&CP prepared for this activity (AMM# 2 above) will document relevant EPA guidelines for

application.

Withdrawal and Discharge of Water

15. Do not draw hydrostatic test water and/or water for storage well O&M from or discharge water directly into the Elk River.

Discharge water in the following manner (in order of priority and preference):

a. Discharge water down gradient of occupied habitat unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.

b. If those circumstances occur, discharge water into uplands >300 feet from occupied habitat unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.

c. If those circumstances occur, discharge water as far from occupied habitat as practical and utilize additional sediment and water flow control devices (Figures 6A&B, 7, 8, 14A&B; ECS) to minimize effects to the waterbody.

Travel for O&M Activities

16. Do not drive across the Elk River – walk these areas or visually inspect from bank and use closest available bridge to cross stream.

Invasive Species

17. Clean all equipment (including pumps, hoses, etc.) that has (1) been in a perennial waterbody for more than four hours within the previous seven days and (2) will work in occupied habitat; following established guidelines to remove exotic or invasive species before entering the Elk River. Do not discharge any water for other sources that might be contained in equipment (e.g. ballast water, hoses, sumps, or other containment). It is important to follow these guidelines even if work is not occurring in the immediate vicinity of this species since, once introduced into a watershed, invasive species could move and eventually affect the diamond darter. If Japanese knotweed is found within any construction areas in the Elk River watershed, take measures to treat and control the species so that it does not spread.

Table 4.3.7: Summary of Impacts to Non-MSHCP Species

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Mussels	Dwarf wedgemussel *Alasmidonta heterodon*	Endangered	**May be affected** (LAA) in Morris County, NJ; Delaware, Orange, Sullivan, and Warren counties, NY; Pike County, PA; and Chesterfield, Culpeper, Dinwiddie, Fauquier, Greensville, Hanover, Louisa, Prince William, and Sussex counties, VA; and in its **historic range** in Morris County, NJ; and Chesterfield County, VA.	Construction, operation, and maintenance of, ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Fat pocketbook *Potamilis capax*	Endangered	**May be affected** (NLAA) in East Carroll Parish, LA; and Issaquena, Sharkey, and Washington counties, MS.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Fluted kidney shell pearlymussel *Ptychobranchus subtentum*	Candidate	**May be affected** (NLAA) in Jackson County, KY.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Mussels	Orangefoot pimpleback pearlymussel *Plethobasus cooperianus*	Endangered	**May be affected** (NLAA) in Bracken, Lewis, and Pendleton counties, KY; and Hardin and Maury counties, TN.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Pink mucket pearlymussel *Lampsilis abrupta*	Endangered	**May be affected** (LAA) in Bath, Pendleton, and Rowan counties, KY; Gallia, Lawrence, Meigs, Morgan, and Washington counties, OH; Hardin and Trousdale counties, TN; and Clay, Jackson, Kanawha and Mason counties, WV.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Mussels	Rabbitsfoot mussel *Quadrula cylindrica*	Proposed Threatened	**May be affected** (LAA) in DeKalb County, IN; Adair, Allen, Barren, Campbell, Floyd, Greenup, Jackson, Lewis, Monroe, Owsley, and Pendleton counties, KY; Sunflower County, MS; Adams, Ashland, Coshocton, Defiance, Delaware, Fairfield, Franklin, Knox, Madison, Muskingum, Pickaway, Putnam, and Union counties, OH; Allegheny, Armstrong, Beaver, Fayette, Greene, Lawrence, Washington, and Westmoreland counties, PA; and Hardin and Maury Counties, TN.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Rayed bean mussel *Villosa fabalis*	Endangered	**May be affected** (LAA) in Dekalb and Marshall counties, IN; Brown, Champaign, Clermont, Coshocton, Defiance, Delaware, Franklin, Hancock, Hardin, Lucas, Madison, Marion, Morrow, Pickaway, Scioto, Union, Warren, and Wyandot counties, OH; and Armstrong, Clarian and Mercer counties, PA.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Mussels	Ring pink mussel *Obovaria retusa*	Endangered; XN	**May be affected** (NLAA) in Bracken, Greenup, Lewis, and Pendleton counties, KY.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.
	Rough pigtoe mussel *Pleurobema plenum*	Endangered	**May be affected** (NLAA) in Bracken, Lewis, and Pendleton counties, KY; and Hardin and Trousdale counties, TN.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Slabside pearlymussel *Lexingtonia dolabelloides*	Candidate	**May be affected** (NLAA) in Maury County, TN.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Snuffbox *Epioblasma triquetra*	Endangered	**May be affected** (LAA) in Bath, Carter, Greenup, Menifee, Montgomery, Nicholas, Powell, Robertson, and Rowan County, KY; Coshocton, Franklin, Greene, Madison, Marion, Monroe, Muskingum, Pickaway, and Washington County, OH; Clarion County, PA; Maury County, TN; Brooke, Calhoun, Doddridge, Gilmer, Kanawha, Marshall, Mason, Putnam, and Wetzel County, WV	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Mussels	Spectaclecase mussel *Cumberlandia monodonta*	Endangered	**May be affected** (LAA) in Hardin County, TN.	Construction, operation, and maintenance of ROWs, access roads, and storage wells, pipeline construction and removal, hydrostatic testing, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Entrapment, introduction of invasive species, crushing, sedimentation, chemical contaminants, permanent or temporary loss of occupied habitat, habitat degradation, physical impacts to individuals, loss of host fish, loss and degradation of host fish habitat, increase in water temperatures, altered flow.
Transitional Successive Pants	American chaffseed *Schwalbea americana*	Endangered	**May be affected** (NLAA) in Greensville and Sussex counties, VA.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and wetland, or other water body crossings.	Removal, crushing, burying, soil compaction, sedimentation, introduction of invasive species, collection, cutting, burning, chemical contaminants, water drawdown, flooding.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Transitional Successive Pants	Eastern prairie fringed orchid *Platanthera leucophaea*	Threatened	**May be affected** (NLAA)in Elkhart, Lake, LaPorte, Noble and St. Joseph counties, IN; Clark, Holmes, Lucas, Ottawa, Sandusky, and Wayne counties, OH; and Augusta County, VA.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and wetland, or other water body crossings.	Removal, crushing, burying, soil compaction, sedimentation, introduction of invasive species, collection, cutting, burning, chemical contaminants, water drawdown, flooding.
Upland Plants	Globe (Short's) bladderpod *Physaria globosa*	Candidate	**May be affected** (NLAA) in Bourbon, Fayette, and Madison counties, KY; and Davidson and Trousdale counties, TN; and in its **historic range** in Clark, Garrard, and Powell counties, KY; and Maury County, TN.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, tree and shrub removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Burying, soil compaction, chemical contaminants, introduction of invasives in occupied habitat, habitat alteration, increased competition with nonnative species, introduction of invasive species by equipment, cutting and crushing of individuals, flooding.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Riparian Plants	Harperella *Ptilimnium nodosum*	Endangered	**May be affected** (NLAA) in Allegany and Washington counties, MD.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Chemical contaminants, soil compaction, soil disturbance, introduction of invasive species, habitat alteration, sedimentation, altered flow, cutting, crushing and burying of individuals.
Upland Plants	Lakeside daisy *Hymenoxys herbacea*	Threatened	**No affect** in Erie and Ottawa Counties, OH.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, tree and shrub removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Burying, soil compaction, chemical contaminants, introduction of invasives in occupied habitat, habitat alteration, increased competition with nonnative species, cutting and crushing of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Transitional Successive Plants	Leafy-prairie clover *Dalea foliosa*	Endangered	**May be affected** (NLAA) in Davidson, Maury, Williamson, and Wilson counties, TN; and in its **historic range** in Sumner County, TN.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and wetland, or other water body crossings.	Removal, crushing, burying, soil compaction, sedimentation, introduction of invasive species, collection, cutting, burning, chemical contaminants, water drawdown, flooding.
Upland Plants	Leedy's roseroot *Sedum integrifolium spp. leedyi or Rhodiola integrifolia ssp. Leedyi*	Threatened	**May be affected** (NLAA) in Schuyler and Yates Counties, NY.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, tree and shrub removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Burying, soil compaction, chemical contaminants, introduction of invasives in occupied habitat, habitat alteration, increased competition with nonnative species, introduction of invasive species by equipment, cutting and crushing of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Successional Plants	Michaux's sumac *Rhus michauxii*	Endangered	**May be affected** (NLAA) in Dinwiddie County, VA.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.
Wetland Plants	Northeastern bulrush *Scirpus ancistrochaetus*	Endangered	**May be affected** (LAA) in Washington County, MD; Adams, Bedford, Cambria, Centre, Clinton, Cumberland, Franklin, Fulton, Lehigh, Monroe, and Northampton counties, PA; Alleghany, Augusta, and Rockingham counties, VA; and Hardy County, WV.	Vegetation management and clearing ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Cushing, removal, soil compaction, topsoil removal and ground disturbance, sedimentation, chemical contaminants, habitat alteration, cutting, introduction of invasive species.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Plants	Northern monkshood *Aconitum noveboracense*	Threatened	**May be affected** (NLAA) in Delaware and Sullivan counties, NY; and Hocking County, OH.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, tree and shrub removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Burying, soil compaction, chemical contaminants, introduction of invasives in occupied habitat, habitat alteration, increased competition with nonnative species, , cutting and crushing of individuals.
Upland Successional Plants	Peter's Mountain mallow *Iliamna corei*	Endangered	**No affect** in Giles County, VA.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Wetland Plants	Pondberry *Lindera melissifolia*	Endangered	**May be affected** (NLAA) in Sharkey and Sunflower counties, MS.	Vegetation management and clearing ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Cushing, removal, soil compaction, topsoil removal and ground disturbance, sedimentation, chemical contaminants, habitat alteration, cutting, introduction of invasive species.
Transitional Successive Plants	Price's potato bean *Apios priceana*	Endangered	**No affect** in Maury, Wayne, and Williamson counties, TN; and in its **historic range** in Davidson County, TN.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream, wetland, or other water body crossings.	Removal, crushing, burying, soil compaction, sedimentation, introduction of invasive species, collection, cutting, burning, chemical contaminants, water drawdown, flooding.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Transitional Successive Plants	Running buffalo clover *Trifolium stoloniferum*	Endangered	**May be affected** (NLAA) in Bourbon, Campbell, Clark, Fayette, Madison, and Montgomery counties, KY; Brown, Clermont, and Lawrence counties, OH; and Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster counties; WV; and in its **historic range** in Jackson County, KY; and Monongalia County, WV.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream, wetland, or other water body crossings.	Removal, crushing, burying, soil compaction, sedimentation, introduction of invasive species, collection, cutting, burning, chemical contaminants, water drawdown, flooding.
Riparian Plants	Sensitive joint-vetch *Aeschynomene virginica*	Threatened	**May be affected** (NLAA) in Chesterfield, Henrico, and James City counties, VA; and in its **historic range** in Gloucester and Salem counties, NJ; Delaware County, PA; and Prince George and Surry Counties, VA.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Chemical contaminants, soil compaction, soil disturbance, introduction of invasive species, habitat alteration, sedimentation, altered flow, cutting, crushing and burying of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Successional Plants	Shale barren rockcress *Arabis serotina*	Endangered	**May be affected** (NLAA) in Alleghany, Augusta, Page, and Rockbridge counties, VA; and Greenbrier, Hardy, and Pendleton counties, WV.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.
Upland Successional Plants	Short's goldenrod *Solidago shortii*	Endangered	**May be affected** (NLAA) in Nicholas and Robertson Counties, KY.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Successional Plants	Small-whorled pogonia *Isotria medeoloides*	Threatened	**May be affected** (NLAA) in New Castle County, DE; Hocking and Scioto counties, OH; Centre and Chester counties, PA; and Fairfax, James City, Madison, and Prince William counties, VA; and in its **historic range** in Montgomery County, MD; Hunterdon County, NJ; Rockland County, NY; Greene, Monroe, and Montgomery counties, PA; and Greenbrier County, WV.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Successional Plants	Smooth coneflower *Echinacea laevigata*	Endangered	**May be affected** (NLAA) in Allegheny and Botetourt counties, VA; and in its **historic range** in Lancaster County, PA.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Crushing, burying, soil compaction, top soil removal, introduction of invasive species by equipment, chemical contaminants, flooding, chopping, collection of individuals.
Riparian Plants	Spring creek bladderpod *Lesquerella perforata*	Endangered	**May be affected** (NLAA) in Wilson County, TN.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Chemical contaminants, soil compaction, soil disturbance, introduction of invasive species, habitat alteration, sedimentation, altered flow, cutting, crushing and burying of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Wetland Plants	Swamp pink *Helonias bullata*	Threatened	**May be affected** (NLAA) in New Castle County, DE; Cecil County, MD; Gloucester, Morris, and Salem counties, NJ; and Augusta and Henrico counties, VA.	Vegetation management and clearing ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Cushing, removal, soil compaction, topsoil removal and ground disturbance, sedimentation, chemical contaminants, habitat alteration, cutting, introduction of invasive species.
Wetland plants	Virginia sneezeweed *Helenium virginicum*	Threatened	**May be affected** (NLAA) in Augusta and Rockingham counties, VA.	Vegetation management and clearing ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings	Cushing, removal, soil compaction, topsoil removal and ground disturbance, sedimentation, chemical contaminants, habitat alteration, cutting, introduction of invasive species
Riparian Plants	Virginia spirea *Spiraea virginiana*	Threatened	**May be affected** (NLAA) in Lewis County, KY; Sioto County, OH; and Greenbrier, Mercer, Raleigh, Summers, and Upshur counties; and in its **historic range** in Fayette County, PA.	Vegetation management and clearing, ROW repair and construction, pipeline construction and removal, storage wells, vehicle operation and foot traffic, access road construction, and stream crossings.	Chemical contaminants, soil compaction, soil disturbance, introduction of invasive species, habitat alteration, sedimentation, altered flow, cutting, crushing and burying of individuals.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Upland Plants	White-haired goldenrod *Solidago albopilosa*	Threatened	**No affect** in Menifee and Powell Counties, KY.	ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, tree and shrub removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, and construction staging at stream, wetland, or other water body crossings.	Burying, soil compaction, chemical contaminants, introduction of invasives in occupied habitat, habitat alteration, increased competition with nonnative species, introduction of invasive species by equipment, cutting and crushing of individuals.
Birds	Piping plover *Charadrius melodus*	Endangered	**May be affected** (NLAA) in Cameron, Lafourche, Plaquemines, St. Mary, Terrebonne, and Vermilion parishes, LA.	Construction, O&M of facilities, ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and O&M, vehicle operation and foot traffic, access road construction, construction staging at stream, wetland, or other water body crossings, vegetation management and clearing.	Habitat degradation, potential attraction of predators, increased disturbance stress on individuals, potential for contaminant impacts.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Red-cockaded woodpecker *Picoidees borealis*	Endangered	**May be affected** (NLAA) in Calcasieu, Evangeline, Grant, La Salle, and Rapides parishes, LA; and Lafayette County, MS; and in its **historic range** in Powell County, KY; Catahoula Parish, LA; Northampton County, NC; Hardin and McNairy counties, TN; and Southampton and Sussex counties, VA.	Construction, O&M of facilities ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction, , and vegetation management and clearing.	Habitat degradation, increased disturbance stress on individuals and nesting pairs, reduction in prey abundance, noise disturbance on individuals, potential for chemical contaminants, habitat degradation from chemical contaminants.
Fish	Diamond Darter *Crystallaria cincotta*	Proposed Endangered	**May be affected** (LAA) in Kanawha and Clay Counties, WV.	Construction, operation, and maintenance of facilities, ROWs, access roads, and storage wells, pipeline construction and removal, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Permanent or temporary loss of habitat, habitat degradation, water quality impacts, physical impacts to individuals, reduction of prey population diversity and abundance.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
	Pallid sturgeon *Scaphirhynchus albus*	Endangered	**May be affected** (NLAA) in East Carroll, Madison, Rapides, and St. Mary parishes, LA; and Issaquena, Sharkey, Warren, and Washington counties, MS.	Construction, operation, and maintenance of facilities, ROWs, access roads, and storage wells, pipeline construction and removal, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Temporary loss of occupied habitat, physical impacts to individuals, habitat degradation and water quality degradation, stress on individuals, contaminant impacts, stress on eggs.
	Roanoke logperch *Percina rex*	Endangered	**May be affected** (LAA) in Brunswick, Dinwiddie, Greensville, Mecklenburg, Southampton, and Sussex counties, VA.	Construction, operation, and maintenance of facilities, ROWs, access roads, and storage wells, pipeline construction and removal, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Temporary or permanent loss of occupied habitat, physical impacts to individuals, habitat degradation and water quality degradation, reduction of prey population, stress on individuals, stress on eggs.
	Spotfin chub *Erimonax monachus*	Threatened, XN	**May be affected** (NLAA) in Lewis County, TN.	Construction, operation, and maintenance of facilities, ROWs, access roads, and storage wells, pipeline construction and removal, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Permanent or temporary loss of occupied habitat, water quality impacts, habitat degradation, physical impacts to individuals, reduction of prey population diversity and abundance.

