# HABITAT CONSERVATION PROGRAM

## HCP and NonHCP Species

## Best Management Practices

March 12, 2014

Version 1.0

Preserving Our Natural Legacy

## Introduction to this document:

All BMP's in this guidebook have been extracted directly from the NiSource Habitat Conservation Plan (HCP). This HCP includes avoidance and minimization measures (AMMs), and Environmental Construction Standards (ECS), which provide detailed environmental specifications for NiSource construction, operation, and maintenance activities in environmentally-sensitive areas, including habitat for federally listed and candidate species. AMMs have been specifically tailored to a species' needs. Consistent and coordinated use of these standards and practices will serve to avoid impacts to species, and where impacts will occur, will seek to minimize and mitigate the impact of the resulting take to the maximum extent practicable. BMP's in this guidebook will be executed in addition to the Columbia Pipeline Environmental Construction Standards (ECS) referenced above.

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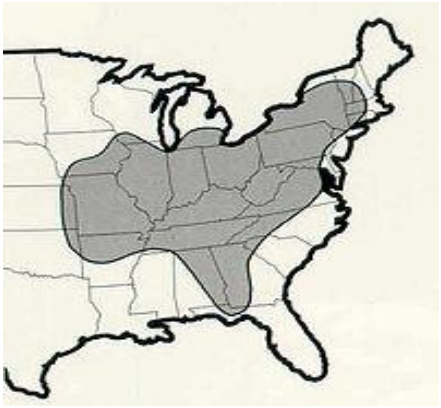
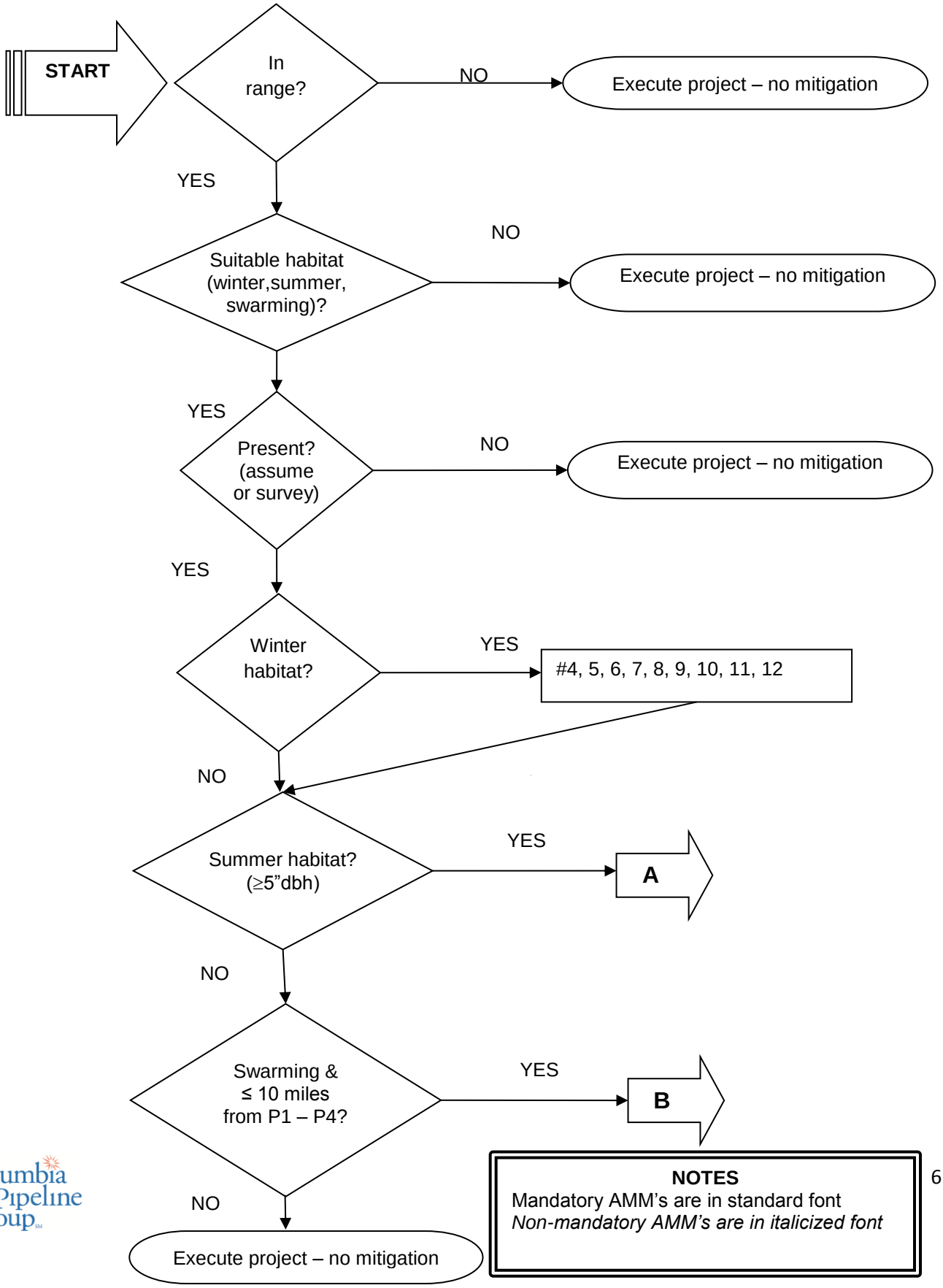
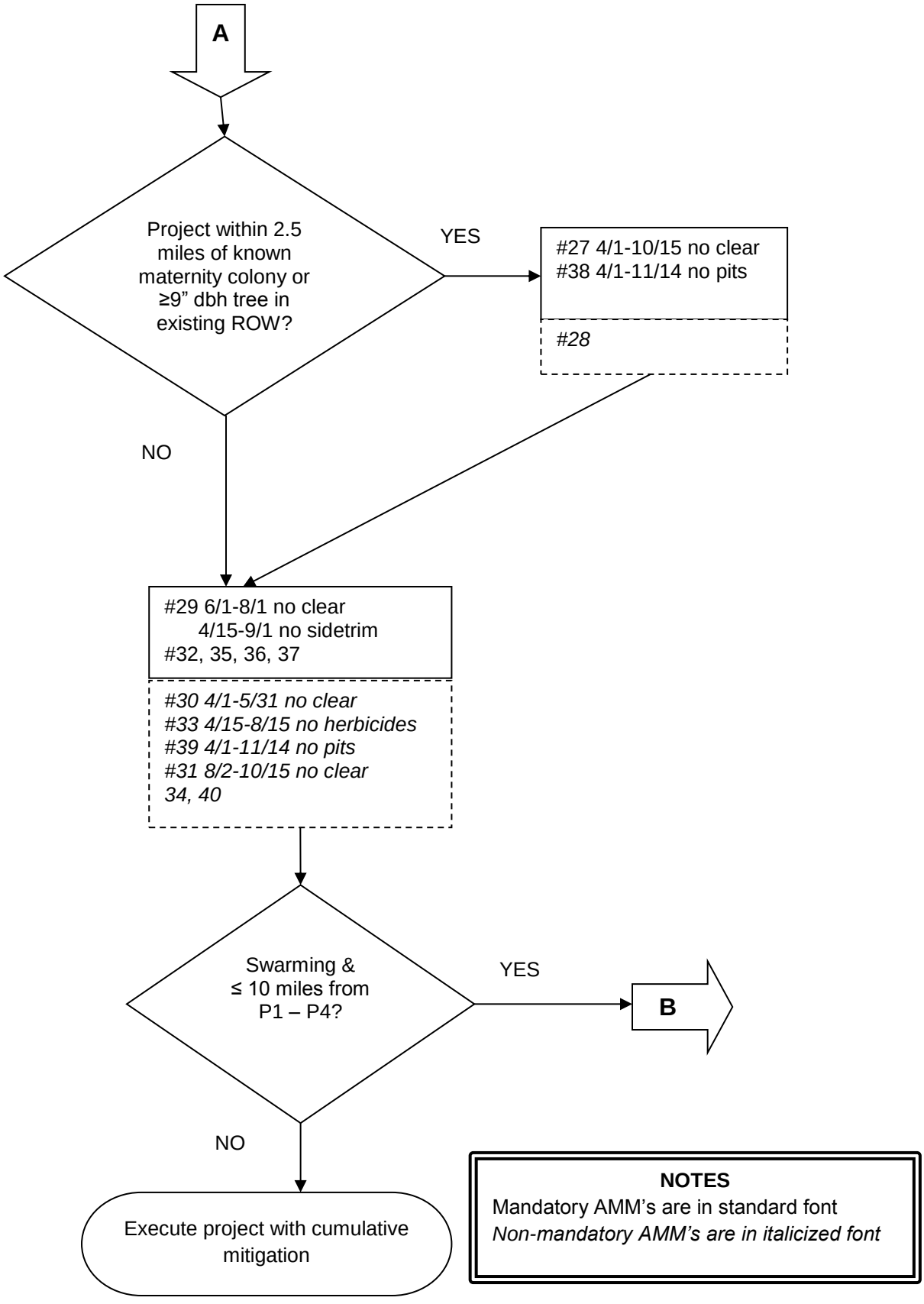


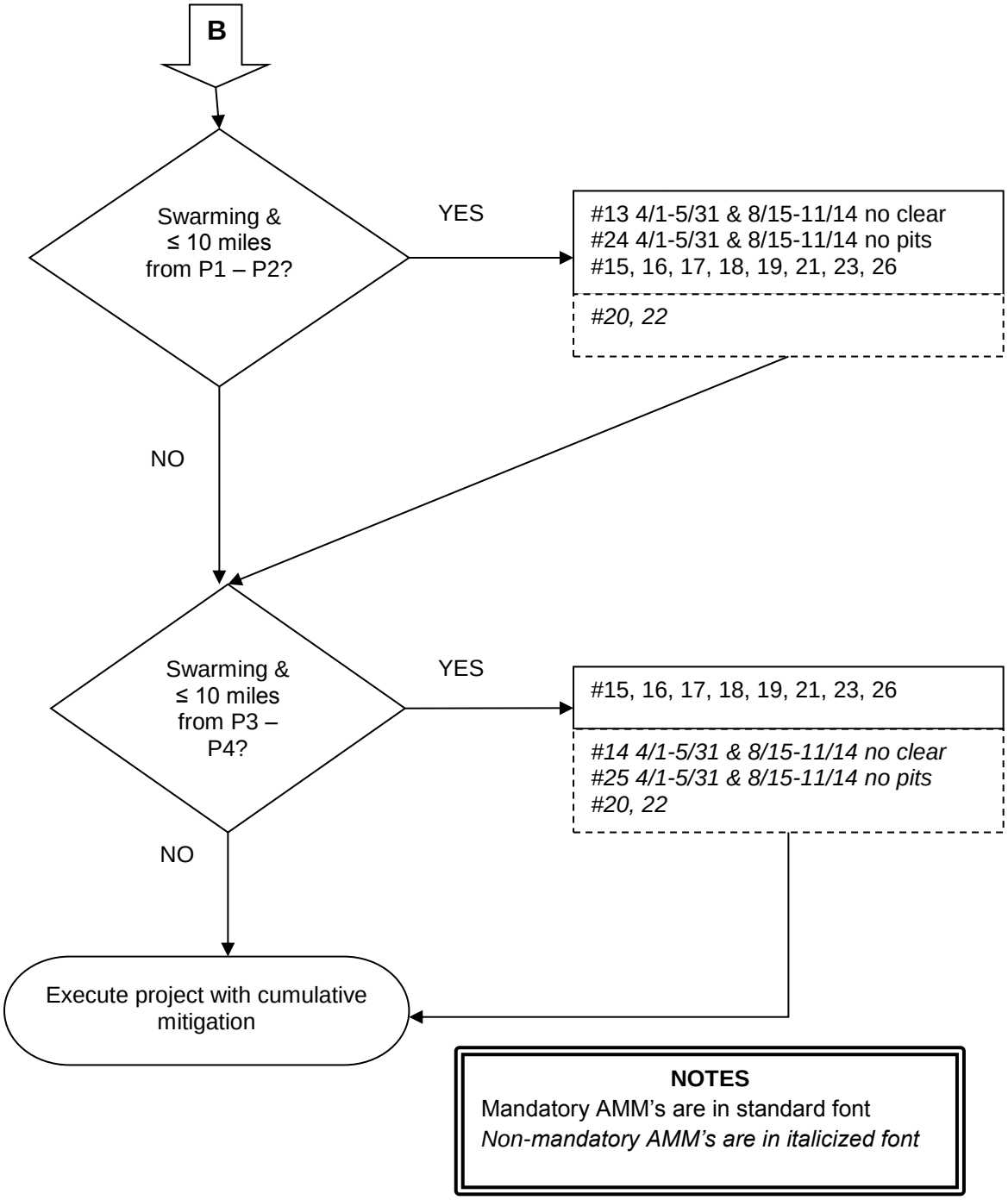
# INDIANA BAT

## *Myotis sodalis*

**Indiana Bat Compliance Flowchart**




A
Project within 2.5 miles of known maternity colony or ≥9" dbh tree in existing ROW?
YES
#27 4/1-10/15 no clear
#38 4/1-11/14 no pits
#28
NO
#29 6/1-8/1 no clear
4/15-9/1 no sidetrim
#32, 35, 36, 37
#30 4/1-5/31 no clear
#33 4/15-8/15 no herbicides
#39 4/1-11/14 no pits
#31 8/2-10/15 no clear
34, 40
Swarming & ≤ 10 miles from P1 – P4?
YES
B
NO
Execute project with cumulative mitigation
NOTES
Mandatory AMM's are in standard font
Non-mandatory AMM's are in italicized font