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Fish	Pygmy madtom *Noturus stanauli*	Endangered, XN	**May be affected** (NLAA)in Maury County, TN.	Construction, operation, and maintenance of facilities, ROWs, access roads, and storage wells, pipeline construction and removal, vehicle operation and foot traffic, stream crossings, and vegetation management and clearing.	Temporary or permanent loss of occupied habitat, physical impacts to individuals, habitat degradation and water quality degradation, reduction of prey population, stress on individuals, stress on eggs.
	Kentucky arrow darter *Etheostoma sagitta ssp. spilotum*	Candidate	**May be affected** (NLAA)	Not applicable	Not applicable
Mammal	Virginia northern flying Squirrel (*Glaucomys sabrinus fuscus*)	Delisted	**May be affected** (NLAA) in Pocahontas, Pendleton,Randolph, Grant, and Tucker counties, West Virginia	Not applicable	Not applicable

Group	Common/Scientific Name	Federal Status	Potential Species Locations within the Covered Land	Covered Activities Causing Impacts	Potential Species Impacts due to Covered Activities
Reptiles	Eastern massasauga *Sistrurus catenatus catenatu*	Candidate	**May be affected** (LAA) in Elkhart, LaPorte, Marshall, Noble, Porter, and St. Joseph counties, IN; Ashtabula, Champaign, Clark, Clinton, Columbiana, Crawford, Defiance, Erie, Fairfield, Fayette, Greene, Hardin, Huron, Licking, Logan, Lorain, Lucas, Marion, Medina, Montgomery, Ottawa, Paulding, Sandusky, Seneca, Stark, Trumbull, Warren, Wayne, and Wyandot counties OH; and Butler and Mercer counties, PA.	Construction, operation, and maintenance of facilities, ROW repair and construction, herbicide application, off-ROW clearing, pipeline construction and removal, storage wells construction and maintenance, vehicle operation and foot traffic, access road construction and maintenance, and construction staging at wetland crossing construction, and vegetation management and clearing.	Physical impacts to individuals and habitat, chemical contaminants, water-level manipulation, predation, burning, chopping, and increase predation potential.

State Listed Species

As discussed in Chapter 3, all 10 take species and a number of the MSHCP and non-MSHCP species are either state listed threatened or endangered. In addition, there may be state-listed species (or species of “special concern”) affect by the Proposed Action that are not included in the MSHCP. For instance, the little brown bat and northern long-eared bat, while not included in the MSHCP, but which share some of the same habitat and habits as the Indiana bat, could be affected by NiSource AMMs (e.g., tree-clearing windows) and mitigation (e.g., protecting and enhancing forest habitat). The same could be true for some state-listed mussels that share habitat and habits with mussel species in the MSHCP. The state-listed spotted turtle, green snake, several dragonflies, and some fen plants should benefit from bog turtle habitat protection. Overall, we would expect impacts to these "other" state listed species to be minor, though positive.

Since most of the states have protections in place for state listed species, we assume NiSource will contact the appropriate state agency when conducting activities (including mitigation) that have the potential to impact state listed species. For instance, a state listed plant species could potentially occur along a riparian area that NiSource intends to restore as mitigation for mussel impacts. In order for NiSource to remain "otherwise lawful" under the ESA, NiSource would be expected to consult with the state agency responsible for that plant species and obtain any exceptions or authorizations needed to conduct that activity. Through those processes, we conclude that appropriate safeguards are in-place to protect state-listed species, and the risk of significant adverse impacts is minor and insignificant.

Alternative 3

Under Alternative 3, potential impacts to T&E species are identical to those discussed above for Alternative 2, although the duration of the future take authorized under an ITP is logically reduced commensurately. After 10 years, NiSource would have the option to return to the status quo for ESA compliance (i.e., Section 7), amend their MSHCP and/or renew their permit.

The potential conservation benefit associated with NiSource’s mitigation program would also be reduced based on the shorter duration of the MSHCP implementation, particularly the long-term benefits associated with the “front-loading” the mitigation for all O&M activities within the first

seven years of implementation, which is associated with Alternative 2. If after 10 years NiSource returns to the status quo, mitigation for impacts associated with take would likely be absent.

4.4 Impacts to Social Resources

4.4.1 Land Use

Analysis of land use resources includes a discussion related to land ownership and use, including federal, state, and local conservation lands, land cover types, and potential land conversion as a result of NiSource mitigation.

Alternative 1

The most prevalent land-use type in the Covered Land is Deciduous Forest (49.30%), followed by Cultivated Crops (17.72%), Pasture/Hay (13.53%), and Developed – Open Space (6.47%). The remainder of the area is covered by eleven other types, none exceeding 3% of the total area. A description of each land-use-cover class is included in Table 3.2 in the MSHCP. Appendix E in the MSHCP provides data on conservation lands owned by federal, state, and local governments and nongovernmental organizations that are crossed by the Covered Land.

NiSource Covered Activities could impact land use within the Covered Land. Construction activities such as clearing, grading, trenching, stripping, and backfilling could potentially impact agricultural uses by causing soil erosion, by altering drainage systems, and by degrading soils through mixing and compaction. These impacts could result in short-term loss of crops or pasture, as well as reduced crop productivity in future planting seasons. Residential lands could be impacted by increased noise, dust, and vehicle traffic. They would last only for the duration of construction, which in most cases would be no more than 1 or 2 weeks at a single location. NiSource has established procedures to minimize these impacts during construction.

New compressor facilities can affect adjacent land use if zoning changes are required to allow construction. Depending on the land use in the vicinity and the appearance and noise associated with the facility, adjacent property values could be affected. The presence of a pipeline generally has no effect on adjacent land use, although if extensive tree-clearing or right-

of-way erosion occurs, the aesthetic impact of the right-of-way can affect it. This aesthetic impact can also have some effect on adjacent recreational use. Within a right-of-way, land use is restricted. No permanent structures or trees are allowed to protect the pipeline and to provide access for maintenance. Agricultural uses of the ROW, other than tree or fruit farming, are not affected. Recreational use of the right-of-way by off-road vehicles is not allowed; however, as a practical matter, there is little that can be done to prevent such use.

Easements taken on properties for Covered Activities or mitigation could be considered a permanent impact, in that it would potentially restrict the use of that portion of the property for a period of time. Negotiated easements would be used to confer rights-of-way by a landowner to the pipeline company, on either a permanent or temporary (usually for construction) basis. The easement would give the company the right to construct, operate, and maintain the pipeline within a permanent or temporary right-of-way. In return, the company would compensate the landowner for its use of the land. Typically, an easement agreement between the company and landowner would specify compensation for loss of use during construction, loss of resources, or damage to the property, and would specify allowable uses for the permanent right-of-way after construction is completed. Compressor stations would emit noise for the life of the station.