B
Swarming & ≤ 10 miles from P1 – P2?
YES
#13 4/1-5/31 & 8/15-11/14 no clear
#24 4/1-5/31 & 8/15-11/14 no pits
#15, 16, 17, 18, 19, 21, 23, 26
#20, 22
NO
Swarming & ≤ 10 miles from P3 – P4?
YES
#15, 16, 17, 18, 19, 21, 23, 26
#14 4/1-5/31 & 8/15-11/14 no clear
#25 4/1-5/31 & 8/15-11/14 no pits
#20, 22
NO
Execute project with cumulative mitigation
NOTES
Mandatory AMM's are in standard font
Non-mandatory AMM's are in italicized font

## Indiana Bat

### Explanation of Terms

Throughout this document, certain terms are used repeatedly to describe Indiana bat habitat. For the purpose of this document the following definitions are provided:

1. "Known habitat" refers to suitable summer habitat or suitable spring staging/fall swarming habitat that is located within 10 miles of a documented hibernaculum, five miles of a documented maternity capture record or a positive identification of Indiana bat from properly deployed acoustic devices (unless NiSource conducts further site specific studies), or 2.5 miles of a documented maternity roost tree. It also refers to suitable winter habitat (i.e., hibernacula) that has been documented to have housed Indiana bats within the last 20 years or is identified by the Service as important to future recovery efforts.
2. "Maternity habitat" refers to suitable summer habitat used by juveniles and reproductive (pregnant, lactating, or post-lactating) females. Maternity foraging and roosting habitat typically occurs within five miles of a documented maternity capture record or a positive identification of Indiana bat from properly deployed acoustic devices (unless NiSource conducts further site specific studies), or 2.5 miles of a suitable roost tree that has been documented as a maternity roost tree.
3. "Occupied" refers to known and suitable habitat that is expected or presumed to be in use by Indiana bats at the time of impact. For summer habitat, this applies from May 15 through August 14; for staging/swarming habitat, this period is from April 1 to May 15 and August 15 to November 14, respectively.
4. "Suitable habitat" occurs where summer and/or winter habitat is appropriate for use by Indiana bats exists.
    a. Suitable winter habitat (hibernacula) is restricted to underground caves and cave-like structures (e.g. abandoned mines, railroad tunnels). These hibernacula typically have a wide range of vertical structures; cool, stable temperatures, generally between 39.2°F and 46.4°F; and humidity levels above 74% but below saturation.
    b. Suitable summer habitat for Indiana bats consists of the variety of forested/wooded habitats where they roost, forage, and travel. This includes forested patches as well as linear features such as fencerows, riparian forests and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 0.25 mile from the next nearest suitable roost tree, woodlot, or wooded fencerow.
    c. Suitable spring staging/fall swarming habitat for Indiana bats consists of the variety of forested/wooded habitats where they roost, forage, and travel. This includes forested patches as well as linear features such as fencerows,

riparian forests and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 0.25 mile from the next nearest suitable roost tree, woodlot, or wooded fencerow.

5. "Suitable roost tree" refers to a tree (live, dying, dead, or snag) with a diameter at breast height (DBH) of five inches or greater that exhibits any of the following characteristics: exfoliating bark, crevices, or cracks.
6. "Unoccupied" refers to suitable habitat not expected to be in use by Indiana bats **at the time of impact**. For summer habitat, this is the period from August 15 through May 14; for swarming habitat, this period is from November 15 to March 31.

These measures apply to all known occupied locations (i.e., where individuals have been documented to occur) and/or suitable habitats where occurrence may be presumed in Indiana, Kentucky, Maryland, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia counties (*See* Section 6.2.1.1 and **Appendix G, Figures 6.2.1.3-1 and -2**). These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Application of measures in *italic* font text will be considered on a case-by-case basis depending on the project needs as more fully described in Chapter 5 of this MSHCP.

NiSource can use the survey processes outlined below (or assume presence) in order to determine the presence of habitat or habitat use. These will inform NiSource about the level of anticipated effects that covered activities may have on the Indiana bat. Once a determination is made whether the species and/or its habitat are present within the proposed covered activity's action area and the type and extent of effects are identified, the relevant AMMs will be implemented.

**Habitat Assessments/Surveys to Evaluate the Presence of the Species and/or Suitable Habitat**

1. Habitat Assessment to Determine Presence of Suitable Summer Habitat

Habitat assessments will be used to complete a project-specific, on-the-ground analysis to determine if proposed activities will adversely affect Indiana bats and/or their habitat. NiSource is responsible for developing and providing sufficient information as to whether suitable summer Indiana bat habitat exists within a proposed project area. In order to accomplish this, NiSource must have knowledge of the project area sufficient to adequately and accurately describe the potential suitable Indiana bat summer habitat conditions that may or may not exist on-site. This knowledge can be derived from any number of sources including, but not limited to, on-site visits, review of aerial photography and other maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of NiSource's consultants or other designees. At a minimum, however, NiSource must determine if suitable Indiana bat

habitat is present, define the general quality of that habitat (i.e., trees ≥ 5" dbh present), and quantify the extent of each habitat class identified. The results of such assessments will be recorded and documented in NiSource's annual compliance report. Results will be valid for one year and can be completed any time of year. **Appendix L** provides specific guidance for completing these habitat assessments.

i. Examine identified impact areas for the following characteristics:

   a. Suitable summer habitat (*see* definition of this habitat as well as suitable roost trees in the "Explanation of Terms" section above).

   Suitable primary roosting summer habitat is habitat meeting the suitable summer habitat definition but includes suitable roost tree(s) ≥ 9" dbh.

   b. Suitable spring staging and fall swarming habitat is habitat meeting the summer habitat definition that is located within a 10-mile radius of P1, 2, 3, and 4 hibernacula.

2. Assessments to Determine Presence of Suitable Winter Habitat (hibernacula)

NiSource will develop sufficient information as to whether potentially suitable winter Indiana bat habitat exists within a proposed project area. This knowledge will be derived from, but not limited to, the following sources: on-site visits, review of aerial photography and other maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of NiSource's consultants or other designees. Indiana bats have been documented using caves (and their associated sinkholes, fissures, and other karst features), quarries, and abandoned mine portals (and their associated underground workings) as winter hibernation habitat.

NiSource personnel or its consultants will determine whether potentially suitable winter habitat exists within the project area by conducting "Winter Habitat Assessments" as described below. The results of these assessments will be recorded and documented in NiSource's annual compliance report. Results will be valid for two years and can be completed any time of year. The Winter Habitat Assessment Protocols are:

i. Examine identified impact areas for the following characteristics:

   a. The ground openings at least one foot in diameter or larger.

   b. Underground passages should continue beyond the dark zone and not have an obvious end within 40 feet of entrance (Note: This may not be verifiable by surveyor due to safety concerns).

   c. Entrances that are flooded or prone to flooding (i.e., debris on ceiling), collapsed, or otherwise inaccessible to bats will be excluded.

   d. Ground openings that have occurred recently (i.e., within the past 12 months) due to creation or subsidence will be excluded. However, a written description and photographs of the opening must be included in the pre-survey report.

***Surveys to Confirm Use of Suitable Winter Habitat***

ii. *If suitable winter habitat is discovered as a result of the habitat assessments above (AMM#2i), do not alter, modify, or otherwise disturb entrances or internal passages of caves, mines, or other entrances to underground voids (potential hibernacula) within the MSHCP covered lands until a "Determination of Suitable Winter Habitat for Indiana Bats" is completed. The survey protocols to make this determination are provided in* ***Appendix L*** *and will be followed to determine if the suitable habitat is in fact, occupied. Some surveys will require modification (or clarification) of these guidelines; therefore, coordination with the Service Field Office responsible for the state in which the site-specific project occurs is necessary prior to initiating suitable winter habitat surveys. Results of completed surveys will be submitted to the responsible Service Field Office(s) prior to clearing of identified habitat. The Service will accept the results of these surveys for the purposes of determining whether and to what degree take is anticipated.*

*If surveys (conducted using approved methodology) fail to detect Indiana bats, AMMs in winter habitat are not mandatory. However, NiSource may voluntarily elect to employ any of the AMMs to maintain the viability of the suitable winter habitat.*

*Alternatively, NiSource may assume presence of Indiana bats in this suitable winter habitat and apply mandatory AMMs.*

***Surveys to Determine Presence in Suitable Summer Habitat***

*3. NiSource may conduct summer surveys to determine presence or probable absence of Indiana bats within suitable summer habitat for site-specific projects not located within known habitat as defined above. The current "Indiana Bat Mist Netting Guidelines" provided in Appendix 5 of the 2007 Indiana Bat Draft Revised Recovery Plan or future versions of superseding Service-approved guidelines will be applied. Some surveys will require modification (or clarification) of these guidelines; therefore, coordination with the Service Field Office responsible for the state in which the site-specific project occurs is necessary prior to initiating summer presence/absence surveys. Results of completed summer surveys will be submitted to the responsible Service Field Office(s) prior to clearing of identified suitable summer habitat. The Service will accept the results of these surveys for the purposes of determining whether and to what degree take is expected. Survey results are valid for two years unless new information changes the Service's view on whether certain geographic areas provide suitable summer habitat for Indiana bats.*

*If no Indiana bats are captured and no other recent information suggests the presence of Indiana bats, no further AMMs or mitigation are necessary. If Indiana bats are captured, the relevant AMMs and mitigation would apply.*

*Alternatively, NiSource may elect to assume presence of Indiana bats in suitable summer habitat and apply the AMMs and mitigation measures.*

**Avoidance Measures for Indiana Bat**

**Measures to Avoid and Minimize Impacts to Indiana Bats in Known or Presumed Occupied Caves /Winter Habitat**

4. When burning brush piles within 0.25 mile of known or presumed occupied hibernacula from August 15 to May 15, the brush piles can be no more than 25 feet by 25 feet, must be spaced at least 100 feet apart, and located at least 100 feet from known hibernacula entrances and associated sinkholes, fissures, or other karst features.

5. No woody vegetation or spoil (e.g., soil, rock, etc.) disposal within 100 feet of known or presumed occupied hibernacula entrances and associated sinkholes, fissures, or other karst features (*see* related adaptive management discussion in Chapter 7).

6. Protect potential recharge areas of cave streams and other karst features that are hydrologically connected to known or presumed occupied hibernacula by employing the relevant NGTS ECS standards such as Section III, Stream and Wetland Crossings, and Section IV, Spill Prevention, Containment and Control.

7. Blasting 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., maximum charge of two inches per second ground acceleration avoids impact to nearby structures) (*see* related adaptive management discussion in Chapter 7).

8. 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).

9. If authorized by the landowner, block (e.g., gate) access roads and ROWs leading to known or presumed occupied hibernacula from unauthorized access.

10. 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.

11. Operators, employees, and contractors (working in areas of known or presumed Indiana Bat Habitat as described in this section) will be educated on the biology of the Indiana bat, activities that may affect bat behavior, and ways to avoid and minimize these effects (AMMs in MSHCP).

12. Restrict use of herbicides for vegetation management within 10 miles of known or presumed occupied hibernacula to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands).

**Measures to Avoid and Minimize Impacts to Indiana Bats in Spring Staging/Fall Swarming Habitat**

13. No clearing of suitable spring staging and fall swarming habitat within a 10-mile radius of any Priority 1 and 2 presumed occupied hibernacula from April 1 to May 31 and August 15 to November 14.

14. *No clearing of suitable spring staging and fall swarming habitat within a 10-mile radius of any Priority 3 and 4 hibernacula from April 1 to May 31 and August 15 to November 14.*

15. Operators, employees, and contractors (working in areas of known or presumed Indiana Bat Habitat as described in this section) will be educated on the biology of the Indiana bat, activities that may affect bat behavior, and ways to avoid and minimize these effects (AMMs in MSHCP).

16. No woody vegetation or spoil (e.g., soil, rock, etc.) disposal within 100 feet of known or presumed occupied hibernacula entrances and associated sinkholes, fissures, or other karst features (*see* related adaptive management discussion in Chapter 7).

17. Protect potential recharge areas of cave streams and other karst features that are hydrologically connected to known or presumed occupied hibernacula by following relevant NGTS ECS standards such as Section III, Stream and Wetland Crossings, and Section IV, Spill Prevention, Containment and Control.

18. Blasting 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., maximum charge of two inches per second ground acceleration avoids impact to nearby structures) (*see* related adaptive management discussion in Chapter 7).

19. 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).

20. *Activities (e.g., drilling) involving continuing (i.e., longer than 24 hours) noise disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a one-mile radius of known or presumed occupied hibernacula should be avoided during the spring staging (April 1 to May 31) and fall swarming (August 15 to November 14) seasons.*

21. 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.

22. *Within 10 miles of Priority 1, 2, 3, and 4 hibernacula and only in areas identified as suitable summer habitat, retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥ 5-inch diameter at breast height (dbh) in areas ≤ one mile from water.*

23. Contaminants, including but not limited to oils, solvents, and smoke from brush piles, should be strictly controlled as provided for in the EMCS and ECS, Section II.C.2, and Section IV so the quality, quantity, and timing of prey resources are not affected.

24. From April 1 to May 31, and August 15 to November 14, use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits within 10 miles of Priority 1 & 2 hibernacula or presumed occupied hibernacula.

25. *From April 1 to May 31, and August 15 to November 14, use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits within 10 miles of Priority 3 & 4 hibernacula.*

26. Implement strict adherence to sediment and erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible) as specified in the ECS upon completion of work within and known or presumed occupied spring staging and fall swarming habitat.

**Measures to Avoid and Minimize Impacts to Indiana Bats in Summer Habitat**

27. No clearing of known maternity colony summer habitat within the covered lands of the MSHCP or trees greater than nine inches dbh within any existing ROW and/or appurtenant facility of the covered lands of the MSHCP from April 1 to October 15 to avoid direct affects to females (pregnant, lactating, and post-lactating) and juveniles (non-volant and volant) (*see* related adaptive management discussion in Chapter 7).

28. *Retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥ 5 inches dbh in areas identified as known maternity colony summer habitat and ≤ one mile from water.*

29. No clearing of suitable summer habitat within the covered lands of the MSHCP from June 1 to August 1 to protect non-volant Indiana bat pups or "side-trimming" of suitable summer habitat from April 15 to September 1 to avoid direct affects to females (pregnant, lactating, and post-lactating) and juveniles (non-volant and volant).

30. *No clearing of suitable summer habitat within the covered lands of the MSHCP from April 1 to May 31 to avoid direct affects to pregnant females and minimize direct affects on Indiana bats in summer habitat.*

31. *No clearing of suitable summer habitat located more than 10 miles from a Priority 1, 2, 3 and 4 hibernacula within the covered lands of the MSHCP from August 2 to October 15 to avoid direct effects to post-lactating females and volant juveniles and minimize direct effects to Indiana bats in summer habitat.*

32. Operators, employees, and contractors (working in areas of known or presumed Indiana Bat Habitat as described in this section) will be educated on the biology of the

Indiana bat, activities that may affect bat behavior, and ways to avoid and minimize these effects.

33. *No aerial application of herbicide on ROWs from April 15 to August 15 to protect maternity colonies in summer habitat.*

34. *Retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥ 5 inches dbh in areas identified as suitable summer habitat and ≤ one mile from water.*

35. Contaminants, including but not limited to oils, solvents, and smoke from brush piles, should be strictly controlled as provided for in the EMCS and ECS, Section II.C.2, and Section IV so the quality, quantity, and timing of prey resources are not affected.

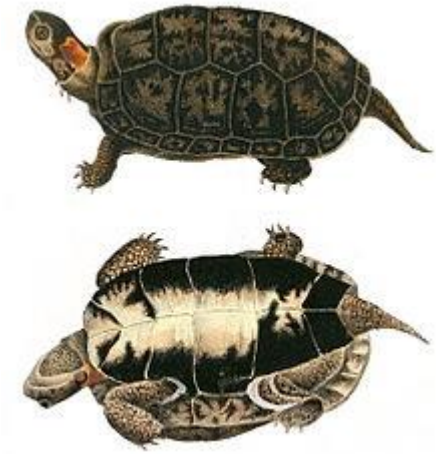
36. Implement and strict adherence to sediment and erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible) as specified in the ECS upon completion of work within suitable summer habitat and known or presumed occupied spring staging and fall swarming habitat.

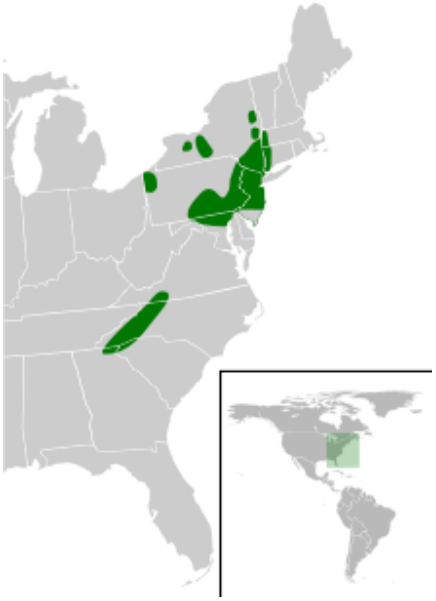
37. Equipment servicing and maintenance areas will be sited at least 300 feet away from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features.

38. Between April 1st and November 14th, use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits in known maternity colony summer habitat within the covered lands of the MSHCP.

39. *Between April 1st and November 14th, use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits in suitable summer habitat within the covered lands of the MSHCP.*

40. *Avoid conducting construction activities after sunset in known or suitable summer habitat to avoid harassment of foraging Indiana bats.*

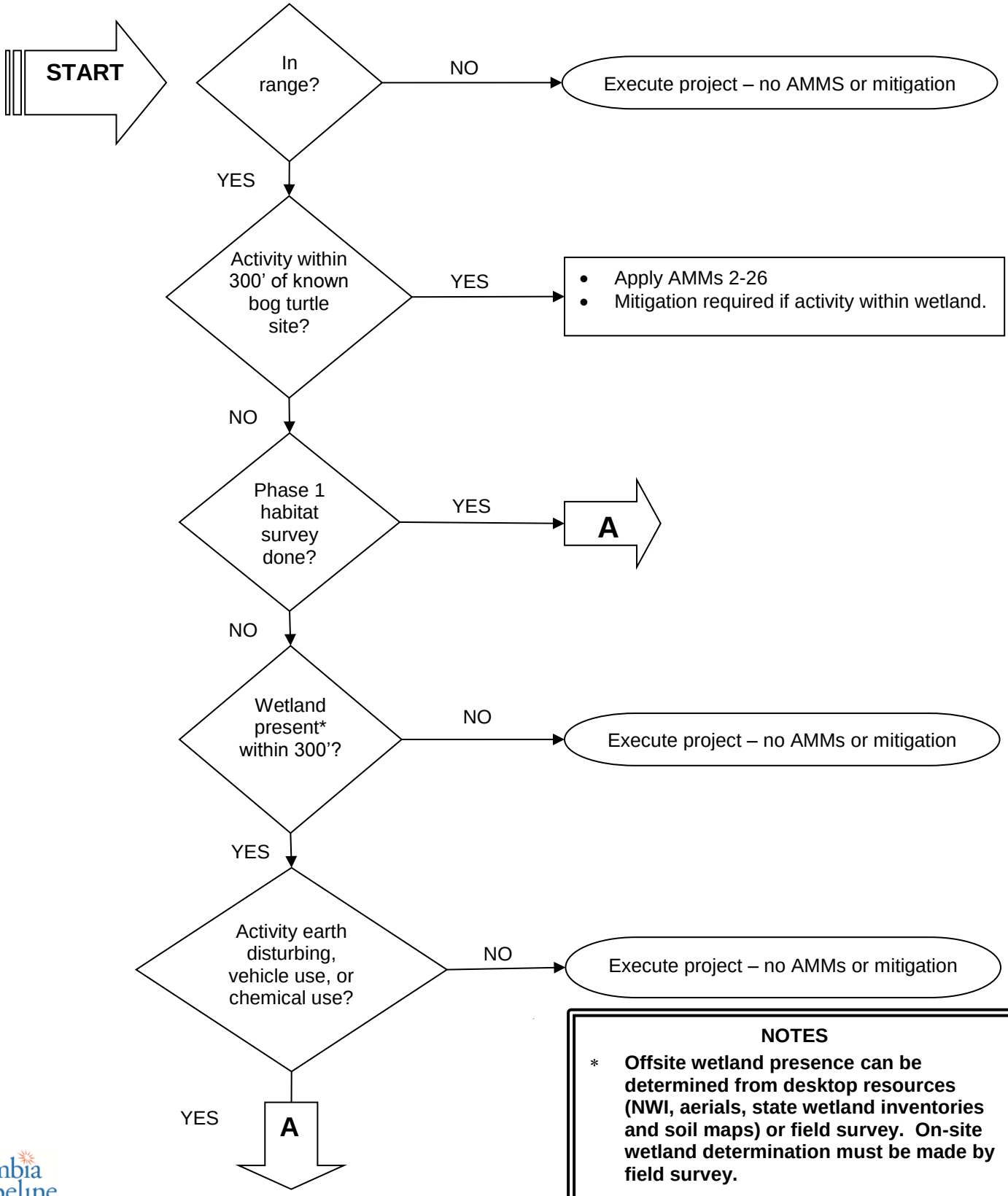




# BOG TURTLE

## *Glyptemys muhlenbergii*

## Bog Turtle Compliance Flowchart



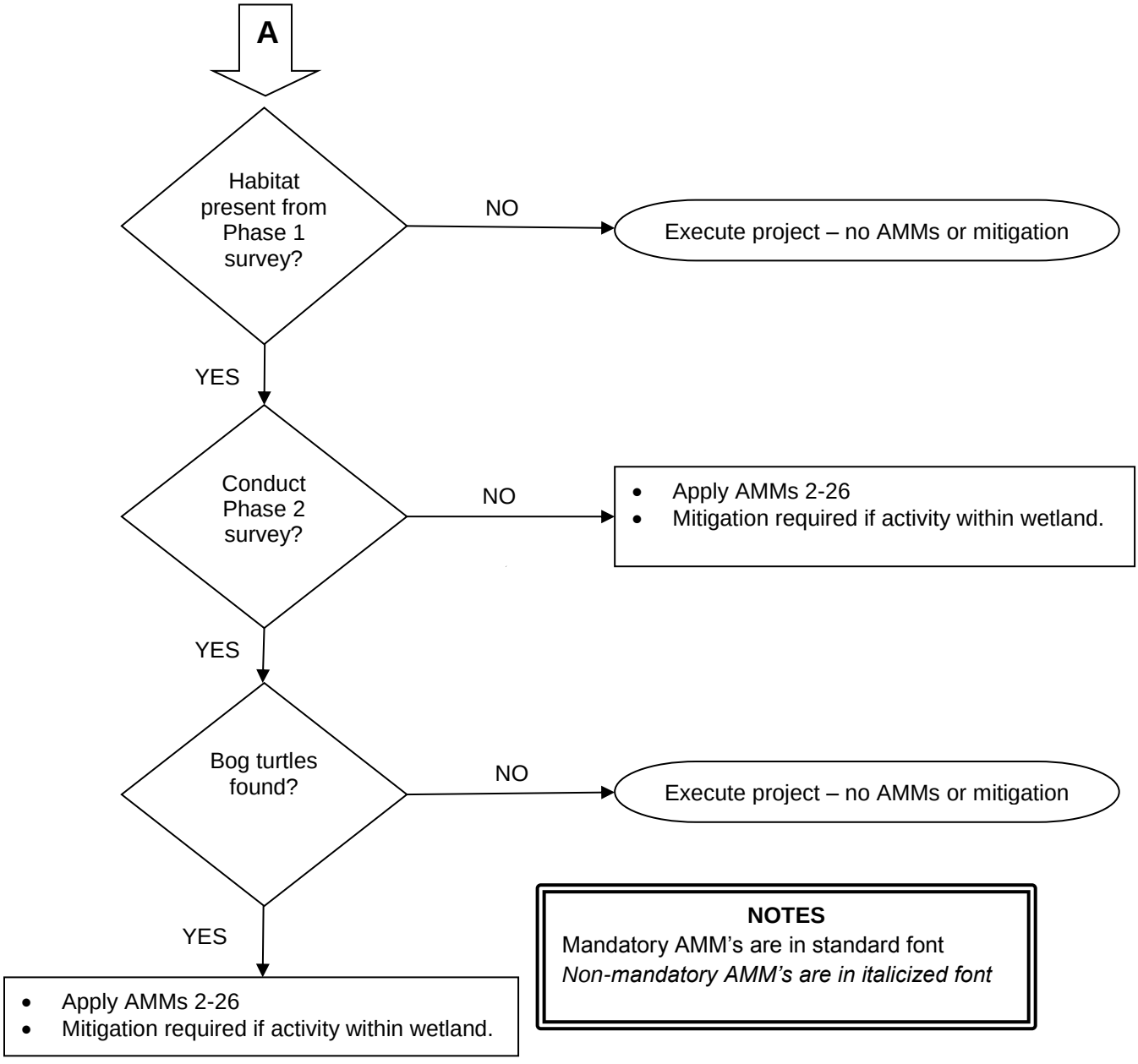

**NOTES**

* **Offsite wetland presence can be determined from desktop resources (NWI, aerials, state wetland inventories and soil maps) or field survey. On-site wetland determination must be made by field survey.**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

Columbia Pipeline Group


A
Habitat present from Phase 1 survey?
NO
Execute project – no AMMs or mitigation
YES
Conduct Phase 2 survey?
NO
Apply AMMs 2-26
Mitigation required if activity within wetland.
YES
Bog turtles found?
NO
Execute project – no AMMs or mitigation
YES
Apply AMMs 2-26
Mitigation required if activity within wetland.
NOTES
Mandatory AMM's are in standard font
Non-mandatory AMM's are in italicized font

## Bog Turtle

## Measures to Avoid and Minimize Impacts

These measures apply to all known occupied and assumed occupied wetlands in the counties listed in Section 6.2.2 (**Appendix G, Figures 6.2.2.3-1 and -2**). These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1.

**Surveys to Evaluate Presence of the Species and/or Suitable Habitat**

1. Either assume wetlands are suitable for bog turtles OR use current Phase 1 survey protocols for all previously unsurveyed wetlands[1] that are in bog turtle counties. Please refer to Service Guidelines for Bog Turtle Surveys April 2006 (**Appendix L**) (or future updated Service Guidelines) for further description of bog turtle habitat and survey protocols. These surveys can be conducted by qualified bog turtle surveyors[2] (recognized by the Service and/or the appropriate State wildlife agency) or NiSource staff[3] that has been appropriately trained by the Service. Lists of recognized surveyors can be obtained from each Field Office on an annual basis. These habitat surveys will be accepted for the life of NiSource's ITP unless the Phase 1 survey was conducted during drought conditions or significant habitat change is noted and reviewed with the local Service Field Office (i.e., habitat restoration or natural factors [e.g., beaver] change local hydrology, or adjacent development renders currently suitable habitat as unsuitable in the future).