In summary, the No Action Alternative would continue with the status quo. All future NiSource Covered Activities would undergo appropriate regulatory review by the appropriate land manager or regulatory agency (e.g. USFS, USFWS, USACE). The main difference between the No Action Alternative and the Action Alternatives is the MSHCP Mitigation Program, which would not occur under this Alternative.

Alternative 2

NiSource proposed mitigation has the potential to impact land use in two ways. First, land that is targeted for mitigation would be either purchased in fee or encumbered with a conservation easement. This has the effect of transferring land ownership and control from a private entity (i.e., land in private ownership) to NiSource or one of their designated agents. Secondly, land that is purchased for mitigation would be most likely maintained in a natural vegetative cover and/or restored and enhanced to native vegetative cover to provide benefits to target fish and wildlife species. This has the effect of converting land from one use to another. While the

composition of any future mitigation land is unknown, it could be possible that some of the land that is acquired for mitigation is cropland. NiSource may protect, restore and enhance up to 10,960 acres of forest land and associated habitats as mitigation for the Indiana bat (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP). For mussels, NiSource has proposed to protect and restore land associated with riparian corridors (see Table 2.3.4 in EIS and Tables 8.2.2-1 and 8.2.2-2 in MSHCP).

Alternative 3

The environmental consequence of Alternative 3 relative to land use would be the same as Alternative 2 with one exception: the amount of mitigation land either acquired or encumbered with easements would be less within the first seven years under Alternative 3, as NiSource would not be mitigating “up-front” for O&M impacts. Over the long-term, assuming NiSource renews their ITP, of the AMMs and the mitigation would be the same as Alternative 2.

4.4.2 Environmental Justice

EO 12898 requires federal agencies to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations. Chapter 3 contains a set of tables that provides statewide information on minority and low income populations, as well as information specific to the population residing within the Covered Land.

Of the 14 states included in the Covered Land, West Virginia has the lowest overall minority population; whereas New York, Maryland, and Louisiana have the highest (see Tables 3.4-20 through 3.4-22). Within the Covered Land specifically, a higher proportion of individuals are considered minority in North Carolina and Delaware relative to their respective statewide populations, whereas the Covered Land in New York has a lower minority population relative to the rest of the state.

New Jersey and Maryland have the lowest low income populations statewide, whereas Mississippi, Louisiana, West Virginia, and Kentucky have the highest. The proportion of the population considered low income within the Covered Land is similar relative to statewide

numbers for the majority of the 14 states. However, North Carolina, Kentucky, and Mississippi have a higher proportion of their populations within the Covered Land considered low income relative to their respective statewide populations, and New Jersey, Delaware, Tennessee, and Virginia have a lower proportion of their populations within the Covered Land considered low income relative to statewide numbers.

The mission of the Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The environmental justice strategy of the Service extends this mission by seeking to ensure that all segments of the human population have equal access to America's fish and wildlife resources, as well as equal access to information which will enable them to participate meaningfully in activities and policy shaping.

Conservation of fish and wildlife and their habitats provides opportunities for Americans to encounter their natural national heritage. Although social or experiential benefits of conservation are not easily quantified, it can be demonstrated that conservation does generate substantial economic activity at local, regional, and national scales.

Alternative 1

In general, construction and operation of pipeline should have a positive economic impact in the region surrounding the project area. Construction material purchases, sales tax on miscellaneous purchases, labor wages to local workers, and construction worker expenditures would result in positive short-term effects on local economies. During operations, NiSource pays county and local property taxes, representing a positive effect of continuing tax revenue generation for the counties.

Under Alternative 1, the Service would not issue NiSource an ITP and thus, no mitigation would be required. NiSource would not establish a designated mitigation fund to pay for mitigation for species take across the Covered Land, which could provide some benefit to local communities.

Alternative 2

Implementation of an ITP would result in land being protected, restored, and managed as mitigation land for the benefit of species covered by the ITP. While there may be some slight

variations in specific timing of NiSource activities due to time savings associated with the issuance of the ITP, there would be minimal differences between the type and overall number of operation, maintenance, and or construction activities that NiSource would ultimately pursue over the span of the proposed ITP. As such, no measurable direct or indirect impacts to employment, income, population (including low income/minority populations), housing or public services are expected throughout the Covered Land based on issuance of the ITP and implementation of the MSHCP. Variations in employment and/or goods and services associated with future construction projects as well as any MSHCP associated mitigation projects may occur, but these are expected to be localized and insignificant when compared to the existing conditions in the entire Covered Land.

Alternative 3

Potential types of impacts relative to environmental justice under Alternative 3 are identical to those discussed above for Alternative 2, although the duration of any future opportunity to provide local economic benefit through mitigation actions would be logically reduced commensurate with permit duration, as well as the opportunity to utilize NiSource mitigation funds associated with the “front-loading” of O&M mitigation during the first seven years of the permit, as provided for in Alternative 2.

4.4.3 Transportation

Analysis of transportation includes a general discussion of direct and indirect impacts related to transportation infrastructure.

Alternative 1

Minor, short-term impacts to the transportation network may result from certain NiSource Covered Activities. These impacts would result primarily from the movement of construction equipment and materials to and from work sites and the daily commuting of workers to and from work sites. These impacts are not expected to be significant. For instance, during NiSource construction projects, the commuting of the construction workforce to a project site could temporarily affect local traffic and potentially create roadside parking hazards. Although most of this commuting would take place during off-peak hours (e.g., before 7:00 AM and after 6:00

PM), it could result in increased traffic in a specific project area. In addition to the construction workforce, the delivery of construction equipment and materials to a work site could temporarily stress transportation networks at certain locations.

With all alternatives, future NiSource projects would be subject to regulatory approval. Therefore, any potential site-specific impacts on transportation networks based on NiSource's future activities would be considered on a project-by-project basis, and the approval of individual projects may be subject to specific mitigation measures. Conditions of approval within individual transportation-related permits might include notification requirements and traffic control measures during construction.

Alternative 2

Impacts to transportation due to Service issuance of an ITP to NiSource for incidental take of 10 species for a 50 year period would be minor, at best. As stated earlier, issuance of an ITP to NiSource does not authorize the activities that cause incidental take of species. Further, implementation of species AMMs and mitigation under an ITP would not change the covered activity in ways that would avoid and/or minimize potential impacts to transportation, as described in Alternative 1.

Alternative 3

Like Alternative 2, impact to transportation due to Service issuance of an ITP to NiSource for incidental take of 10 species for 10 years would be minor, at best.

4.4.4 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires the Service to take into account the effect of its undertakings (including issuance of ITPs) on properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP). The process NiSource must follow to assist the lead federal agency in compliance with the National Historic Preservation Act (NHPA) is described in Chapter 1 of this EIS.

Alternative 1

Construction and operation of natural gas pipeline and associated facilities could potentially affect historic properties. Impacts can be direct or indirect. Direct impacts could include the physical destruction or damage to all or a portion of a site, or alteration or removal of a historic property. Indirect impacts could include the introduction of visual, atmospheric, or audible elements that diminish the integrity of the site or alter settings associated with historic properties. Both direct and indirect project impacts on cultural resources can be mitigated. Mitigation measures for both direct and indirect project impacts on historic properties may include route variation to avoid historic properties; data recovery, including the scientific excavation of archaeological sites; detailed documentation, including architectural drawings of historic buildings; and the use of landscaping techniques to screen visual intrusions and maintain site settings.

A project sponsor (like NiSource) requiring a certificate from the Federal Energy Regulatory Commission (FERC) under Section 7 of the Natural Gas Act (NGA) is required to follow the procedures in the applicable FERC regulations and guidelines to assist the FERC in complying with Section 106. Projects constructed under the Natural Gas Policy Act (NGPA) or the NGA blanket certificate program must also meet requirements of the NHPA and comply with the applicable FERC regulations. Therefore, NiSource's construction and operation and maintenance activities must be in compliance with the NHPA to be authorized.

Compliance with Section 106 will occur as projects are reviewed for site-specific resource issues. Areas that are maintained within the pipeline ROW have already been reviewed for archeological resources. As new activities such as expansion projects occur, the areas will be reviewed for compliance with the NHPA. NiSource's annual project planning includes consultation with State Historic Preservation Officers for clearance or completion of any required compliance documentation (e.g., Phase I surveys). In the event that a site-specific project requires further planning relative to impacts on historic or cultural resources, NiSource serves as the non-Federal representative to complete those plans. For the Federal agency, and for agencies cooperating on this EIS, future NEPA documentation will include evaluation of any

historic or cultural preservation concerns as a result of NiSource planning and providing the information.

From a practical standpoint, the extent to which NiSource is able to document previous NHPA clearance for maintenance activities, such review will be completed. Where new ground disturbance is anticipated, such as looping of the existing pipeline, NiSource must assure that their Federally permitted activities are in full compliance with NHPA and other applicable Federal and state law governing historic and cultural resource preservation.

Alternative 2

There are no differences between any of the alternatives related to cultural resource protection. NiSource must assist the lead federal agency to fully comply with the NHPA regardless of which alternative is selected. However, under Alternative 2 and 3, NiSource would also be required to extend NHPA protections to the mitigation lands that are part of those alternatives.

Alternative 3

Again, there are no differences between any of the alternatives related to cultural resource protection. NiSource must assist the lead federal agency to fully comply with the NHPA regardless of which alternative is selected. Under Alternative 2 and 3, NiSource would also be required to extend NHPA protections to the mitigation lands that are part of those alternatives. Also, under Alternative 3, NiSource would not front-load mitigation.

4.4.5 Recreation

Analysis of recreation includes a discussion of potential direct and indirect impacts on land within the Covered Land, and those lands that may serve mitigation purposes.

Alternative 1

Public lands available for recreation have existing land use restrictions that guide allowable development and uses on these lands. As such, these restrictions would guide all NiSource activities on those properties under all alternatives, and would minimize potential impacts to recreational resources.

Construction of facilities could impact recreation and special use areas in the Covered Land in several ways. First, habitats and wildlife may be affected by the clearing of vegetation, the generation of noise, and or the generation of dust. Second, construction of the facilities could result in a disruption of recreational uses potentially including but not limited to hiking, fishing, camping, bird watching, picnicking, and environmental education. Disruptions to recreational uses could potentially occur if access is reduced due to construction activity or if construction activities change the recreational quality of the area.

Impacts to natural resources within recreation areas could indirectly impact recreation within these areas. If conventional construction is used, there may be permanent changes in natural resources associated with vegetation maintenance within the permanent right-of-way. In forested areas, recovery of the construction right-of-way could be short-term or long-term, depending on the age and type of trees. All other impacts would typically be short-term. If boring or HDD methods are used, then impacts to sensitive natural resources would be avoided, but there would still be impacts to any associated temporary workspaces. Construction-related noise, dust, and traffic could indirectly impact recreation in certain areas. Impacts due to changes in access could result if traffic flows within a recreation or special use area would be disrupted. These impacts would be temporary, lasting a few days to a few weeks in any given location. In general, the severity of impacts from noise, dust, and viewscape alteration would depend on the distance between the project site and areas where recreationalists would be located (e.g., campgrounds, picnic areas, trails, private lands). The timing of construction may also be important, as recreation is often seasonal.

Alternative 2

Under both action alternatives, there would be mitigation in the form of land acquisition, restoration, and management. Land acquisition by NiSource could have impacts ranging from reduced recreational opportunities resulting from land being removed from private ownership, to increased recreational opportunities, as land is restored and maintained for the benefit of fish and wildlife. Land that is restored and maintained in a natural state should attract more game species than developed land, and assuming those lands are made available to the public, there could be a net gain in the amount of hunting land available to the public, again at a local scale.