***For any activity within a bog turtle county that involves disturbance in or within 300 feet of wetlands (not including lakes, ponds, or rivers)***

Step 1. For wetlands that have not previously been surveyed by a qualified surveyor, either conduct Phase 1 survey or presume the wetland is potential habitat. Maintain Phase 1 survey reports (including Phase 1 field forms) and enter both positive and negative Phase 1 findings in a GIS database. The results should be submitted to the Service and the state Fish and Wildlife agencies annually (including both the Phase 1

[1] NiSource defines two types of wetlands (dry and wet), both of which will be included in surveys.
[2] NiSource acknowledges that the lists maintained by the Field Offices do not constitute endorsements, recommendations or guarantees regarding the quality or suitability of the work. Rather, the field offices have developed the lists based on the requisite experience needed to identify bog turtle habitat and locate bog turtles with the habitat.
[3] NiSource staff must meet the same qualification standards as those surveyors that are included on the Service "qualified bog turtle surveyor list".

reports and the GIS data). If wetlands have been previously surveyed and no potential habitat is present, no further surveys, AMMs or mitigation measures are needed. If wetlands have previously been surveyed and potential habitat is present, go to step 2. If wetlands have previously been surveyed and bog turtles are known to be present, go to step 3. If a Phase 1 survey is not conducted, each wetland is assumed to be potential habitat, go to step 2.

Potential habitat present?

- If no, document for future NiSource activities and annual compliance report and no further bog turtle AMMs are needed.
- If yes, conduct Phase 2 and, if recommended by local Service Field Office, trapping or assume bog turtle presence.

Step 2a. If conducting Phase 2 and trapping (if recommended) surveys:

Bog turtles found?

- If no, document for future NiSource activities and annual compliance report and no further bog turtle AMMs are needed.
- If yes, conduct further bog turtle AMMs – go to step 3.
- Submit both positive and negative Phase 2 survey reports to the Service Field Office in the state in which the surveys were conducted annually and Service MSHCP contact.

Step 2b. If assuming presence, employ further bog turtle AMMs – go to step 3 **(not AMM # 3).**

Step 3. Employ further bog turtle AMMs #2-26.

**Timing of Actions and Associated Generic AMMs Related to Earth Disturbance**

2. If a proposed activity is within 300 feet of a wetland that is known or assumed to be occupied by bog turtles - identify the full extent of the wetland area that will be subject to disturbance from any and all sources or activities (e.g., vehicles, staging areas, excavation, side-cast soil, timber mats, etc.). Within the anticipated wetland disturbance area, a qualified bog turtle surveyor will determine whether any "mucky"[4] areas are present, as described in the current *Bog Turtle Survey Guidelines*, and determine the extent and location of these mucky areas. They will also determine the vegetative cover type(s) present in mucky areas proposed for disturbance (see below), since this will affect project timing. An EM&CP will be developed whenever earth disturbance is proposed in wetlands that are known or assumed to be occupied by bog turtles.

[4] "Mucky" refers to soft, saturated soils that can be probed (e.g., with a blunt tool handle) to a depth of at least three inches. In this case, it does NOT refer to a specific wetland soil type(s) or classification.

a. **Scenario 1: Mucky areas ARE present in the proposed disturbance area.** Conduct construction and earth disturbance outside the hibernation period

   i. When disturbance is proposed in areas of the wetland that are dominated by woody vegetation (trees or shrubs) or invasive herbaceous species that are not conducive to bog turtle nesting (*e.g.*, *Phragmites*, purple loosestrife, reed canary grass):
      (1) conduct pre-construction turtle survey (*see* **Appendix L** for Pre-construction Survey Protocol which includes moving any turtles found out of the work area);
      (2) install silt fencing to isolate work area (AMM #3); and
      (3) conduct activities between **April 1 and September 30**

   ii. When disturbance is proposed in areas of the wetland that are dominated by herbaceous species
      (1) conduct pre-construction turtle survey;
      (2) install silt fencing between **April 1 and June 15**; and
      (3) conduct activities between **April 1 and September 30**.

b. **Scenario 2: Mucky areas are NOT present in the proposed disturbance area.**
   i. install silt fencing between **October 1 and March 31** to isolate work area; and
   ii. conduct work between **October 1 and March 31** (i.e., when turtles are hibernating or concentrated near their hibernacula)

   or

   iii. conduct pre-construction turtle survey;

   iv. install silt fencing to isolate work area; and
   v. conduct work activities between **April 1 and September 30**

c. **Scenario 3: No wetlands occur within the proposed disturbance area, but known or assumed bog turtle wetlands occur within 300 feet of it.**
   i. install silt fencing between **October 1 and March 31** to isolate work area; and

   ii. conduct work between **October 1 and March 31** (i.e., when turtles are hibernating or concentrated near their hibernacula)

   OR

   iii. conduct pre-construction turtle survey (*see* **Appendix L** for Pre-construction Survey Protocol which includes moving any turtles found out of the work area);

   iv. install silt fencing to isolate work area per AMM #3; and

v. conduct work activities between **April 1 and September 30.**

3. Employ silt fences around construction/soil disturbance activities within known or assumed bog turtle wetlands. The silt fencing should completely isolate the work area from the remainder of the wetland to ensure bog turtles cannot enter the work area, and to ensure silt does not enter un-disturbed parts of the wetland. Ensure soil is level with grade and pressed against the inside and outside of the silt fence, so there is no potential for turtles to approach the fence and fall into a trench on either side of the fence. Inspect silt fences each morning prior to work to ensure there are no breaches in the fence. Repair any breaches immediately, and do not begin work until they are repaired. If there is a breach in the silt fence during the bog turtle active season (April 1 to September 30), conduct another pre-construction bog turtle survey within the fenced work area prior to re-starting work activities. When work activities are finished and the site is stabilized, remove all silt fencing from the wetland and fill in any trenches or furrows to grade. [NOTE: Adaptive Management will be employed for this AMM.]

**Vegetation Management on the Existing ROW**

4. Do not drive through "mucky" areas to minimize risk of crushing turtles.
5. Do not step on hummocks and tussocks when conducting vegetation management in known or potential bog turtle habitat.
6. Do not pull woody vegetation out by the roots in "mucky" areas to avoid destruction of potential hibernacula.
7. Mowing: Conduct between **October 1 and April 15** to avoid impacts to nests and eggs and minimize impacts to hatchlings.
8. Herbicide application:
   a. Apply herbicides in accordance with NiSource policy and procedures, EPA guidelines and requirements, state requirements, and the manufacturer's label. Prior to herbicide use, consult with the timing requirements specified previously.
   b. Do not use aerial herbicide application methods within 300 feet of known/assumed bog turtle wetland.
   c. For non-aerial application of herbicides within known or presumed bog turtle wetlands, follow current Service herbicide guidelines for use in bog turtle sites. The following are from March 10, 2006, Appendable Biological Opinion on Bog Turtle Habitat Restoration Practices (Service 2006):
      i. Hack and squirt (frill or drill and fill) – cut trunk of tree and apply glyphosate using backpack sprayer, squirt bottle, syringe, or tree injector.
      ii. Inject pellets of glyphosate or imazapyr directly into trunks of woody vegetation (red maple, alder, poison sumac).
      iii. Cut stump/stem – cut tree or shrub and apply glyphosate to cut surface using spray bottle or wick applicator.

iv. Wick application – apply glyphosate directly to leaves and/or stem via "glove application" or paint stick with a contained reservoir to hold the herbicide.
v. Spot spray – spray glyphosate directly onto leaves or stem via backpack sprayer, squirt bottle, or modified low volume hydraulic applicator – no high pressure sprayers.
vi. Herbicide will not be applied using an open container of herbicide for any application to reduce risk of spills.
vii. When conducting foliar application of glyphosate, the surfactant LI-700 may be used in accordance with EPA-approved label instructions.
viii. Filling and emptying of herbicide containers will occur in upland areas.
ix. All applicators will have a spill kit available.
x. All hoses, tanks, and clamps will be inspected in uplands prior to use each treatment day.
xi. Apply herbicide when wind speed at treatment height is ≤ 5 miles per hour.

9. Do not drag vegetation through known or assumed bog turtle wetlands (hand-carry pieces and if too large, cut into smaller pieces) if soil conditions are saturated.

10. Do not burn brush piles along ROW within 300 feet of known/assumed bog turtle wetlands.

**Construction Practices (Existing or New ROW)**

11. *Avoid stepping on hummocks and tussocks in open, emergent areas of known or assumed bog turtle wetlands.*

12. *Avoid vehicle-use within known or assumed bog turtle wetlands. Conduct patrols, vegetative maintenance, etc., by foot whenever practical.*

13. *Avoid pulling woody vegetation out by the roots in "mucky" areas to avoid destruction of potential hibernacula.*

14. Do not drag vegetation through known or assumed bog turtle wetlands (carry pieces and if too large, cut into smaller pieces) if soil conditions are saturated.

15. Do not withdraw water from known or assumed bog turtle wetlands for hydrostatic testing.

16. Do not discharge hydrostatic testing water into known or assumed bog turtle wetlands.

17. Discharge hydrostatic testing water in the following manner (in order of priority and preference):

a. Discharge hydrostatic testing water down gradient of known or assumed bog turtle wetlands 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 known or assumed bog turtle wetlands 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 wetland as practical and utilize additional sediment and water flow control devices (**Figures 6A&B, 7, 8,14A&B; ECS**) to minimize effects to the wetland area.

18. Re-vegetate wetlands in accordance with the ECS (e.g., use indigenous, non-invasive species).

19. Do not apply fertilizers within 300 feet of known or assumed bog turtle wetlands.

20. Ensure that upland work (including access roads) does not result in impacts (altered hydrology) to adjacent bog turtle sites. [NOTE: Adaptive Management will be employed for this AMM.]

21. Ensure that work in streams including crossings, restoration, and culvert repair/replacement methods do not result in impacts (altered hydrology) to adjacent bog turtle sites by following the requirements specified in the ECS. [NOTE: Adaptive Management will be employed for this AMM.]

22. Do not abandon pipe (leaving on surface) in presumed or known bog turtle wetlands. Below-grade abandonment is acceptable.

23. Refuel equipment and check for leaks each day as described in the ECS "Spill Prevention, Containment and Control".

24. Do not construct bell holes and trenches for remote/perpendicular cathodic protection in bog turtle habitat.

**Routing Criteria (replacements, loops, new ROWs, access roads)**

NiSource is strongly oriented towards using existing ROWs for facility replacement and/or expansion projects as these areas have been previously disturbed. However, to avoid and/or minimize impacts to bog turtles or their habitat, NiSource will consider the following AMMs during route selection. This consideration will include, for example, overall effect of using the existing ROW versus disturbance of new areas, landowner concurrence, and the ability to construct the new facility using trenchless methods. When routing new or replacement facilities away from the existing ROW, strong emphasis will be placed on avoidance of bog turtles or their actual or assumed habitat. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1. If an HDD is planned, a frac out contingency plan will be prepared and included in the EM&CP (AMM #2).

Note that mitigation requirements generally increase with impacts associated with each successive option for construction routing.

25. 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 wetland between **April 1 and October 1** to avoid any potential impact to

hibernating turtles from frac-outs. HDDs can be conducted at other times if engineering studies determine that the potential for a frac-out within the wetland area is minimal (solid rock). Also, route to avoid potential hibernacula.

or

b. Use conventional construction practices, narrow or reconfigure the work area to avoid impacts to "mucky" areas of wetland, and follow timing and monitoring guidelines from above (AMM #2).

or

c. If the existing line is in "mucky" area and all above measures are not possible, follow timing and monitoring guidelines from AMM #2.

26. FERC 7c projects shall be done in the following manner (in order of priority/preference):

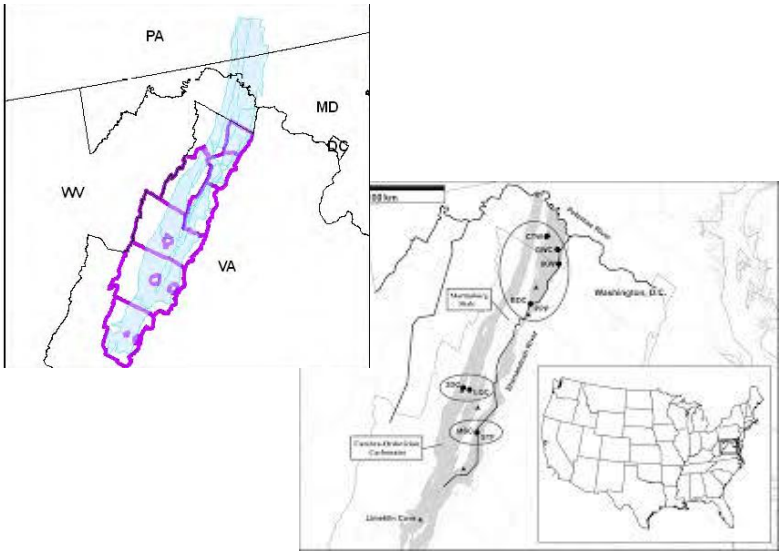
a. Route projects (loops, new ROWs and access roads) to avoid known or assumed bog turtle wetlands (the entire wetland).

or

b. conduct HDD or horizontal bore to install pipe under wetland between **April 1 and September 30** to avoid any potential impact to hibernating turtles from frac-outs. HDDs can be conducted at other times if engineering studies determine that the potential for a frac-out within the wetland area is minimal (solid rock). Also, route to avoid potential hibernacula.