Rivers and streams that receive NiSource mitigation, mainly in the form of riparian restorations, could see improvements to water quality, thereby improving local fish populations used by recreationists.

Alternative 3

Impacts under Alternative 3 would be the same as Alternative 2. However, NiSource would not front-load mitigation; thus some recreation benefits may be foregone, or at least delayed, under this Alternative.

4.4.6 Visual Resources

Analysis of visual resources includes a discussion of potential impacts related to natural or human made features that make up the aesthetic quality of the Covered Land. These features may be landforms, water resources, vegetation, or manufactured in form, and make up the overall visual impression in a certain area. Specific lands or resources that would constitute potentially sensitive visual resources within the Covered Land include land managed by the NPS or USDOT, such as Wild and Scenic Rivers and Scenic Byways. For instance, there are eight segments of rivers designated as Wild and Scenic totaling just over 25 miles within the Covered Land area (see table Table 3.4-34). Other federal land of note within the Covered Land includes the Appalachian Trail and the Laurel Forks Wilderness Area within the Monongahela NF in West Virginia.

Alternative 1

As specific future NiSource activities are undertaken: local, state, or federal level permits or review may be required depending upon the nature and location of the activity. Potential direct or indirect impacts to visual resources (e.g., permanent clearing of vegetation, viewshed modification due to right-of-way construction and maintenance) would be considered on a project-by-project basis and would be subject to conditions of approval.

The Covered Land predominantly crosses privately owned lands. Private lands are not subject to federal or state visual management standards. Visual resources on private lands are a

function of geology, climate, and historical processes, and are influenced by topographic relief, vegetation, water, wildlife, land use, human uses, and development.

Visual impacts associated with new construction and associated temporary workspace areas could include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting, rock formation alteration or removal, and machinery and tool storage. Other visual effects may result from the removal of large individual trees that have aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture. Visual impacts would be greatest where the ROW parallels or crosses roads, trails, recreational waterbodies, overlooks, historic properties and districts, and where the pipeline ROW would be seen by passing motorists or recreational users. The visual impacts would vary depending on vegetation type. The recovery timeframe would be shortest on agricultural and open lands consisting of herbaceous and shrub communities, where the re-establishment of vegetation following construction would be relatively fast (between one or two growing seasons). Short-term impacts to developed lands would also be minor due to the previously disturbed nature of these areas and the quick recovery time.

Overall, the greatest potential for visual impact from NiSource Covered Activities would be from the removal of large, mature trees, which would take a longer time to regenerate than other vegetation types, and would be prevented from re-establishing on the new ROW. Clearing would convert existing forested areas to open areas and result in a new corridor with distinctive edges. In general, site-specific visual impacts would diminish over time as the affected areas gradually blend in with the surrounding landscape. Aboveground facilities would be the most visible, and would result in long-term changes to the landscapes where they are located.

Alternative 2

Under Alternative 2, impacts to visual resources would be the same as for Alternative 1. NiSource mitigation for Indiana bat and mussel species could result in improvements to visual resources assuming local publics appreciate forest land and forested riparian corridors. For NiSource projects that occur within or on special designation land, such as Wild and Scenic

Rivers, federal and state action agencies may require additional protective measures, including mitigation, beyond what is required for an ITP.

Alternative 3

Impacts of Alternative 3 would be the same as Alternative 2. Mitigation under Alternative 3 could be less than Alternative 2, especially in the first seven years.

4.4.7 Noise

Analysis of noise relates to impacts surrounding generation of sound or sounds that are loud, unpleasant, unexpected, or undesired within the Covered Land due to the alternatives considered. Human responses to noise can vary depending on the time of day, sensitivity of the receptor (homes, schools, hospitals, etc.), the distance between the source of noise and the receptor, and the type of noise. Noise levels are typically categorized as follows: a 3-dBA increase is considered noticeable, a 6-dBA increase is considered clearly noticeable, and a 9-dBA increase is considered significantly noticeable.

Alternative 1

New construction is expected to be typical of other pipeline projects in terms of schedule, equipment used, and types of activities. Construction activities would increase sound levels in the vicinity and the sound levels would vary during the construction period. Pipeline construction generally would proceed at rates ranging from several hundred feet to 1 mile per day. However, due to the assembly-line method of construction, activities in any one area could last from several weeks to several months on an intermittent basis.

Nighttime noise levels would normally be unaffected because most pipeline construction would take place during daylight hours. A possible exception would be at HDD sites. At HDD locations, drilling equipment may operate on a 24-hour-per-day, 7-day-per-week basis.

Noise associated with construction at a compressor station would be concentrated in the vicinity of the station. Construction equipment would be operated on an as-needed basis during those periods and would be maintained to manufacturers' specifications to minimize noise impacts.

Principal noise sources would include the air inlet, exhaust, and casing of the turbines. Secondary noise sources would include yard piping and valves. Noise from the relief valves, blow-down stacks, and electrical generation equipment would be infrequent. Noise control measures could be applied to motors and associated compressors, and appropriate building materials used to enclose turbines and engines. Mufflers could be installed for turbine exhaust systems or engine exhaust systems, and silencers could be installed for the engine or turbine air intake system. Acoustical insulation for aboveground piping may be installed if necessary to meet the applicable sound criteria. An air ventilation system for electric motors designed and specified to meet stringent noise requirements may be installed. Compressor stations would emit noise for the life of the station.

As projects are undertaken, and depending upon the nature of the activity (e.g., heavy equipment operation, blasting, drilling), local noise ordinances, state noise regulations, or federal level permits or review by FERC may be required, and therefore impacts to noise sensitive areas would be minimized to the extent possible. For example, under the NGA, FERC regulations (18 CFR 380.12) require that a noise resource report be developed involving compressor facilities at new or existing compressor stations and for all new liquid natural gas facilities. FERC also evaluates noise levels due to certain construction activities such as HDD. Potential impacts on noise sensitive areas would be considered on a project-by-project basis.

Alternative 2

Under Alternative 2, impacts resulting from noise would be the same as for Alternative 1.

Alternative 3

Impacts of Alternative 3 would be the same as Alternative 1 and 2.

4.5 Short-term Uses versus Long-Term Productivity

The National Environmental Policy Act (NEPA) states in Section 102 [42 United States Code (U.S.C.) 4332] that all agencies of the Federal Government shall:

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on --

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. Again, for the purposes of this EIS, short term is defined as three years or less; long term more than three years.

NiSource Covered Activities, including mitigation, could result in short-term and long-term impacts to physical, biological, and social resources in the Covered Land. The EIS evaluates these potential impacts (see above) to surface water, ground water, climate, air quality, vegetation, wetlands, wildlife and fish, threatened, endangered, candidate, and proposed species, socioeconomics and environmental justice, transportation and utilities, cultural resources, recreation, and noise and visual resources.

Over the life of the ITP, the estimated annual average disturbance anticipated from NiSource operations and maintenance activities and new construction will be approximately 19,000 acres. NiSource estimates that approximately 18,000 of these impacted acres would be within previously disturbed land (e.g., existing ROW) and that approximately 900 acres per year would be associated with new construction, equating to approximately 0.2 percent of the Covered Land footprint (see Appendix A in the MSHCP). There will be resources such as earth, fossil fuels, and labor allocated for these activities. Vegetation will be impacted in ROWs and workspaces, and habitats in those areas will be altered. Vegetation loss would be short term in some areas and long term in others, depending on the area and type of vegetative cover (i.e., grasses, shrubs, trees).

During new construction, short-term use of the labor force could result in long-term productivity of the economic environment, including employment, personal income, and tax revenue. Short-term employment would be related to construction activities. Long-term employment would be related to the operation and maintenance of ROWs, access roads, and storage fields.

Under Alternatives 2 and 3, there would be mitigation in the form of land acquisition, habitat restoration, and habitat management for impacts associated with the taking of listed species. In this context, mitigation would be required to "off-set" those impacts of take. In most cases, the "off-set" would occur over both short and long periods of time (i.e., the time it would take to restore habitat, or enhance the productivity (e.g., growth rate) of a species). Land acquisition and habitat management associated with mitigation would occur over long periods of time as well (i.e., 50 years), or in some cases, perpetuity.

4.6 Irreversible and Irretrievable Commitments of Resources

NEPA analysis also requires that an EIS include identification of ". . . any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented."

Irreversible resource commitments are related to the use of nonrenewable resources, such as energy, minerals, and soils, and the effects that the uses of these resources would have on future generations. Such uses are considered irreversible because their implementation would affect a resource that has deteriorated to the point where renewal can occur only over long periods of time, or at great expense, or because they would cause the resource to be destroyed or removed. Irretrievable resource commitments mean loss of production or use of a resource. Irretrievable refers to the permanent loss of a resource, such as extinction of a species, destruction of a cultural site, or loss of soil productivity.

Under all alternatives, most resource commitments are neither irreversible nor irretrievable. Potential impacts to species are both short-term and long-term. In cases where a NiSource covered activity impacts habitat for a take or MSHCP species, NiSource will mitigate for those impacts, in some cases two or three times the amount of habitat that was impacted over time. Also, potential impacts will be reduced through appropriate measures (e.g., ECS, BMPs, and AMMs). Those resources that may have a possible irreversible or irretrievable commitment include individual plants, animals, and habitat patches. Land acquired for mitigation could remain within the conservation estate in perpetuity.

Under the NHPA, cultural resources eligible for listing in the NRHP would be protected from development (see Section 2.1.1). However, development of land could result in the irretrievable loss of unidentified cultural resources.

Funding and personnel commitments by the Service under Alternatives 1-3 for compliance with Section 7 of the ESA, MSHCP implementation, and MSHCP monitoring would be unavailable for other programs. The most substantial commitment of irretrievable resources would be in the form of employable labor associated with ESA compliance under Alternative 1, where Service personnel enter into informal and formal Section 7 consultations with other federal agencies and NiSource (see Section 1.5.2).

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Chapter 5 Cumulative Impacts

5.1 Introduction

The combined, incremental effects of human activity, commonly referred to as cumulative impacts, pose a serious threat to the environment. Cumulative impacts are defined in 40 CFR 1508.7 to mean "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. Cumulative impacts within the context of the NEPA arise when a relationship exists between a proposed action and other actions that have occurred or are expected to occur in a similar location or period of time. It is the combination of these effects, and any resulting environmental degradation, that is the focus of cumulative impact analysis.

As stated earlier, the proposed federal action in this EIS is the Service's issuance of an ESA Section 10(a)(1)(B) incidental take permit (ITP) to NiSource for the purpose of authorizing "take" of federally listed species protected by the ESA, within the context of a conservation plan. The scope of the cumulative impact analysis therefore focuses mainly on impacts to federally listed species, and the habitat resources that support them. The geographic scope of the analysis corresponds with the NiSource Covered Lands, and the resources contained within, as described in Chapter 3. The temporal range, or how far into the past and future the analysis looked, was based on whether the effects would be temporary, short-term, long-term, or permanent. The impact analysis is organized within the three resource categories covered in Chapters 3 and 4, namely physical resources, biological resources, and social and economic resources.

5.2 Past, Present and Reasonably Foreseeable Activities within the Covered Land

The NiSource Covered Land is diverse spatially and includes a variety of topographic, geologic, ecological, and unique land-use features (see Chapter 3 of this EIS). Portions of the proposed

Covered Land have undergone extensive development, while other portions are primarily agricultural and natural lands, which have experienced little development. Past and present activities within the Covered Land that have impacted physical, biological, and socioeconomic resources included natural gas production, storage, and transmission (i.e., NiSource Activities); agriculture development; wind energy development; commercial timber production; urban development; and transportation Infrastructure. Collectively, these activities have had profound impacts to the Covered Land landscape, the most notable being the loss and/or conversion of native landscapes to intensive agricultural production lands, urban and rural development, and transportation infrastructure. The result is a variety of past and present actions within the Covered Land that has shaped its condition today, as described in Section 3.3.1 of this EIS.

Due to the large geographic scope of the Covered Land, a quantifiable, project-specific evaluation of past, present and reasonably foreseeable activities is not feasible or practical. However, reasonably foreseeable activities can be anticipated based on history, current land use patterns, and other factors. We assume that innumerable activities are reasonably certain to occur within the Covered Land, including the following discussed below.

5.2.1 NiSource Activities

Natural gas distribution and storage activities within the Covered Land dates back eighty years, predating NEPA and numerous other environmental laws and regulations. The Covered Land includes NiSource's existing 15,000+ mile natural gas distribution and storage system operating within existing ROWs and other NiSource controlled land (i.e. storage fields) across 14 east-central states. The pipeline system includes approximately 15,562 miles of buried steel pipe ranging in diameter from 2 to 36 inches, 117 compressor stations with approximately 1.1 million in combined horsepower, and 6,236 measuring and regulating stations. NiSource also operates and maintains underground natural gas storage fields in conjunction with its pipeline system. Currently, NiSource operates 36 storage fields comprised of approximately 3,600 individual storage wells in Maryland, West Virginia, Ohio, Pennsylvania, and New York. Chapter 2 of the NiSource MSHCP describes the NiSource Covered Land and Covered Activities in detail.

Of late, NiSource has had three pipeline and storage field projects constructed under the authority of the FERC. These include:

Millennium Project – FERC Docket CP98-150-06

According to FERC Docket CP98-150-06 some of the key features of the Millennium project include the following:

- Construct and operate approximately 181.7 miles of 30-inch diameter pipeline from the Corning compressor station to the Ramapo station where the pipeline will connect with Algonquin;
- Replace approximately 1,278 feet of 10-inch diameter pipeline on Columbia's existing Line A with 24-inch diameter line in Orange County, New York;
- Operate 23 metering and regulating stations;
- Construct and operate a 15,002-horsepower compressor station and measuring and regulating facilities at a site adjacent to Columbia's existing Corning compressor station on property owned by Columbia;
- Construct the Wagoner measurement and regulation station in Deer Park, New York
- Install upgrades to the Ramapo station; and
- Modify the existing measurement and regulation stations at Tuxedo, Sloatsburg, and Ramapo to accommodate the replacement 30-inch line.

Hardy Storage - FERC Docket CP05-144

According to FERC Docket CP05-144, Hardy Storage, a subsidiary of NiSource, proposed to convert two partially depleted gas production fields that are connected to Columbia facilities to a storage field located in Hampshire and Hardy Counties, West Virginia. Hardy Storage's storage field proposal consisted of two pools: the Lost River pool, which begins a few miles from Columbia's Lost River Compressor Station and originally contained 11 inactive production wells; and the Inkerman pool, which began approximately 19.6 miles north of Lost River Compressor Station extending into Hampshire County and originally contained 4 inactive production wells.

Hardy Storage proposed to connect both pools by new storage pipelines to a new Hardy Storage Compressor Station, and from there, connected by a new storage pipeline to Columbia's Lost River Compressor Station. In all, the proposal stated that Hardy Storage would construct or recondition a total of 29 storage wells, construct 36.7 miles of pipeline, 7,100 horsepower of compression, and associated appurtenances, as well as install 26 new 4-inch, 6-inch, and 8-inch pipelines for reconditioned production wells and new storage wells. Hardy also proposed to install ground beds, repeater towers, access roads and a methanol injection system.

Ohio Storage – FERC Docket CP08-431

According to the EA completed by FERC for this project, the Ohio Storage Expansion Project proposed to provide an additional 103,400 dekatherms per day of storage deliverability for service in the eastern United States and to increase storage capacity at these fields by 6.7 billion cubic feet (Bcf) of natural gas. Specifically the project would add 3.0 Bcf within the Crawford Storage Field (Fairfield and Hocking Counties, Ohio) and 3.7 Bcf within the Weaver Storage Field (Ashland and Holmes Counties, Ohio). The project would not result in an expansion of the certificated storage field boundaries or increase the maximum operating pressure within the respective storage fields. Basic project components are described below:

- **Crawford Storage Field Pipelines** - Columbia would construct a total of about 13.4 miles of interconnecting pipeline at 42 locations within the Crawford Storage Field including approximately 1.2 miles of abandonment by replacement of existing pipeline, ranging in size from 4- to 8-inches in diameter. In addition, approximately 0.2 mile of existing pipeline would be abandoned-in-place as a result of project activities.

- **Crawford Storage Field Wells** - Columbia would construct new storage wells, as well as upgrades and conversions of existing wells, within the existing storage field boundary. Namely, Columbia would install 19 new storage wells in previously undisturbed sites located within the limits of the existing storage field; these wells would require new permanent rights-of-way and access roads; convert 11 existing counter storage wells to injection/withdrawal uses; convert 10 existing observation wells to counter storage or injection/withdrawal wells; convert

two injection/withdrawal wells to counter-storage wells; and purchase and convert the four Rose Run wells to storage wells.

- **Crawford Compressor Station** - Columbia would make minor modifications to the existing Crawford Compressor Station within the limits of the existing station yard in the Crawford Storage Field.

- **Weaver Storage Field Wells** - The Weaver Storage Field in Ohio currently consists of more than 150 wells. Columbia would recondition 21 of these wells, 12 of which are located within the boundary of Mohican Memorial State Forest.

- **Weaver Storage Field Pipelines** - Columbia would install approximately 4.15 miles of new 6-inch-diameter high-density polyethylene (HDPE) plastic natural gas pipeline in a new permanent right-of way; abandon and remove a total of 1.7 miles of 2-inch-diameter plastic pipeline at two locations, and replace these segments with a new 6-inch-diameter HDPE plastic pipeline (installed within the existing permanent right-of-way) install one meter station; install one regulation station; and install one mainline valve setting.

As discussed in Chapter 4, over the next 50 years NiSource anticipates 964 acres of new disturbance (i.e., new construction) and 18,505 acres of disturbance on previously disturbed ROW (most of which is vegetation maintenance) on an annual basis. This equates to a total annual disturbance of approximately 0.2% of the total Covered Land area (0.19% within the existing ROW and 0.0092% in areas outside existing ROWs). NiSource estimates that 95% of their future projects will occur within existing ROWs (typically 50 feet wide with the buried pipe(s) generally in the center) and will result in little ground disturbance. NiSource anticipates that the majority of their near-term projects will occur in the states of West Virginia and Ohio.

Cumulative impacts to resources could occur from NiSource construction activities occurring outside of existing ROWs. Impacts and stressors include land clearing, habitat alteration and disturbance, introduction of nonnative invasive species, human disturbance, application of potentially toxic chemicals, degradation of waterways.

5.2.2 Agriculture Development

Beginning with European settlement thousands of acres of land were converted from native forests and open landscapes to agriculture and pasture. In recent years, as rural development has expanded, agricultural land has been subdivided for commercial and residential development, reducing the amount of agricultural use.

Cultivated crops and pasture/hay land presently comprise 1,722,685 acres and 1,321,169 acres respectively within the NiSource Covered Land (Table 3.4-8). Cultivated crops include corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled. Pasture and hay land includes grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle.

Agriculture has the potential to impact a wide range of physical, biological, and social and economic resources, including water quality, soil retention and productivity, carbon sequestration, biodiversity conservation, employment, and recreation. Impacts and stressors include conversion to nonnative land cover types, habitat alteration and disturbance, human disturbance, introduction of nonnative invasive species, application of potentially toxic chemicals, and degradation of waterways.

5.2.3 Wind Energy Development

The Department of Energy has reported that wind power is expected to provide 20% of the nation's electricity by 2030. Wind power in the US has expanded quickly over the last decade. Construction of new wind power generation capacity in the first three quarters of 2012 totaled 4,728 Mws, bringing the total installed capacity to 51,630 Mws (American Wind Energy Associated, October 2012).

Activities associated with wind energy development include access road construction; site development (i.e., tree, shrub, herbaceous clearing); pad construction; excavation of foundation footings for structures; pouring concrete foundations for wind generator towers, placement of

meteorological towers, transformer pads, and substations; trenching for underground utilities and placement of subsurface electrical and communication cables; placement of electrical poles and cables for overhead transmission; substation construction; tower assembly, erection, and equipment installation; electrical connection to tower; access road grading, and vegetation management.

According to the Federal Aviation Administration, approximately 371 wind turbines have either been constructed or are proposed within the NiSource Covered Land (**Table 5.1-1**). Cumulative impacts to wildlife from operating wind turbines include mortality to birds and bats. In addition to turbines, it is reasonable to assume that there would also be upgrades and extensions to the existing electrical power transmission grid to support wind energy development in the vicinity of the Covered Land. The magnitude of impacts from the upgrades and extensions would be dependent upon the extent of new lines required to meet the needs of new and existing wind farms. Impacts and stressors include land clearing, habitat alteration and disturbance, physical disturbance from human activity, and presence of turbines (impacts, collisions). Cumulative impacts from future construction and operation of transmission lines originating from wind farms could include disruption to land uses and vegetation, and avian wildlife mortality.

Table 5.1-1 – Wind Energy Development in the NiSource Covered Land

County-State	Status	Turbines	County	State
Lake-Indiana	Proposed	5	Lake	Indiana
Allegany-Maryland	Proposed	54	Allegany	Maryland
Garrett-Maryland	Proposed	8	Garrett	Maryland
Garrett-Maryland	Built	2	Garrett	Maryland
Crawford-Ohio	Proposed	18	Crawford	Ohio
Erie-Ohio	Proposed	2	Erie	Ohio
Hancock-Ohio	Proposed	9	Hancock	Ohio
Hardin-Ohio	Proposed	41	Hardin	Ohio
Huron-Ohio	Proposed	4	Huron	Ohio
Lorain-Ohio	Proposed	2	Lorain	Ohio
Medina-Ohio	Proposed	1	Medina	Ohio
Morrow-Ohio	Proposed	1	Morrow	Ohio
Ottawa-Ohio	Proposed	3	Ottawa	Ohio
Richland-Ohio	Proposed	55	Richland	Ohio
Sandusky-Ohio	Proposed	1	Sandusky	Ohio
Seneca-Ohio	Proposed	9	Seneca	Ohio
Wood-Ohio	Proposed	5	Wood	Ohio
Bedford-Pennsylvania	Proposed	26	Bedford	Pennsylvania
McKean-Pennsylvania	Proposed	2	McKean	Pennsylvania
Somerset-Pennsylvania	Proposed	9	Somerset	Pennsylvania
Somerset-Pennsylvania	Built	1	Somerset	Pennsylvania
Shenandoah-Virginia	Proposed	9	Shenandoah	Virginia
Hardy-West Virginia	Proposed	6	Hardy	West Virginia
Mineral-West Virginia	Built	3	Mineral	West Virginia
Preston-West Virginia	Proposed	91	Preston	West Virginia
Preston-West Virginia	Built	4	Preston	West Virginia
Subtotal	**Built**	**10**		
Subtotal	**Proposed**	**361**		
Total	**Built/Proposed**	**371**		

5.2.4 Commercial Timber Production

The U.S. Forest Service defines a forested area as "forest land" if it is at least 1 acre in size and *at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use.* Forest land includes transition zones,

such as areas between heavily forested and non-forested lands that are at least 10 percent stocked with forest trees, and forest areas adjacent to urban and built-up lands. Timberland on the other hand is defined as forest land used for the production of commercial wood products. Roughly seventy percent of U.S. timberland is located in the eastern portion of the U.S.