or

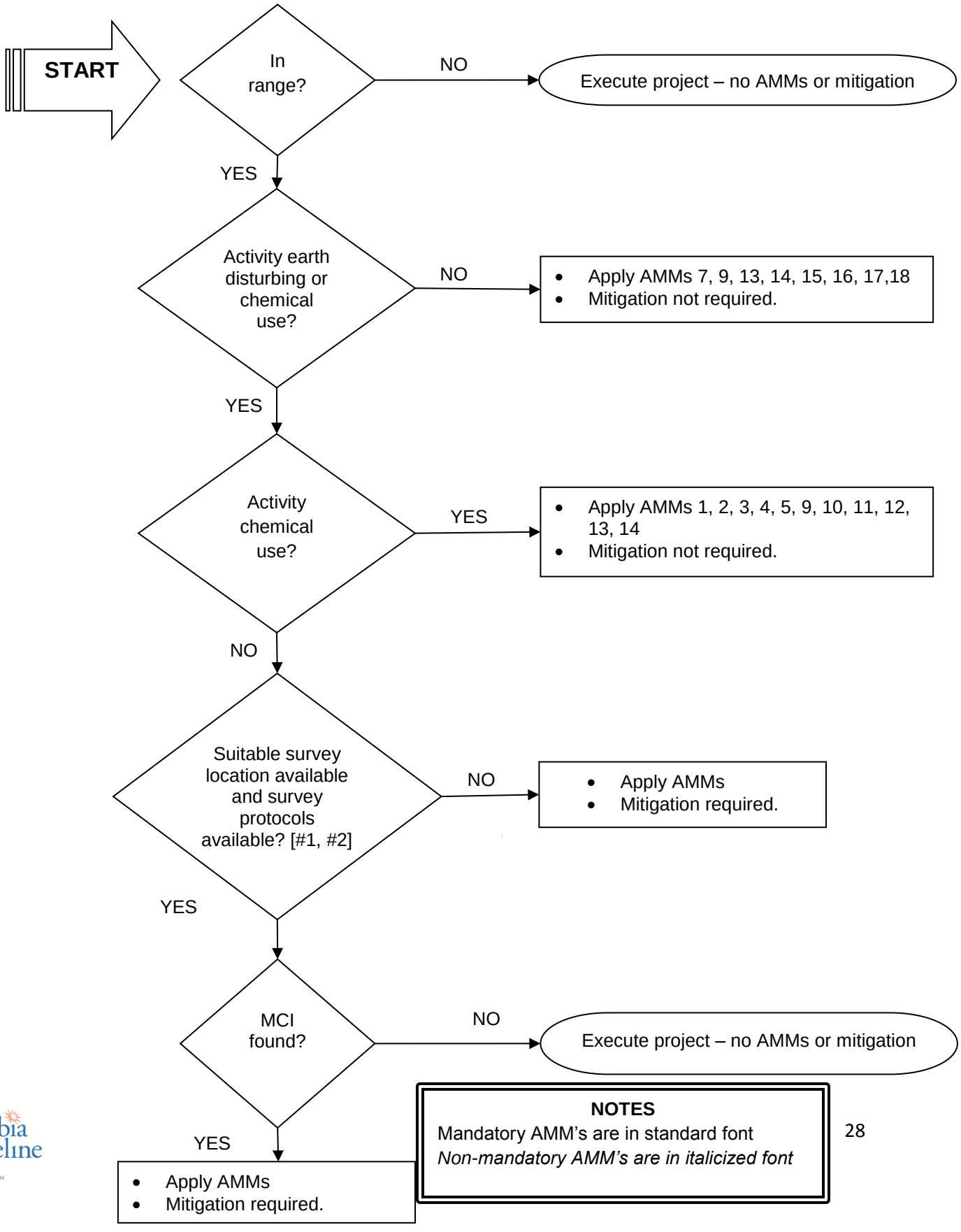
c. use conventional construction practices, route projects to avoid impacts to "mucky" areas of the wetland, and follow timing and monitoring guidelines from above (AMM #2).




# MADISON CAVE ISOPOD

## *Antrolana lira*

# Madison Cave Isopod (MCI) Compliance Flowchart



## Madison Cave Isopod

## Measures to Avoid and Minimize Impacts

These measures apply to the 76 miles of ROW and covered lands above karst features in Augusta, Clarke, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties, and the City of Waynesboro, Virginia (**Appendix G, Figure 6.2.3.3-1**). These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

**Surveys to Evaluate Karst Features (indicators of potential presence of Madison Cave isopod) (Appendix L)**

1. Field inspections and remote sensing for surface karst features within the range of Madison Cave isopod were completed in 2009 (Denton, et. al. 2009). Findings suggest that no caves, or closed depressions, with open throats occur within the existing ROW. However, there are four locations with open throats that receive drainage from the existing ROW. In addition there are areas with vegetated closed depressions (sinkholes) that are internally drained and may be areas of potential future subsidence.

Within one calendar year prior to start of any earth disturbing activity, the area of the disturbance will be surveyed visually to document the presence of existing karst features, and to identify new karst features that may have developed after the completion of the 2009 GeoConcepts survey (Denton, et. al. 2009). This information will be included in the annual compliance report.

**Surveys to Evaluate Presence of the Species in Subsurface Habitat**

2. NiSource will assume Madison Cave isopod subsurface presence along the 76 miles of ROW and covered lands of mapped potential habitat (**Figure 6.2.3.3-1**).

At this time, surveys for individuals are not recommended due to the limited information about the species, inadequacy of existing survey protocols, and the physical inability to survey for individuals in many cases. The best available survey guidelines have been developed by B. Hutchins and W. Orndorff. (Hutchins B. and Orndorff W. 2009). At this time the Service has not developed standard survey protocols based on this publication.

Once survey protocols are available, NiSource will conduct surveys for Madison Cave isopods in cases where suitable survey locations (survey points that are connected to NiSource areas of disturbance) are available and landowner permission is granted. If no suitable survey locations are available, NiSource will assume presence and follow the AMMs below. It is anticipated that the survey protocols will specify the number of years they will be considered valid. If no Madison Cave isopods are found, then the

findings of the survey will be documented for future NiSource activities and the annual compliance report, and no further Madison Cave isopod AMMs or mitigation are needed.

**Measures to Avoid and Minimize Impacts to Madison Cave Isopod and its Habitat**

3. Protect known and/or future mapped recharge areas of cave streams and other karst features by following relevant ECS standards, such as Section III, Stream and Wetland Crossings; and Section IV, Spill Prevention, Containment and Control.

4. Buffers of 300 feet around karst features[5] in all work areas (within and off-ROW including discharge areas) must be established and clearly marked in the field with signs and/or highly visible flagging until construction-related ground-disturbing activities are completed.

5. Earth-disturbing activities will be conducted in a manner that minimizes alteration of existing grade and hydrology of existing surficial karst features. Land disturbances including permanent filling, excavating, or otherwise altering existing karst features, or any of these activities within 300 feet of a feature, will be avoided, if possible, or minimized. In addition to the requirements in the ECS, the following will be implemented in these areas:

a. If new open-throated sinkholes form within the ROW or construction work area, work in that area will stop and the sinkhole will be isolated from the rest of the work area with sandbags or other suitable materials. The Service will be notified. The sinkhole will be inspected (size, location, connectivity to ground water, etc.) and appropriate action taken (e.g. facility relocated, sinkhole remediated, etc.) to ensure facility integrity and protection of the aquatic resource and Madison Cave isopod habitat. If the sinkhole must be filled, an inverted filter to bridge the karst feature above the water table rather than filling it below, will be used (**Appendix L, Figures 6.2.3.3-2,-3,-4, and -5**).

b. If a subsurface void should open or be intersected, or a new sinkhole forms within the ROW or construction work area, work in that area will stop and the void will be isolated from the rest of the work area with sandbags or other suitable materials. The Service will be notified. The void will be inspected by a qualified geologist and/or engineer and appropriate action taken including filter fabric secured over the void and other such measures as necessary (e.g. facility relocated, sinkhole remediated, etc.) to ensure facility integrity and protection of the aquatic resource and Madison Cave isopod habitat, (standard operating procedures for sinkhole remediation can be found in **Appendix L**).

[5] Specific geologic structures that characterize the karst landscape, including sinkholes, caves, sinking or losing streams, ponors, pinnacled bedrock and large springs.

c. In linear excavations adjacent to karst features, spoils will be placed on the upgradient side of the excavation so that if any erosion takes place the stockpiled soil will flow back into the excavation and not downgradient towards the karst feature;

d. Surface water control measures, including, but not limited to: diversion (direct water flow into trench or off-ROW areas past area of concern), detention or collection and transportation, will be utilized to prevent construction-influenced surface water from freeflowing into open-throated surface karst features, and eventually into the subsurface.

e. Open-throated surface karst features will not be utilized for the disposal of water generated by covered activities. Water will be discharged through energy dissipating devices (ECS).

6. Blasting within the Madison Cave isopod potential habitat zone (**Figure 6.2.3.3-1**) will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of known or presumed occupied habitat. If rock is required to be hammered or blasted out of the way of a new pipeline installation, then the following parameters shall be adhered to:

a. The excavation shall be carefully inspected for any voids, openings, or other indications of solution activity.

b. If the rock removal intercepts an open void, channel, or cave, the work in that area shall be stopped until a remedial assessment can be carried out by a qualified geologist or engineer with experience in karst terrain.

c. All use of explosives shall be limited to low-force charges that are designed to transfer the explosive force only to the rock which is designated for removal (e.g., maximum charge of two inches per second ground acceleration).

d. If the track drill used to prepare the hole(s) for the explosive charge(s) encounters a subsurface void larger than six inches within the first 10 feet of bedrock, or a group of voids totaling more than 6 inches within the first 10 feet of bedrock, then explosives should not be used or a subsurface exploration should be conducted to determine if the voids have connectivity with a deeper structure. The subsurface exploration can be carried out with track drill probes, coring drill, electrical resistivity, or other techniques capable of resolving open voids in the underlying bedrock. If a track drill or coring rig is used, then all open holes shall be grouted shut after the completion of the investigation.

[NOTE: Adaptive Management will be employed for this AMM.]

7. Do not utilize HDD within the Madison Cave isopod potential habitat zone (**Figure 6.2.3.3-1**).

8. *If authorized by the landowner, block (e.g., gate) access roads and ROWs leading to known or presumed occupied habitat from unauthorized access.*

9. Further avoid and minimize the impact of spills by the following additions to the Spill Prevention Control and Countermeasures (SPCC) Plan contained in the ECS:

a. Equipment refueling will not be performed within flagged or marked buffer areas of streambed, sinkhole, fissure, or areas draining into these or other karst feature except by hand-carried cans (five gallon maximum capacity) when necessary;

b. Equipment servicing and maintenance areas will be sited outside of flagged or marked buffer areas of streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features;

c. Prevent runoff resulting from construction equipment washing operations to directly enter any karst feature by locating these operations outside of the buffer area;

d. Construction equipment vehicles, materials, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will not be parked, stored, or serviced within 300 feet of any karst feature;

e. All equipment will be checked by a NiSource inspector daily for leaks prior to beginning to work in karst habitat, and equipment will be removed or repaired if necessary; and

f. If a reportable spill has impacted a karst feature:

   i. follow spill response plan; and

   ii. call the Service at 413-539-3194 to report the release, in addition to the National Response Center (800-424-8802) and the Virginia Department of Environmental Quality (800-469-8892).

10. Restrict use of herbicides for vegetation management within the known or presumed occupied habitat to those provided by the Service (appropriate for aquatic use and unknown to be toxic to crustaceans) (**Appendix L**). Other appropriate herbicides may be approved by the Service upon request by NiSource.

11. Herbicide application

a. Apply herbicides in accordance with NiSource policy and procedures, EPA guidelines and requirements, state requirements, and the manufacturer's label.

b. Do not use aerial herbicide application methods within 300 feet of marked or flagged buffers of karst features.

c. The following measures must be undertaken for non-aerial application of herbicides within 300 feet of marked or flagged buffers of karst features:

   i. Hack and squirt (frill or drill and fill) – cut trunk of tree and apply glyphosate using backpack sprayer, squirt bottle, syringe, or tree injector.

   ii. Inject pellets of glyphosate or imazapyr directly into trunks of woody vegetation (red maple, alder, poison sumac).

iii. Cut stump/stem – cut tree or shrub and apply glyphosate to cut surface using spray bottle or wick applicator.

iv. Wick application – apply glyphosate directly to leaves and/or stem via "glove application" or paint stick with a contained reservoir to hold the herbicide.

v. Spot spray – spray glyphosate directly onto leaves or stem via backpack sprayer, squirt bottle, or modified low volume hydraulic applicator – no high pressure sprayers.

vi. Herbicide will not be applied using an open container of herbicide for any application to reduce risk of spills.

vii. When conducting foliar application of glyphosate, the surfactant LI-700 (or less toxic future surfactants) shall be used in accordance with EPA-approved label instructions.

viii. Filling and emptying of herbicide containers will occur in areas that do not drain into sinkholes, fissures, streambeds, or other karst feature.

ix. All applicators will have a spill kit available.

x. All hoses, tanks, and clamps will be inspected in non-karst areas prior to use each treatment day.

xi. Apply herbicide when wind speed at treatment height is ≤ 5 miles per hour.

12. Do not apply fertilizers within marked or flagged buffer of streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features.

13. Contaminants, including but not limited to oils, solvents, and others, shall be strictly controlled as provided for in the EMCS and ECS, Section II.C.2, as well as Section IV so the known occupied or presumed occupied habitat is not affected.

14. Operators, employees, and contractors will be educated on the biology of the species, activities that may affect behavior, and ways to avoid and minimize these effects.

15. Hydrostatic test water will not be obtained from karst features (only free-flowing streams) within the mapped Madison Cave isopod range. To prevent effects to the isopod, water from known or presumed occupied habitat will be withdrawn in a manner that will not visibly reduce the wetted perimeter of the steam channel.