Over the years, large areas of native forest were converted into timber stands managed for timber production. Today, forest land within the Covered land includes deciduous forest, evergreen forest, and mixed forest that comprise 4,799,870 acres, 215,417 acres, and 124,263 acres respectively. What amount of that total is actually used for commercial timber production is unknown.

Impacts and stressors include land clearing, habitat alteration and disturbance, introduction of nonnative invasive species, and human disturbance. The cumulative effects of commercial timber production in the Covered Land region have been a change in the age structure of the forest and a gradual shift towards greater dominance by monoculture stands.

5.2.5 Rural and Urban Development

Rural and urban development refers to high, medium and low intensity development where people reside or work in high, medium and/or low numbers. High intensity development includes apartment complexes, row houses and commercial/industrial facilities, where impervious surfaces account for 80 - 100 percent of the total cover. Medium intensity development includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50 - 79 percent of the total cover. These areas most commonly include single-family housing units. Low intensity development includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20 - 49 percent of total cover. These areas most commonly include single-family housing units.

Within the Covered Land, high intensity development accounts for 28,907 acres; medium intensity development 79,184 acres; and low intensity development 244,524 acres. Impacts and stressors include conversion to nonnative land cover types, habitat alteration and disturbance, human disturbance, introduction of nonnative invasive species, application of potentially toxic chemicals, and degradation of waterways.

Transportation Infrastructure

Transportation infrastructure within the Covered Land includes vehicular, rail and air travel networks comprising roads, highways, railroads, and airports. There are innumerous federal, state, county, and local roadways crossed by the NiSource Covered Lands area (see page Chapter 3 page 159). There are approximately 1,677-miles of railroad and 53 unique railroad lines crossed within all states in the Covered Land area except North Carolina. The majority of lines have less than five-miles within the Covered Land area. CSX Transportation Incorporated and Norfolk Southern Railway Company are the two primary lines within the Covered Land, making up just over 73-percent of the total. There are five airports within the Covered Land and 15 within a three mile radius. Impacts and stressors include land clearing, habitat alteration and disturbance, potential introduction of nonnative invasive species, and human disturbance.

5.3 Cumulative Impacts to Physical Resources

5.3.1 Overview

Under all alternatives, the Applicant will continue to operate and maintain existing distribution and storage facilities within the Covered Land. Implementation of the MSHCP could be beneficial to some physical resources because many species conservation measures, which were developed to avoid and minimize adverse impacts to species, were designed to address the physical resource itself (e.g., water quality). Some species mitigation measures, such as protection and management of habitat, would serve to enhance the condition of the physical resources in those areas.

NiSource's Covered Activities are not expected to significantly contribute to loss or degradation of physical resources, including surface water, groundwater, geology, soils, or air quality, nor are they considered to create a separate, additive cumulative effect to any physical resources beyond that which already exists with the Covered Land. Broadly, cumulative impacts could include impacts on surface waters or groundwater due to inadvertent spills or contamination; impacts on geologic resources due to limiting of access to mineral resources; impacts on soils due to topsoil loss, erosion, and contamination; and impacts on air quality, due to fugitive dust emissions and pollutants. However, impacts would be negligible and, as such implementation of

the proposed MSHCP should not contribute to significant negative cumulative impacts. Below are some general examples of how various physical resource areas could be affected by a range of activity types.

5.3.2 Surface Water

All major watersheds crossed by the Covered Land and their waters have been cumulatively affected by agriculture, urbanization, timber harvest, and many other development activities over the past 150 years. Timber harvest has been a dominant activity in the Covered Land that has cumulatively affected surface water resources through tree removal and clearing activities, and from development and use of access roads. In many urban and agricultural areas, riparian vegetation is now thin or nonexistent, and the state of riparian vegetation in these areas is not expected to increase significantly in the foreseeable future. Agriculture, timber production, road construction, rural development, and urbanization have cumulatively affected water quality by increasing sediment loads to streams through soil disturbance and accidental release of contaminants.

As discussed in Chapter 4, construction-related direct and indirect impacts to surface water resources could occur from future NiSource activities within the Covered Land, especially earth-disturbing activities associated with wetlands, rivers and streams. Future commercial, industrial, and residential development could also impact surface water quality, primarily due to earth-disturbing activities and associated erosion. In general, the more energy-intensive activities that occur in the Covered Land, the more likely for potential surface water impacts, primarily due to erosion from earth-disturbing activities. As a result, there may be direct, indirect, and cumulative effects to surface water resources. However, minimization and mitigation measures have been developed to reduce NiSource's contribution to cumulative effects, whenever feasible.

5.3.3 Ground Water

Cumulative impacts of past, present, and future actions on the quantity and quality of groundwater would be variable and site-specific. Depending upon local groundwater conditions, groundwater resources in some portions of the Covered Land could be impacted from

commercial, industrial, or residential development, namely through the placement of impervious surfaces on the land. Population growth will likely be accompanied by an increase in groundwater consumption related to residential, commercial and/or industrial development, agriculture, and other activities.

Hydraulic fracturing associated with storage well installation, operations, and maintenance has the potential to adversely impact local ground water. Hydraulic fracturing involves high pressure injection of water-based slurry into a well or wells to break up the underlying geologic formation and expand or recondition the storage capacity of a storage well. This technique is used to enhance or recondition existing storage wells. However, typical depths of NiSource's storage field well fracturing is between 2,000-6,000-feet (NiSource 2010c), well under the groundwater supply commonly used for domestic or otherwise potable water supply. As such, there is no anticipated significant cumulative impact to potable ground water quantity or quality as a result of NiSource activities.

5.3.4 Geology

Cumulative impacts of past, present, and future actions to geologic resources, specifically mineral extraction capability, along with topography and seismic characteristics, would be variable and site-specific. Localized impacts to geological resources may occur if future commercial, industrial, or residential development and associated infrastructure limits access to geological resources (e.g., minerals, natural gas, and oil) in regards to limiting their extraction potential. Many potential future projects, especially transportation and utility corridors, and urban development, are not compatible with mining activities due to related noise, visual, and safety impacts, generally making these forms of development and geologic resource extraction activities mutually exclusive, further limiting potential extraction areas that are already constrained from activity in the Covered Land area (due to safety concerns in regards to the pipeline). Impacts to topography and seismic potential from most potential development activities would be highly localized, likely due to grading or foundation activities. Alternately, the topographic and seismic impacts from potential mineral extraction activities would likely be larger in physical scope, temporal length, and overall impact potential; however, due to the spatial scope of the Covered Land area, with the associated variety of mineral resources and

mining activities, a more detailed analysis of these potential impacts is not feasible, and would need to be covered more thoroughly in future project specific NEPA analyses.

NiSource activities may include hydraulic fracturing, a technique commonly used in the natural gas industry for storage well installation, operations, and maintenance. Hydraulic fracturing involves high pressure injection of a water-based slurry into a well or wells to create fractures in the underlying geologic formation of a storage well. Fractures in storage wells typically extend several hundred feet radially from the wellbore. Sand contained within the slurry props the fractures open to improve movement of natural gas through the well. This technique has the potential to impact local geology in the immediate area around the well within specific underground storage zones certificated by FERC.

5.3.5 Soils

Future commercial, industrial, or residential development in the Covered Land area have the potential to result in localized direct loss of topsoil resources via land conversion from agricultural or forest-based land uses to development, as well as from indirect soil loss due to erosion. Soils could also be contaminated with petroleum or chemicals due to spills or releases from construction related efforts associated with development (e.g., industrial, commercial and energy development). Cumulative impacts from these potential projects, along with NiSource's future actions, could occur if periods of construction are coincident, or activities occur in areas with highly erodible soils, leading to short-term increases in soil erosion during construction. Additionally, cumulative impacts could be seen in the form of permanent removal or covering of topsoil during development. Local, state, and federal laws, already in place to control storm water runoff, should minimize potential future erosion and runoff from either NiSource's covered activities or from other potential projects. Additionally, spill control plans would help to minimize the potential for spills or releases to occur and would provide a plan of action to follow in the event contamination does occur. Finally, standard BMPs for erosion control would be utilized for all construction and maintenance activities, limiting the potential for these to result in impacts.

5.3.6 Climate

Cumulative impacts of past, present, and future actions in regards to local and regional climate would be variable and site-specific. Due to a lack of anticipated climatological impacts from the NiSource covered activities, no additional cumulative impact to climate would be anticipated.

On October 8, 1997, the CEQ issued "Draft Guidance Regarding Consideration of Global Climatic Change in Environmental Documents Prepared Pursuant to the National Environmental Policy Act." The CEQ guidance calls on Federal agencies to consider, in the context of the NEPA process, both how major Federal actions could influence the emissions and sinks of greenhouse gases and how climate change could potentially influence such actions. Specifically, Federal agencies must determine whether and to what extent their actions affect greenhouse gases. Furthermore, Federal agencies must determine whether the actions they take, the planning and design of Federal projects, may be affected by any changes in the environment that might be caused by global climatic change. The CEQ concluded that "global climate change is a serious environmental concern which, given the current state of scientific knowledge, must be viewed under NEPA as a "reasonably foreseeable' impact of continued emissions and changes in sinks of greenhouse gases."

Issuance of an incidental take permit to NiSource by itself will not create or affect greenhouse gas emissions or sinks. Under all Alternatives, vehicles and equipment used for construction and maintenance activities would have the potential to emit carbon dioxide (CO2), nitrogen oxides (NOX), methane (CH4), and hydro fluorocarbons (HFCs). In addition, the clearing of rights-of-way vegetation would result in the reduction of greenhouse gas sinks. While these potential impacts are known, there is currently insufficient information to accurately quantify these impacts in a meaningful manner. Issuance of the incidental take permit will not result in an increase or decrease of greenhouse gas emissions.

The construction and maintenance of natural gas storage and distribution infrastructure is a long-term project. Any new construction will likely remain in place for a long period of time. As such, the Covered Activities have the potential to be impacted by the effects of climate change. EPA states that the potential effects of climate change observed to date and projected to occur

in the future, include, but are not limited to more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems. These predicted weather changes have the potential to increase the number of maintenance activities within the Covered Lands area. However, there is currently insufficient information to determine the specific local or regional effects of climate change, and their impact on the Proposed Action.

Populations within portions of the proposed Covered Land area have increased and will likely continue to grow throughout the 50-year life of the proposed permit. Population growth will likely be accompanied by an increase in fossil fuel consumption and greenhouse gas emissions related to transportation, energy and heat production, commercial and/or industrial production, agriculture, and other activities. Areas of population growth could experience increased land development, which would also decrease the amount of vegetation and natural sinks within the proposed Covered Land area.

5.3.7 Air Quality

Potential cumulative impacts of past, present, and future actions to air quality throughout the Covered Land area and surrounding environs could result due to a potential increase in natural gas development, industrial development, transportation and infrastructure development, as well as urbanization throughout the area. Typical types of impacts could include increases in dust emissions, exhaust emissions, fuel combustion emissions, and chemical/petroleum spills or releases. In general, the contribution of construction activities to degraded air quality would be fairly localized and short in duration. Localized impacts could include a short-term contribution to regional pollutants as well as fugitive dust emissions. Future operation and maintenance activities from natural gas or other industrial development would not likely produce a long term impact on air quality as such activities typically must file for air quality permits and/or be in compliance with local and regional air quality standards. An increase in population and associated transportation networks could result in an overall increase in exhaust emissions compared to what exists today.

5.4 Cumulative Impacts to Biological Resources

5.4.1 Overview

NiSource's Covered Activities are not expected to contribute cumulatively to significant loss of biological resources, including vegetation, wetlands, fish, wildlife and special status species, nor are they considered to create a separate, additive cumulative effect to any biological resources beyond that which already exists with the Covered Land area.