16. Do not discharge hydrostatic testing water from new pipe directly into flagged or marked buffer areas of sinkholes, fissures, or other karst features or channels or surface features that flow towards those features. Discharge this hydrostatic testing water in the following manner (in order of priority and preference):

a. Discharge hydrostatic testing water down gradient of flagged or marked buffer areas of sinkholes, fissures, or other karst features 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 more than 300 feet from flagged or marked buffer areas of sinkholes, fissures, or other karst features unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.

c. If not practicable, discharge water as far from flagged or marked sinkholes, fissures, or other karst features as practical and utilize additional sediment and water flow control devices (**Figures 6A&B, 7, 8,14A&B**; ECS) to minimize effects.

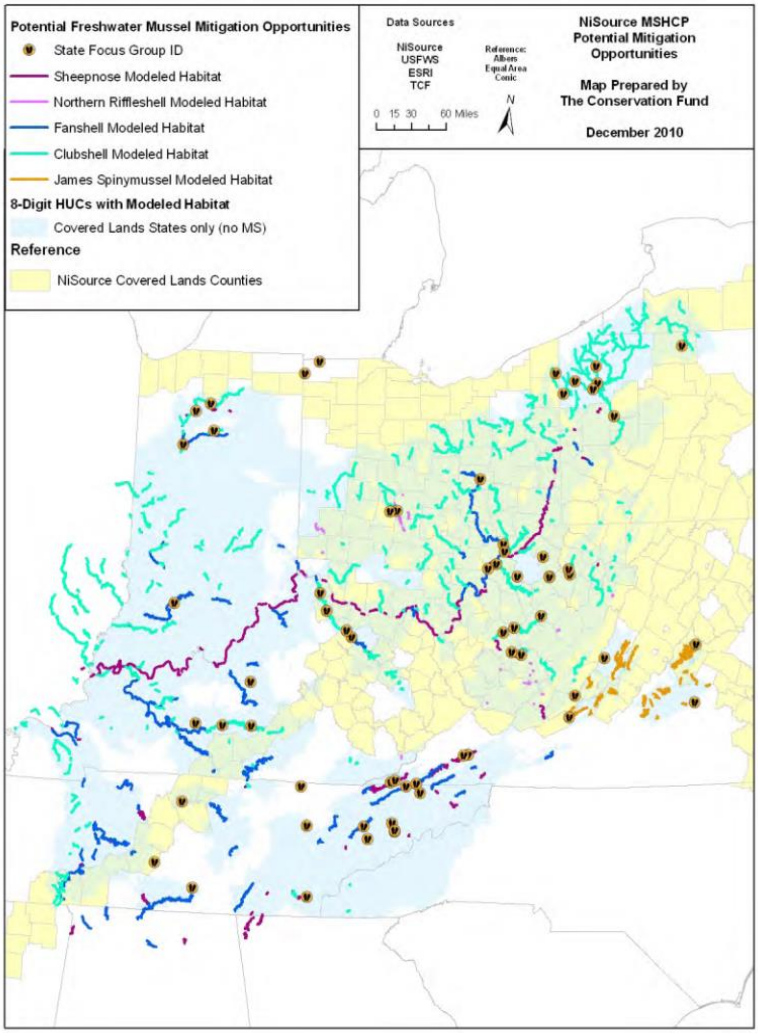
17. Do not discharge hydrostatic testing water from existing pipe directly into flagged or marked buffer areas of sinkholes, fissures, or other karst features or channels or other surface features that flow towards those features. Discharge this hydrostatic testing water down gradient of flagged or marked buffer areas unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge. If such circumstances occur, collect water and dispose of it in an approved disposal facility.

**Routing Criteria (new ROWs, access roads)**

18. NiSource is strongly oriented towards using existing ROWs for facility replacement and/or expansion projects as these areas have been previously disturbed. When routing new or replacement facilities away from the existing ROW, strong emphasis will be placed on avoidance of surface karst features and their 300-foot buffers, in particular open throated sinkholes or other features that provide direct access to subsurface water. In situations where surface (or unknown subsurface) karst features cannot be avoided (e.g., due to other environmentally sensitive resources, man-made structures, landowner concerns, or terrain), the appropriate AMMs above will be applied to the construction, operation, and maintenance activities for the facility.

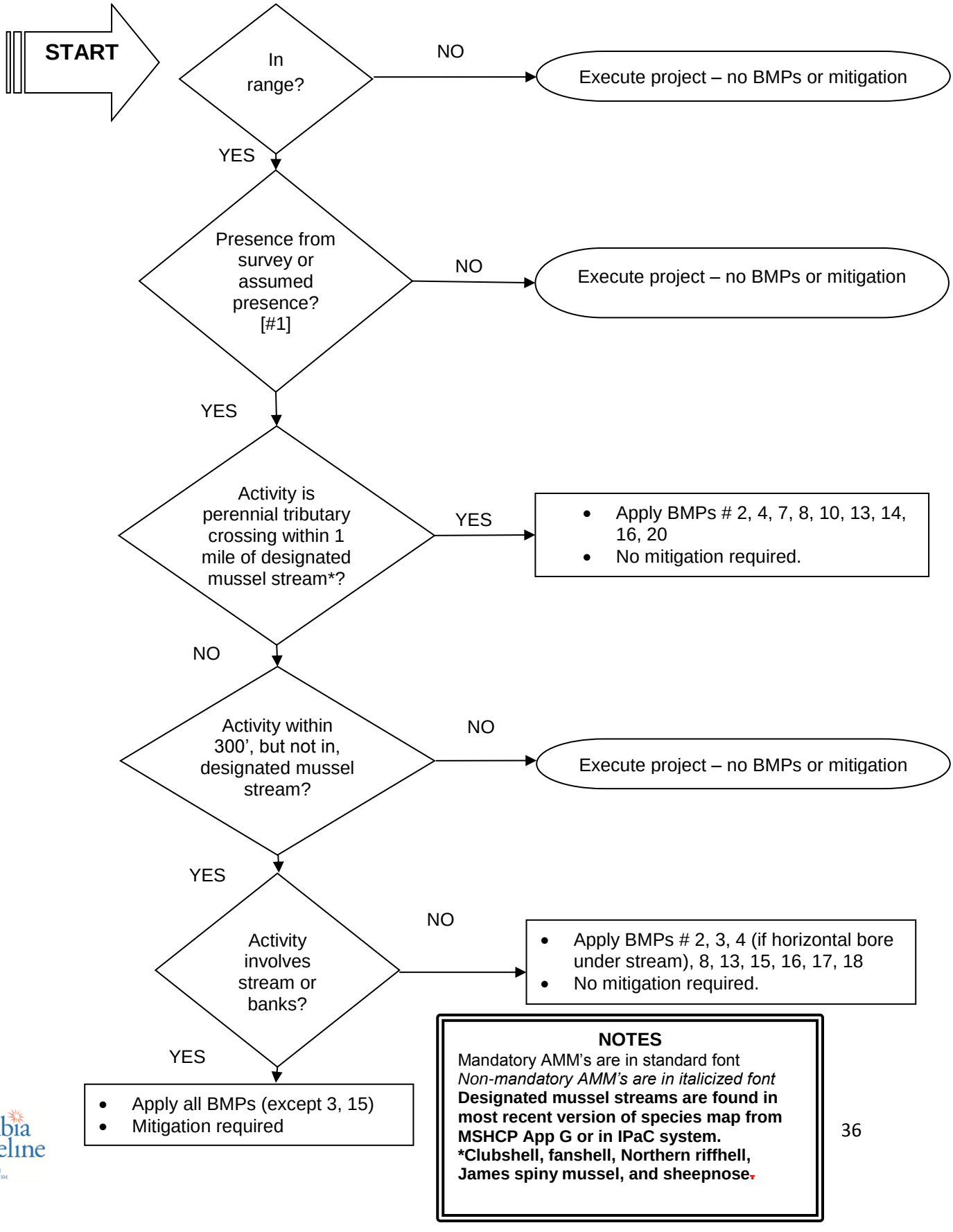
NiSource will coordinate with the Service if either surface or subsurface features are intersected (*see* above AMMs).

**CLUBSHELL (*Pleurobema clava*), NORTHERN RIFFLESHELL (*Epioblasma torulosa rangiana*), FANSHELL (*Cyprogenia stegaria*) & SHEEPNOSE (*Plethobasus cyphyus*) MUSSELS**




Columbia Pipeline Group

## Clubshell, Northern Riffleshell, Fanshell, and Sheepnose Mussels Compliance Flowchart



## Clubshell, Northern Riffleshell, Fanshell & Sheepnose Mussels

## Measures to Avoid and Minimize Impacts

These measures apply to "may affect" counties in Section 6.2.4 and the maps in **Appendix G, Figure 6.2.4.3-1** for the clubshell mussel.

These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1.

**Surveys to Evaluate Presence and Relocation of Species in NiSource Action Areas**

1. A survey can be conducted to determine the presence of this mussel species. Mussel survey protocols designed to detect endangered mussels that often occur in low densities; protocols as of 2009 are provided in **Appendix L**. Survey methodologies must be evaluated at minimum every five years and updated to the most effective survey methods currently available. If the most current methodology implemented by a biologist, qualified to conduct the survey, does not indicate the presence of the species, it will be classified as unoccupied habitat and the AMMs will not be mandatory.[6]

If a survey is not completed, presence will be assumed. In that case, all suitable habitat would be treated as occupied, and all mandatory AMMs must be followed. NiSource or its contractors will follow the Service approved relocation plan as referenced below. Survey and relocation may be implemented in the same time period (as one action) as long as both survey and relocation protocols are followed (general relocation protocols are identified in **Appendix L**, but may be modified in conjunction with Service Field Office based on conditions).

Relocation may be implemented only if: (1) all required permits are in place, (2) a Service approved relocation plan documenting all relevant protocols including how and where the mussels will be moved is in place, (3) a contingency plan is in place to conduct additional consultation with the Service should the actual field survey not reflect the conditions identified in the approved relocation plan, and (4) a monitoring program to evaluate the effects of the relocation is in place. Relocation will include at least all individuals of the federally endangered species identified in the impact area and may include other species based on the assessment of the Service Field Office and other regulatory agencies. A copy of the survey and any reports will also be included in the annual report submitted to the Service.

[6] However, NiSource may implement some of these measures if appropriate to protect potentially suitable habitat.

**Pre-Construction Planning: Preparation of an EM&CP**

2. A detailed EM&CP will be prepared for any activity with potential effects (e.g., streambed or stream bank disturbance, impacts to riparian habitat, activities causing sediment) within 100 feet of the ordinary high water mark of occupied mussel 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 waterbody crossing will be considered "high-quality" for the purpose of preparing this plan regardless of the actual classification. The plan will be strongly oriented towards minimizing streambed and riparian disturbance (including minimization of tree clearing within 25 feet of the crossing [**Figure 24, ECS**]), preventing downstream sedimentation (including redundant erosion and sediment control devices, which would be designed to protect mussel resources as appropriate), and weather monitoring by the Environmental Inspector to ensure work is not begun with significant precipitation in the forecast. The plan will comprehensively address all activities needed to complete the work and minimize take of mussels in occupied habitat including crossing the streams during dry periods when practical and using dry-ditch crossing techniques for intermittent streams leading to mussel habitat. The EM&CP will include the frac-out avoidance and contingency plans described in AMM #3 below. 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. These plans will include techniques such as hard or soft trench plugs, temporary sediment barriers, a wider trench at the slope base, and/or temporary slope drains (plastic). In areas with less than a 30 percent slope, ECS and AMM erosion control measures protective of mussels will be implemented. 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 mussel AMMs that must be implemented.

**Streambed Construction**

3. For activities in occupied habitat, install new or 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 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 specifically reference mussel resources 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 mussels, and actions to address a large scale frac-out in occupied habitat. The plan should also consider the potential effects on mussels if drilling fluids are released into the

environment. The plan must contain all information required for a FERC Section 7c filing at a minimum.

If, after detailed engineering studies (e.g., geotechnical, physiological, topographical, and economic), it is determined (and agreed to by NRP personnel) that an HDD is not feasible, a report will be prepared and included in the annual report submitted to the Service. However, due to the potentially significant amount of take that might occur for Ohio River crossings, open trenching in this river is not a "covered activity" as part of the NiSource MSHCP.

4. 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.

5. For repairs in occupied habitat, do not install in-channel repairs (bendway weirs, hardpoints, concrete mats, fill for channel relocation, or other channel disturbing measures) except when measures in AMM #3 above are not feasible from an engineering design perspective, and then, only in conjunction with a stream restoration plan based on Rosgen (*see* Wildland Hydrology 2009 http://www.wildlandhydrology.com/html/references_.html) or other techniques mutually agreed upon by NiSource and the Service that result in no direct or lethal take of listed mussels.

*6. Conduct replacements/repairs from a lay barge or temporary work bridges of the minimum length necessary to conduct the replacements/repairs rather than operating heavy equipment (e.g., backhoes, bulldozers) in-stream. Temporary construction and equipment bridges are not to be confused with stone or fill causeways with pipe structures, which should not be employed in known or presumed occupied waterbodies.*

7. Remove equipment bridges as soon as practicable (this is typically interpreted to be a few days to a few weeks unless there are extenuating circumstances) after repair work and any site restoration is completed

8. 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 mussel 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**

*9. Do not construct culvert and stone access roads and appurtenances (including equipment crossing) across the waterbody or within the riparian zone. Temporary equipment crossings utilizing equipment pads or other methods that span the waterbody are acceptable provided that in-stream pipe supports are not needed.*

10. For equipment crossings of small streams, 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**).

11. *Reserved.*

**Pipeline Abandonment**

*12. Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to endangered mussels.*

**Contaminants**

13. 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 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; and

b. call the appropriate Service Field Office to report the release, in addition to the National Response Center (800-424-8802).