5.4.2 Vegetation

Cumulative impacts of past, present, and future actions on the vegetation and habitats would be variable and site-specific. Depending upon local conditions, vegetation and groundcover in some portions of the Covered Land area could be impacted (e.g., deforestation and destruction of vegetation, fragmentation, contamination due to chemical or petroleum spills or releases, and increases in invasive species) due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development. In general, the more energy-related or other development pressure that occurs the more likely the potential for vegetation and habitat changes due to land conversion or community impacts.

As stated in Chapter 4, pipeline and storage field facilities within the Covered Land comprise approximately 15,562 miles of linear facilities, including twelve counties where potential storage fields most likely to be considered for expansions are found. The NiSource Covered Land footprint equates to approximately 9,783,207 acres. In Appendix A of the MSHCP, NiSource provides annual acreage disturbance projections (see MSHCP Appendix A). Of the total anticipated disturbance within the Covered Land area, approximately 95 percent of the disturbance would occur on existing previously disturbed ROWs in the form of vegetation maintenance. The remaining 5 percent represents new disturbance from operations and maintenance activities or new construction projects. Over a 50-year period this acreage impact would be approximately 42,200 acres within the Covered Land area (844 acres annually). This would be additive to impacts from other activities within the Covered Lands.

5.4.3 Wetlands

Past activities within the Covered Land has resulted in wetland loss and degradation. However, in some cases, the impacted wetlands have transitioned back to pre-disturbance conditions. Recovery time for herbaceous or scrub-shrub vegetation in wetlands is typically 2 to 5 years. For forested wetlands, recovery can take from 20 to 50 years or more to accommodate tree species height potential. Depending on the wetland type, past effects on wetlands within the Covered Land may still be evident. Cumulative impacts of future activities on wetland habitats would be variable and site-specific. Depending upon local conditions, wetland resources in some portions of the Covered Land area could be impacted (e.g., dredge and fill, degradation, contamination due to spills or releases) due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development. In general, the more energy-related or other development pressure that occurs the more likely the potential for wetland degradation due to land conversion or inadvertent contamination. However state and federal laws (e.g., Section 404/401 Certification) already in place to protect wetlands would minimize or mitigate most potential impacts.

5.4.4 Wildlife and Fish

Cumulative impacts on wildlife and fish of past, present, and future actions due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development would be variable and site-specific. For example, adverse impacts within portions of the Covered Land might include direct injury or mortality, impacts due to contamination, habitat fragmentation, interference with migration or other behavioral traits, increase in water temperature, or degradation of water quality.

Past and present actions within the Covered Land have caused the cumulative loss and degradation of wildlife habitat that supported a diversity of species. Clearing and converting land for agricultural use, urban development, utility infrastructure, roads, and other uses by past and present actions have led to cumulatively increased wildlife disturbance from human activity, increased habitat fragmentation, increased wildlife mortality from roads, and the spread of non-native vegetation that reduces habitat diversity. Timber production activities have converted

large tracts of old-growth forest to managed forest land, which has also resulted in disturbance from human activity, habitat loss and fragmentation, and reduced habitat diversity.

Reasonably foreseeable development activities in previously undeveloped areas would incrementally add to cumulative wildlife impacts, both through reduction of potential habitat, and disturbance and mortality of wildlife species in and around the sites of these actions. For instance, evidence shows that certain species of bats are particularly susceptible to mortality from operating wind turbines. Of the 45 species of bats found in North America, 11 have been observed dead at wind energy facilities. Of these, nearly 75% were eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and silver-haired bats (*Lasionycteris noctivagans*). Other bat species documented killed by wind turbines in the US and of special concern to the Service include the little brown bat (*Myotis lucifugus*) and northern long-eared bat (*Myotis septentrionalis*).

NiSource Covered Activities would contribute to cumulative wildlife impacts through the loss of wildlife habitat where project facilities such as ROWs, access roads, and substations would be located, and disturbance to wildlife during maintenance and construction projects. All action alternatives would contribute incrementally to the impacts that past, present, and reasonably foreseeable future timber production, urbanization, utility infrastructure, roads, and agricultural and other uses have had on wildlife species and habitat.

Past and present actions have also resulted in cumulative impacts to fish. These include agricultural and timber harvest activities, transportation infrastructure, and other human developments, especially in floodplains. These past actions have caused the loss of streamside riparian cover and function, the loss of large woody debris sources, and the addition of sediment into streams.

Reasonably foreseeable future actions that could cumulatively impact fish include actions that would remove shade vegetation in riparian areas along rivers or streams and actions that degrade water quality in rivers or streams from soil erosion. These future actions include forest harvest activities, residential and commercial development (especially in floodplains), and creation or expansion of ROWs for gas transmission and/or power transmission lines. Covered Activities, regardless of the alternative, would remove forested vegetation in riparian areas

along the ROWs and access roads, and these areas would be managed by restricting future vegetation growth. However, projects and practices will also be implemented to mitigate or restore natural stream functions. In particular, riparian area restoration and protection projects by NiSource would likely result in a greater degree of riparian function.

5.4.5 T&E and Candidate Species

Wind resources suitable for energy development occur within the Covered Land, specifically in the Midwest and Northeast regions, which is are also part of the core maternity range of the Indiana bat. As of April 2013, four Indiana bats have been documented killed by wind energy facilities: two in Indiana, one in Ohio, and one in West Virginia.

Cumulative impacts of past, present, and future actions on special status species due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial or residential development would be similar to those on other wildlife and fish species as discussed in **Section 5.3.3**. Impacts on special status species would be variable and site-specific. In general, the more development pressure that occurs within the Covered Land, the more likely it is for special status species to be impacted. Through the application of the species-specific and general AMMs (as described in **Section 4.3.4** and **Appendix E**) and mitigation, impacts to MSHCP and take species would be avoided, reduced or compensated for in regards to NiSource activities. Similarly, local, state, and federal wildlife laws such as the ESA would serve to reduce the potential for impacts from other potential projects in the area.

5.5 Cumulative Impacts to Social and Economic Resources

5.5.1 Overview

The analysis of social and economic effects contained in Chapter 4 of this EIS largely takes into account past and present actions in the region that have had a cumulative effect on social and economic considerations. Reasonably foreseeable actions that could contribute to cumulative social and economic impacts include those that would generate employment or income, increase demand for housing and public services, population changes, or impacts to property values. Typical examples include commercial and residential construction, major infrastructure projects, and increased timber production activities.

NiSource Covered Activities are not expected to significantly contribute to loss or negative/adverse impacts to social and/or economic resources, including land use, transportation and utilities, cultural resources, recreation, visual resources or noise, nor are they considered to create a separate, additive cumulative effect to any social and/or economic resources beyond that which already exists with the Covered Land area. Potential cumulative impacts due to future construction activities by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development, would vary state-to-state, county-to-county, and city-to-city.

NiSource Covered Activities would not cause significant demands on public services or facilities. During construction, public services such as police, fire, and medical facilities, would be needed only in cases of emergency, which would likely be the case with other construction projects that could potentially coincide with Covered Activities. Covered Activities would not have a noticeable adverse impact on local landfill resources or their ability to handle other current or future waste streams. NiSource Covered Activities would not contribute to cumulative impacts to public services or facilities.

Future urbanization within the Covered Land area, as well as industrial development and associated transportation and infrastructure development, could translate into an increase in population within the general vicinity of that development, along with potential changes to employment, tax revenues, and personal income. No specific environmental justice impacts are anticipated to occur to low income or minority populations due to such cumulative actions.

Employment created by NiSource or other entities would be temporary jobs that would last only through project construction. If construction coincides with construction-related activities from other reasonably foreseeable future actions, such as those described above, this would increase the number and/or duration of temporary jobs, which would increase the cumulative need for temporary construction workers in the area. None of the alternatives would change populations or the need for permanent housing. There likely would be a need for temporary lodging for construction workers not hired from the local area. These impacts would be cumulatively beneficial as they would increase lodging-related revenue and other ancillary

businesses such as restaurants, grocery stores, gas stations, and other businesses necessary to support temporary construction workers.

While beneficial, local construction-related expenditures, employment, and earnings would be small relative to the total amount of economic activity in the Covered Land area, and would, as a result, make a small positive contribution to cumulative impacts on any local economy. Other reasonably foreseeable projects would make similar positive, yet small contributions to local economies. Overall, the cumulative actions combined with the proposed project would have a small beneficial cumulative effect on local economies.

The subsections below outline general examples of how various social and economic resource areas have been and could be affected by activity types.

5.5.2 Land Use and Valuations

Land use within the Covered land has incrementally changed due to cumulative past and present development, and this trend would be expected to continue. Past and present actions have cumulatively established the current land use patterns. Urban development is expanding with population and economic growth, generally occurring on the periphery of already developed areas, and there is no evidence of any shift in trends. Assuming these trends continue, land would continue to be converted from rural to developed uses, and urban uses would continue to be intensified within already developed areas.

Because transmission ROWs have relatively small footprints and, other than associated transmission and storage structures, span other land uses, Covered Activities would not be expected to cumulatively contribute to any changes in existing land use in areas outside of ROWs. Adjacent agricultural areas would still be used for agriculture, timber areas would remain as timber areas, and residential areas would continue to be residential. Covered Activities would, however, cumulatively add to the presence of developed uses and the on-going development of utility-related land use.

Cumulative effects on land values are difficult to estimate and location specific. Some NiSource construction projects could have a detrimental effect on property values, while others could

serve to increase values (e.g., mitigation land managed for wildlife). Further, it is difficult to distinguish and isolate a specific projects effect on land values due to the myriad of other factors that affect property values, such as market conditions, potential buyer preferences, and economic conditions. Nonetheless, NiSource Covered Activities are not expected to have a significant impact on property values, and thus would make only minor contributions to any cumulative effect on property values.

Because Covered Activities would introduce new ROWs and facilities, including ROW easements, those activities could contribute incrementally to potential cumulative land use impacts. However, those impacts would be minor given the relatively small amount of land NiSource would purchase.

5.5.3 Transportation and Utilities

Potential cumulative impacts of past, present, and future actions on transportation and utilities due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development would vary greatly within the Covered Land area. Increased urbanization of private lands and an increase in commercial and industrial activity could result in associated improvements to, and expansion of, the transportation network and utility networks within and surrounding the Covered Land area. Potential impacts could include increased congestion on existing or future transportation networks, and construction-related interruption of service on existing or future utility networks.

5.5.4 Cultural Resources

Cultural resources have been and are being cumulatively impacted by past and present development and activities. These cumulative impacts include disturbance of cultural sites, reduction of the cultural integrity of certain sites, and removal of cultural artifacts. Past actions that have affected cultural resources include agricultural activities, timber harvest activities, highway and railroad construction, construction of existing gas transmission infrastructure, and commercial, industrial, and residential development. Present and ongoing activities add to these impacts. Continued conversion of native vegetation to agricultural land, timber production land, or development decreases the amount of land Tribes can use for native plant gathering.

During ground disturbing construction activities, there is the potential to affect undiscovered archaeological resources. Compliance with Section 106 of the National Historic Preservation Act would lessen or avoid the potential for impacts on archaeological resources. However, the project may still contribute incrementally to the adverse cumulative impact on cultural resources in the area.

Potential cumulative impacts due to future construction activities proposed by NiSource or other entities, as well as due to other types of commercial, industrial, or residential development would vary across the area. Any future urbanization that occurs, as well as industrial development and associated transportation and infrastructure development could negatively affect culturally significant resources due to inadvertent destruction or degradation. Regardless, compliance with Section 106 and associated state-specific regulations for new construction projects within the Covered Land area will occur on a project-by-project basis for those NiSource covered activities requiring such approvals, as well as for other future construction activities proposed by other entities, limiting the potential for future impacts.

5.5.5 Recreation

Recreational areas within the Covered Land are numerous, along with recreational uses such as hunting, fishing, camping, hiking, biking, and alike, occurring predominately on public land in the area. Reasonably foreseeable actions within the Covered Land could cumulatively increase opportunities for recreation. However, other reasonably foreseeable actions, such as timber harvest, could cumulatively reduce opportunities for recreation or interfere with recreational experiences.

Potential cumulative impacts from future NiSource actions on recreational use and access to recreational land, as well as due to other types of commercial, industrial, or residential development, would vary state-to-state, county-to-county, and city-to-city. Land conversion due to increased urbanization of private lands and an increase in commercial and industrial activity could result in an increase in incompatible land uses which in turn could impact both the quality of certain recreational experiences as well as the availability of lands for recreational use. For instance, NiSource could contribute to cumulative impacts on the recreational experience in

areas where it introduces a developed feature to a natural landscape. Development of new access roads and improvements to existing access roads also may increase access by motorized users to some areas difficult to access or inaccessible to these users, which could also contribute to cumulative impacts on the recreational experience of non-motorized users in these areas. However, the potential for impacts will vary somewhat within the Covered Land depending on the nature and extent of local zoning and restrictions on local, state and federal public lands.

5.5.6 Visual Resources

Potential cumulative impacts of past, present, and future actions on visual resources throughout the Covered Land area and surrounding environs relates primarily to urbanization, as well as industrial development and associated transportation and infrastructure development. Past and present development and land management activities have cumulatively changed the visual landscape and visual features by introducing man-made elements and altering natural forms. These changes include urbanization along rivers and streams, rural residential development, agriculture, timber clearing and harvest, and the development of roads and utility infrastructure. Reasonably foreseeable future actions involving development and resource use would continue this trend.

Reasonably foreseeable residential development likely would further encroach into open spaces that are currently considered to have intrinsic scenic value. As new residents move into the area and greater numbers of sensitive viewers perceive cumulative changes in the landscape, existing and new developments may be received more negatively. Land conversion due to increased urbanization of private lands and an increase in commercial and industrial activity could result in an increase of contrasting surrounding landscapes which in turn could impact or degrade the visual quality in some areas, although visual quality regulations do not necessary apply to all areas within NiSource's Covered Land.

5.5.7 Noise

Cumulative impacts from noise occur when actions occur simultaneously and relatively close to each other. Past and present actions in the Covered Land only have the potential to have a

combined cumulative noise effect if they are continuing to generate or result in noise today. Typical examples of such past and present actions are natural gas development, industrial development, transportation and infrastructure development, as well as urbanization throughout the area. The contribution of future construction activities proposed by NiSource or other entities to these general types of impacts would likely be fairly localized and short in duration. Localized impacts could include a short-term contribution to ambient noise levels due to earthmoving, blasting, as well as general construction activities. Future operation and maintenance activities would not likely produce a long term impact on ambient noise levels.

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Chapter 6 Consultation and Coordination

6.1 Consultation and Coordination Overview

Public participation, agency consultation, and tribal outreach and involvement specific to the NiSource MSHCP EIS are summarized in this chapter. The Service used several media to notify the public and potentially interested parties to provide them with the opportunity to participate in the scoping and public involvement process.

6.1.1 Agency Notification

On May 17, 2007, formal invitations were sent to both the FERC in Washington, DC, and to the USACE in Washington, DC, inviting them to become cooperating agencies as per regulations set forth in 40 CFR 1501.6. On September 17, 2008, formal invitations were sent to NPS and USFS, inviting them to cooperate on the EIS. On September 11, 2009, a Memorandum of Understanding (Appendix G) was finalized, articulating the responsibilities of all five cooperating agencies, NiSource, and AMEC, relative to preparation of this EIS.

6.1.2 Notice of Intent

To solicit participation of responsible federal, state, and local agencies, Tribes, and the public in determining the scope of this EIS, the Service's formal scoping process began on October 11, 2007, with the publication in the FR of a *Notice of Intent to Prepare an Environmental Impact Statement, Announcement of Public Scoping Meetings, and Request for Comments* (FR Vol. 72, No. 196 [October 11, 2007]). The notice provided information about:

- The MSHCP and the EIS;
- Species proposed for inclusion in the NiSource MSHCP; and,
- The website link for specific locations, dates, and times of the 13 public scoping meetings; how comments could be mailed, faxed, or e-mailed to the Service until December 8, 2007; and contact information for two key Service representatives for further information (their names, e-mail addresses, and telephone numbers).

In addition, both the NOI and the public scoping/*Dear Interested Party* letter (see **Section 6.1.4**) sent to over 1,300 known interested parties, contained a paragraph that asked for "federal, state, tribal, and local agencies with jurisdiction and/or special expertise with respect to environmental issues to cooperate with [the Service] in the preparation of the EIS".

Persons needing reasonable accommodations in order to attend and participate in the scoping meetings were asked to contact the Service a minimum of one week in advance of the meeting such that appropriate arrangements could be made.

6.1.3 Local Newspaper Announcements

Both a legal notice and an open house/public scoping meeting notification were published in the following local newspapers one to two weeks prior to the public scoping meetings:

- *Binghamton Press* (Binghamton, NY);
- *Charleston Gazette* (legal notice only); *Charleston Daily Mail* (Open House/Public Scoping Meeting notification) (Charleston, WV);
- *Cleveland Sun* (Cleveland, OH);
- *All Around Cleveland* (Cleveland, OH);
- *The Daily Legal News* (Cleveland, OH);
- *The Plain Dealer* (Cleveland, OH);
- *Cleveland Free Times* (Cleveland, OH);
- *The Clarion-Ledger* (Jackson, MS);
- *The Advertiser* (Lafayette, LA);
- *Lexington Herald-Leader* (Lexington, KY);
- *The Tennessean* (Nashville, TN);
- *The City Paper* (Nashville, TN);
- *Philadelphia Daily News* (Philadelphia, PA);
- *Pittsburgh Tribune-Review* (Pittsburgh, PA);
- *New Pittsburgh Courier* (Pittsburgh, PA);
- *Pittsburgh Post Gazette* (Pittsburgh, PA);
- *Portsmouth Herald* (Portsmouth, NH);

- *Richmond Times-Dispatch* (Richmond, VA);
- *The Hill* (Washington, DC);
- *The Examiner* (Washington, DC);
- *Washington City Paper* (Washington, DC); and
- *Washington Times (Washington, DC).*

6.1.4 Public Scoping/Interested Party Letter

On October 18, 2007, a public scoping/*Dear Interested Party* letter was sent to over 1,300 known interested parties. In addition, the public scoping letter was sent to federally recognized Native American Tribes in Louisiana, Maine, Massachusetts, Mississippi, and New York. The letter provided information on the project and the EIS, and included the dates of the 13 scoping meetings with the times and locations of the meetings provided on a separate enclosed *"Venues for Open Houses"* document. In addition, notification was given that written comments would be received until December 8, 2007, through either U.S. Postal Mail, facsimile or the Service's website.

For those people requiring further information, the names, e-mail addresses, and telephone numbers of two key Service representatives, along with a 1-800 number, were also provided.

6.1.5 Website

To support distribution of the NOI and notice of the public meetings, documents and the meeting information was posted on the Service's Region 3 website at the following link: http://www.fws.gov/midwest/Endangered/permits/hcp/hcp_nisource.html

6.1.6 Draft EIS Public Review

In accordance with NEPA, a draft EIS was circulated for public review and comment. The public review period was initiated with the publication of the Notice of Availability (NOA) in the Federal Register on July 13, 2011, (FR 76, No. 134, 41288-41293) and the public comment period was extended for an additional 90 days (FR 76, No. 199, 63950). The comment period closed on December 13, 2011, culminating a 150-day public comment period.

In August 2011, public meetings were held to facilitate information exchange in Columbus, Ohio; Lexington, Kentucky; and Charleston, West Virginia.

A variety of comments were received on the DEIS which are available at http://www.fws.gov/midwest/endangered/permits/hcp/nisource/index.html. Written responses to public comments are appended to this document.

6.1.7 Final EIS

In June 2013, the Service published an NOA in the Federal Register advising the public of the availability of a Final EIS, MSHCP, and Implementing Agreement (IA) associated with the ITP application received from NiSource, pursuant to the ESA. The notice was provided under Section 10(c) of the ESA (16 U.S.C. 1531, 1539(c)) and its implementing regulations (50 CFR 17.22 and 17.32), and the NEPA (42 U.S.C. 4321 *et seq.*) and its implementing regulations (40 CFR 1506.6; 43 CFR Part 46). The Service's decision on whether to issue NiSource an ITP occurred no sooner than 30-days after publication of the notice in the Federal Register and completion of the Record of Decision. If the Service determined that all requirements were met, an ITP to NiSource would be issued for incidental take of 10 species in accordance with their MSHCP and associated IA.

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Chapter 9 Acronyms and Abbreviations

Acronym	Definition
AAR	All-American Road
ACHP	Advisory Council on Historic Preservation
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
AMM	Avoidance and Minimization Measures
ARPA	Archaeological Resources Protection Act
asl	Above Sea Level
BA	Biological Assessment
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CEC	Council for Environmental Cooperation
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CP	Conservation Plan
CUP	Coastal Use Permit
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
CZM	Coastal Zone Management
dB	Decibels
dBA	A-Weighted Decibel Scale
DOD	Department of Defense
DOW	Defenders of Wildlife
DEIS	Draft Environmental Impact Statement
EAC	Early Action Component
ECS	Environmental Construction Standards
EDF	Environmental Defense Fund
EIS	Environmental Impact Statement
EM&CP	Environmental Management & Construction Plan
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
GIS	Geographic Information Systems
GSA	General Services Administration
HCP	Habitat Conservation Plan

HDD	Horizontal Directional Drilling
HUC	Hydrologic Unit Code
IA	Implementation Agreement
INGT	Interstate Natural Gas Transmission
IPaC	Information, Planning, and Consultation System
ITP	Incidental Take Permit
Ldn	Day-Night Average Sound Level
MBPP	Migratory Bird Protection Plan
MBTA	Migratory Bird Treaty Act
MM	Modified Mercalli
MMLHS	Mild Mid-Latitude Humid Subtropical
NAAQS	National Ambient Air Quality Standards
NABCI	North American Bird Conservation Initiative
NAGPRA	Native American Graves Protection and Repatriation Act
NBP	National Battlefield Park
NCDC	National Climate Data Center
NCL	NiSource Covered Lands
NEPA	National Environmental Policy Act of 1969
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NFWF	National Fish and Wildlife Foundation
NGA	Natural Gas Act
NGO	Non-Governmental Organizations
NHL	National Historic Landmark
NHP	National Historic Park
NHPA	National Historic Preservation Act
NHS	National Historic Site
NL	National Lakeshore
NLCD	National Land Cover Database
NMP	National Military Park
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NP	National Park
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Natural Resources Inventory
NSB	National Scenic Byway
NSR	National Scenic River
NST	National Scenic Trail

NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O_3	Ozone
O&M	Operation and Maintenance
OPS	Office of Pipeline Safety
Pb	Lead
PEIF	Project Environmental Information Form
PGA	Peak Ground Acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIF	Partners in Flight
PM_{10}	Particulate Matter with an Aerodynamic Size Less Than or Equal to 10 Microns
$PM_{2.5}$	Particulate Matter with an Aerodynamic Size Less Than or Equal to 2.5 Microns
PSA	Natural Gas Pipeline Safety Act
ROD	Record of Decision
ROW	Right-of-Way
SEQRA	State Environmental Quality Review Act
SF	State Forest
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SLOPES	Standard Local Operating Procedures for Endangered Species
SMLHC	Severe Mid-Latitude Humid Continental
SO_2	Sulfur Dioxide
SP	State Park
SPCC	Spill Prevention Control and Countermeasures
SRR	Scenic & Recreational River
SSA	Sole Source Aquifer
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TCF	The Conservation Fund
THPO	Tribal Historic Preservation Office
TNC	The Nature Conservancy
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
WAP	Wildlife Action Plan
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
WSR	Wild & Scenic Rivers

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