14. 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.

15. For storage well activities, use enhanced and redundant measures to avoid and minimize the impact of spills from contaminant events into known or presumed occupied streams. 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.

16. Do not use fertilizers or herbicides within 100 feet of known or presumed occupied habitat. 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 mussel habitat. The EM&CP prepared for this activity (AMM# 2 above) will document relevant EPA guidelines for application.

**Withdrawal and Discharge of Water**

17. Hydrostatic test water and/or water for storage well O&M will not be obtained from known or presumed occupied habitat unless other water sources are not reasonably available. To prevent desiccation of mussels, water from known or presumed occupied habitat 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.

18. 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.

**Travel for O&M Activities**

*19. Do not drive across known or presumed occupied streams – walk these areas or visually inspect from bank and use closest available bridge to cross stream.*

**Zebra Mussels and Other Invasives**

20. Clean all equipment (including pumps, hoses, etc.) that have been in a perennial waterbody for more than four hours within the previous seven days and will work in occupied or potential federally listed mussel habitat; following established guidelines to remove zebra mussels (and other potential exotic or invasive species) before entering a known or presumed occupied stream for a federally listed mussel, which is not known to be infested with zebra mussels (**Appendix L**). 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 these mussels since, once introduced into a watershed, invasive species could move and eventually affect the federally listed mussels.

**Location Specific BMPs for Clubshell mussels**

- Implement HDD at the Elk River (West Virginia) crossings if practicable, if not implement dry-ditch techniques and survey and translocate mussels.
- Implement HDD at Little Darby Creek (Ohio) if practicable, if not, cross using dry-ditch technique, survey, and translocate mussels
- Make all Meathouse Fork (West Virginia) crossings using dry-ditch technique.

**Location Specific BMPs for Northern Riffleshell mussels**

- Implement HDD at the Allegheny River (Pennsylvania) crossing if practicable, if not, survey and translocate mussels.
- Implement HDD at Big Darby Creek (Ohio) if practicable, if not, survey and implement dry-ditch crossing with translocation of mussels.
- Implement HDD at Elk River (West Virginia) crossings if practicable, if not, implement dry-ditch technique, and survey and translocate mussels.

**Location Specific BMPs for Fanshell mussels**

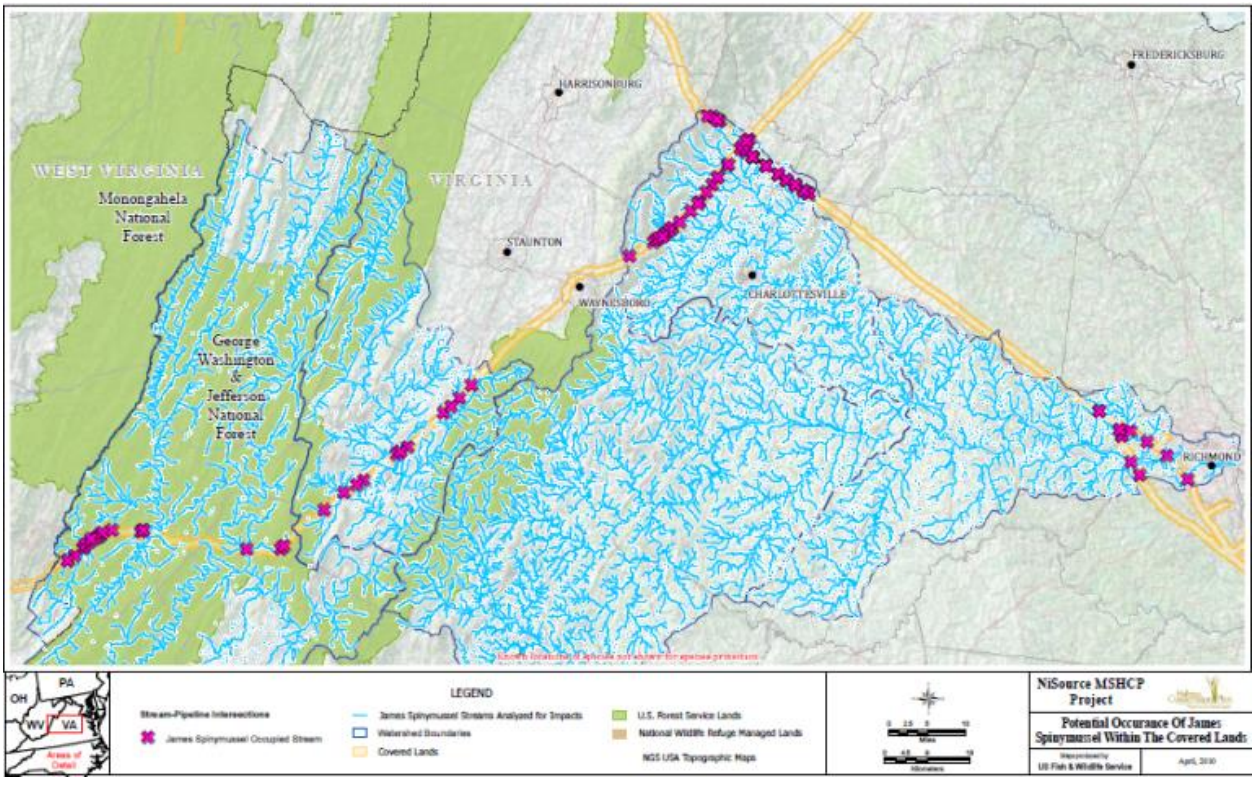
- Implement HDD at the downstream crossings (Nicholas-Robertson County Kentucky area) of the Licking River if practicable, if not, evaluate and implement dry-ditch techniques, if practicable and translocate mussels.
- Implement crossings of Tygart's Creek and Lick Branch (Kentucky) using dry-ditch Methodology

**Location Specific BMPs for Sheepnose mussels**

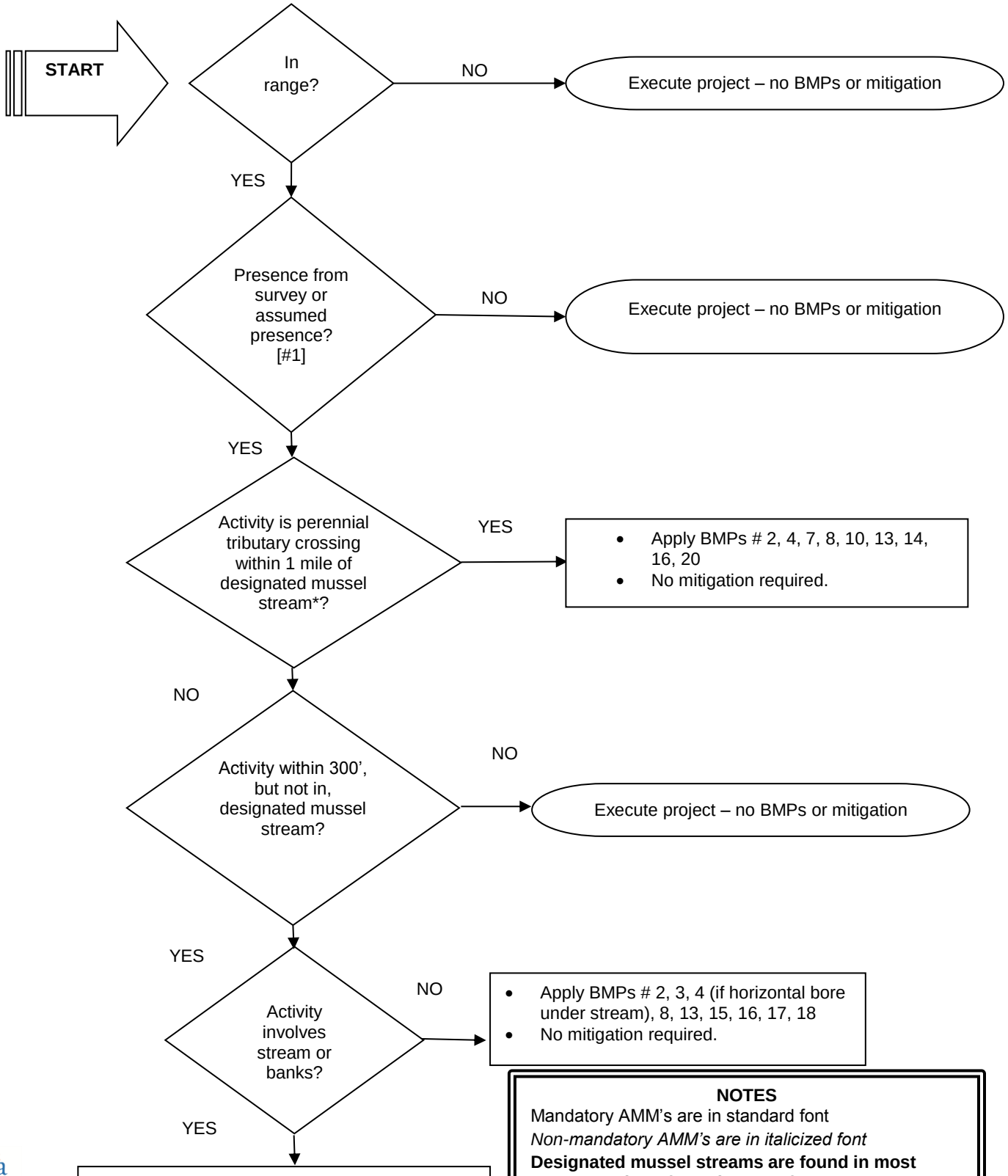
- Implement HDD at the two downstream Muskingum River (Ohio) crossings if practicable, if not, survey and translocate mussels.
- Implement HDD at Big Sunflower River (Mississippi) crossing if practicable, if not, survey and translocate mussels.

# JAMES SPINYMUSSEL

## *Pleurobema collina*



# James Spinymussel Compliance Flowchart




**NOTES**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

**Designated mussel streams are found in most recent version of species map from MSHCP App G or in IPaC system.**

***Clubshell, fanshell, Northern riffleshell, James spiny mussel, and Sheepnose.**

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## James Spinymusse l

## Measures to Avoid and Minimize Impacts

These measures apply to "may affect" counties in 6.2.7 and the maps in **Appendix G, Figure 6.2.7.3-1** for the JSM.

These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1.

**Surveys to Evaluate Presence and Relocation of Species in NiSource Action Areas**

1. A survey can be conducted to determine the presence of this mussel species. Mussel survey protocols designed to detect endangered mussels that often occur in low densities; protocols as of 2009 are provided in **Appendix L**. Survey methodologies must be evaluated at minimum every five years and be updated to the most effective survey methods currently available. If the most current methodology implemented by a biologist, qualified to conduct the survey, does not indicate the presence of the species, it will be classified as unoccupied habitat and the AMMs will not be mandatory.[7]

If a survey is not completed, presence will be assumed. In that case, all suitable habitat would be treated as occupied, and all mandatory AMMs must be followed. NiSource or its contractors will follow the Service-approved relocation plan as referenced below. Survey and relocation may be implemented in the same time period (as one action) as long as both survey and relocation protocols are followed (general relocation protocols are identified in **Appendix L**, but may be modified in conjunction with Service Field Office based on conditions).

Relocation may be implemented only if: (1) all required permits are in place, (2) a Service-approved relocation plan documenting all relevant protocols including how and where the mussels will be moved is in place, (3) a contingency plan is in place to conduct additional consultation with the Service should the actual field survey not reflect the conditions identified in the approved relocation plan, and (4) a monitoring program to evaluate the effects of the relocation is in place. Relocation will include at least all individuals of the federally endangered species identified in the impact area and may include other species based on the assessment of the Service Field Office and other regulatory agencies. A copy of the survey and any reports will also be included in the annual report submitted to the Service.

[7] However, NiSource may implement some of these measures if appropriate to protect potentially suitable habitat.

**Pre-Construction Planning: Preparation of an EM&CP**

2. A detailed EM&CP will be prepared for any activity with potential effects (e.g., stream bed or stream bank disturbance, impacts to riparian habitat, activities causing sediment) within 100 feet of the ordinary high water mark of occupied mussel 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 waterbody crossing will be considered "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 25 feet of the crossing [**Figure 24, ECS**]), preventing downstream sedimentation (including redundant erosion and sediment control devices, which would be designed to protect mussel resources as appropriate), and weather monitoring by the Environmental Inspector to ensure work is not begun with significant precipitation in the forecast. The plan will comprehensively address all activities needed to complete the work and minimize take of mussels in occupied habitat including crossing the streams during dry periods when practical and using dry-ditch crossing techniques for all JSM streams and intermittent streams leading to JSM habitat. The EM&CP will include the frac-out avoidance and contingency plans described in AMM #3 below. 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% leading directly to occupied habitat. These plans will include techniques such as hard or soft trench plugs, temporary sediment barriers, a wider trench at the slope base, and/or temporary slope drains (plastic). In areas with less than a 30% slope, ECS and AMM erosion control measures protective of mussels will be implemented. 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 mussel AMMs that must be implemented.

**Streambed Construction**

3. For activities in occupied habitat, install new or 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 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 specifically reference mussel resources 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 mussels, and actions to address a large scale frac-out in occupied habitat. The plan should also

consider the potential effects on mussels if drilling fluids are released into the environment. The plan must contain all information required for a FERC Section 7(c) filing at a minimum.

If, after detailed engineering studies (e.g., geotechnical, physiological, topographical, and economic), it is determined (and agreed to by NRP personnel) that an HDD is not feasible, a report will be prepared and included in the annual report submitted to the Service.

4. 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.

5. For repairs in occupied habitat, do not install in-channel repairs (bendway weirs, hardpoints, concrete mats, fill for channel relocation, or other channel disturbing measures) except when measures in AMM #3 above are not feasible from an engineering design perspective, and then, only in conjunction with a stream restoration plan based on Rosgen (*see* Wildland Hydrology 2009 http://www.wildlandhydrology.com/html/references_.html) or other techniques mutually agreed upon by NiSource and the Service that result in no direct or lethal take of listed mussels.

*6. Conduct replacements/repairs from a lay barge or temporary work bridges of the minimum length necessary to conduct the replacements/repairs rather than operating heavy equipment (e.g., backhoes, bulldozers) in-stream. Temporary construction and equipment bridges are not to be confused with stone or fill causeways with pipe structures, which should not be employed in known or presumed occupied waterbodies.*

7. Remove equipment bridges as soon as practicable (this is typically interpreted to be a few days to a few weeks unless there are extenuating circumstances) after repair work and any site restoration is completed

8. 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 mussel 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).

*9. Do not construct culvert and stone access roads and appurtenances (including equipment crossing) across the waterbody or within the riparian zone. Temporary equipment crossings utilizing equipment pads or other methods that span the waterbody are acceptable provided that in-stream pipe supports are not needed.*

10. For equipment crossings of small streams, use half pipes of sufficient number and size that both minimize impacts to streambed and minimize flow disruption to both upstream and downstream habitat (**ECS, Figure 22**).

**Timing Restrictions to Minimize Impact to Reproducing Populations**

11. Impacts to the mussel reproductive period will be avoided by implementing a Time of Year (TOY) restriction from May 15 – July 31 of any year on any instream work (not including the installation or removal of equipment bridges) in the following JSM streams:

Upper James Watershed - Allegheny Co.
- Potts Creek

S. Fork Rivanna River Watershed - Albemarle Co.
- Moormans River
- Rocky Creek
- Wards Creek
- Piney Creek
- Buck Mountain Creek

N. Fork Rivanna River Watershed - Greene / Orange Co.
- Lynch Run
- Roach Run
- Swift Run
- Blue Run
- Preddy Creek
- Burnley Brook

For the remaining JSM rivers, creeks, and tributaries at least 70% of the individual project activities that affect the channel will be completed with a TOY restriction from May 15 through July 15 to avoid impacts to the JSM during the reproductive period. Of these 70% of projects, additional mitigation will be provided for those that occur from July 15 through July 31. The other 30% of the project's activities that affect the channel of the JSM streams can occur any time but will be subject to additional mitigation.

**Pipeline Abandonment**

*12. Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to endangered mussels.*

**Contaminants**

13. 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 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; and

b. call the appropriate Service Field Office to report the release, in addition to the National Response Center (800-424-8802).

14. Ensure all imported fill material is free from contaminants (including 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.

15. For storage well activities, use enhanced and redundant measures to avoid and minimize the impact of spills from contaminant events into known or presumed occupied streams. 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.

16. Do not use fertilizers or herbicides within 100 feet of known or presumed occupied habitat. 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 mussel habitat. The EM&CP prepared for this activity (AMM #2 above) will document relevant EPA guidelines for application.

**Withdrawal and Discharge of Water**

17. Hydrostatic test water and/or water for storage well O&M will not be obtained from known or presumed occupied habitat unless other water sources are not reasonably available. To prevent desiccation of mussels, water from known or presumed occupied habitat 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.

18. 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.

**Travel for O&M Activities**

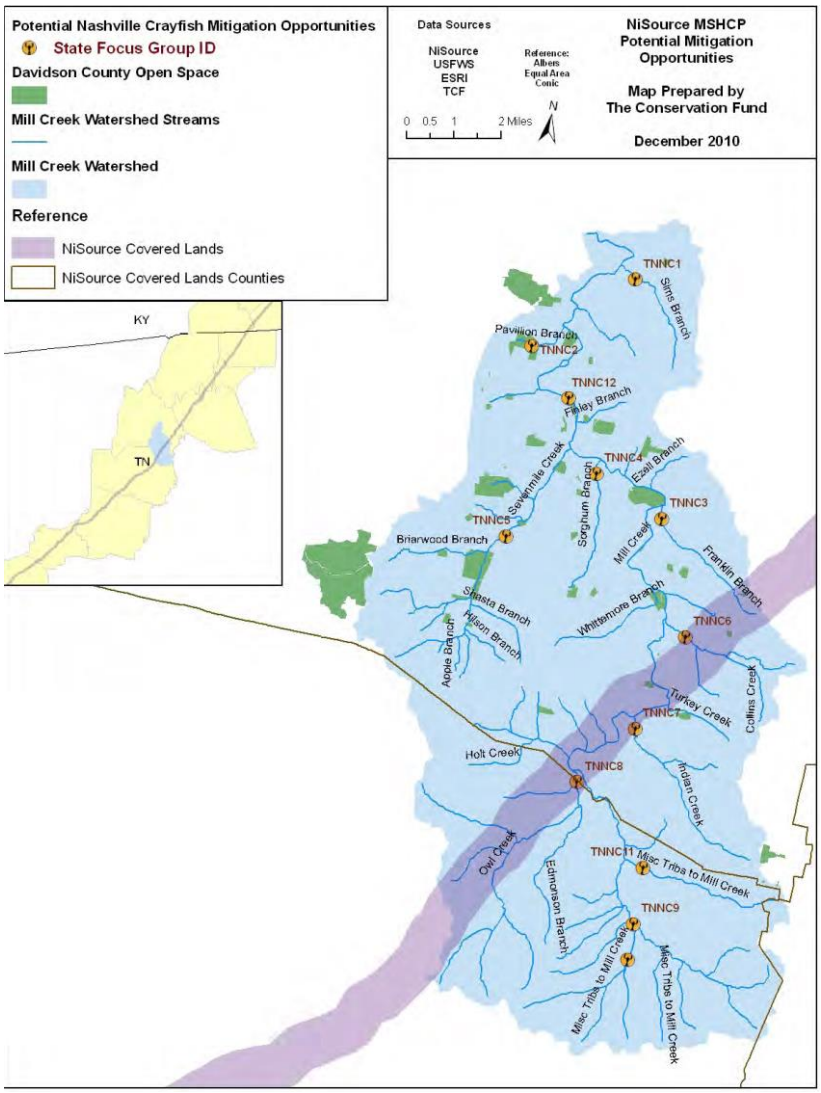
*19. Do not drive across known or presumed occupied streams – walk these areas or visually inspect from bank and use closest available bridge to cross stream.*

**Zebra Mussels and Other Invasives**

20. Clean all equipment (including pumps, hoses, etc.) that have been in a perennial waterbody for more than four hours within the previous seven days and will work in occupied or potential federally listed mussel habitat; following established guidelines to remove zebra mussels (and other potential exotic or invasive species) before entering a known or presumed occupied stream for a federally listed mussel, which is not known to be infested with zebra mussels (**Appendix L**). 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 these mussels since, once introduced into a watershed, invasive species could move and eventually affect the federally listed mussels.

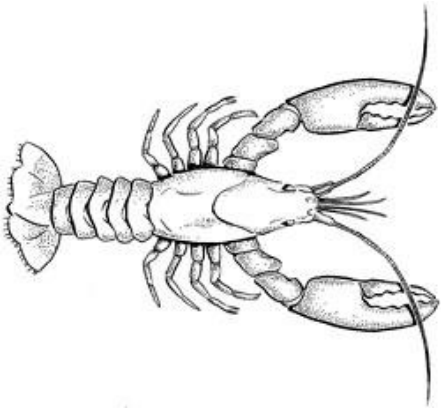
**Location Specific BMPs for James Spinymussels**

- Survey Swift Run (Virginia) and translocate JSMs if present.
- Survey any newly discovered populations of JSM during the life of the permit within the impact zone of a NiSource project where the status of the population (size, stability, reproductive status) has not already been determined, populations that are stable or reproducing will be translocated.

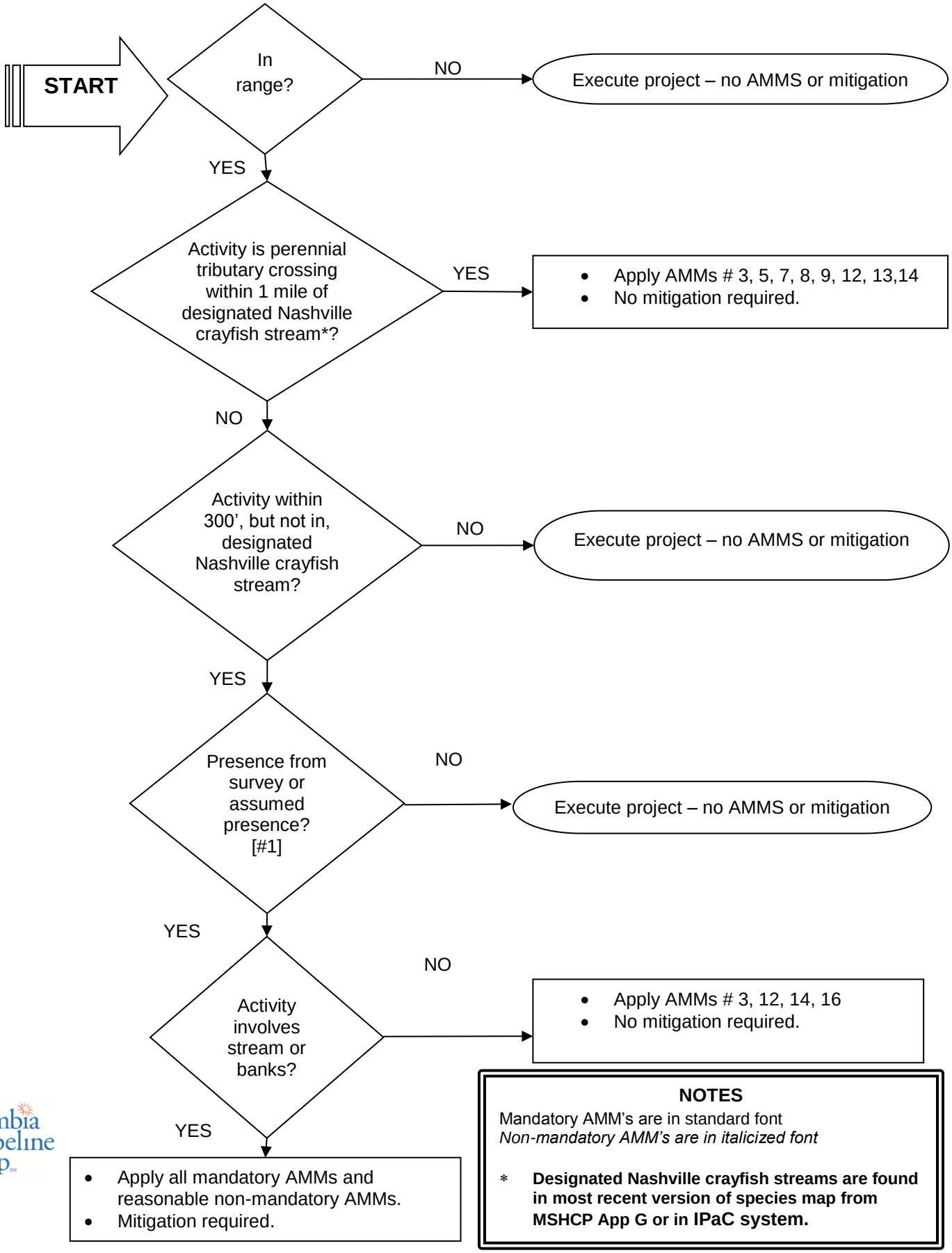



# NASHVILLE CRAYFISH

## *Orconectes shoupi*



## Nashville Crayfish Compliance Flowchart




**NOTES**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

* **Designated Nashville crayfish streams are found in most recent version of species map from MSHCP App G or in IPaC system.**

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## Nashville Crayfish

## Measures to Avoid and Minimize Impacts

These measures apply to all known occupied and presumed occupied areas in the Mill Creek watershed in Davidson and Williamson counties, Tennessee (**Appendix G, Figure 6.2.9.3-1**). These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1.

**Pre-construction Surveys within Suitable Habitat to Remove and Relocate Individuals**

1. Stream crossing activities will occur between May 16 and September 30 to avoid the Nashville crayfish reproductive period. Within 24 hours prior to commencement of work: (1) the area to be trenched, the water diversion structure, and a 25-foot buffer on either end of the coffer dam location (potential work area) shall be surveyed (**Appendix L**) for Nashville crayfish by a qualified biologist; and (2) barriers to preclude re-entry of Nashville crayfish at the propose coffer dam location put into place. Any Nashville crayfish found during the survey must be removed upstream into suitable habitat (as per specifications below) prior to construction in the stream.

- Any crayfish collected will be removed and relocated by a qualified biologist approved under Federal and State permits to conduct such work.
- All crayfish collected shall be returned within one hour of collection to the stream into suitable habitat outside the area of potential impact and no less than 150 feet upstream from the project site. Suitable habitat generally requires conditions of depth, flow, substrate, channel morphology, and riparian vegetation analogous to that from which the individuals were removed.
- During construction, a biologist shall be available to, at a minimum, monitor Nashville crayfish movement into the construction area, move any Nashville crayfish threatened by construction activities, and to monitor in-stream construction activities for significant impacts from construction outside the limits of the cofferdams.
- Within 24 hours after the water diversion structures are constructed, but before excavation of the trench begins, another sweep will be made within the water diversion structures.

If an adequate survey effort (includes the initial sweep and an inspection of the dewatered area within the coffer dam) does not indicate the presence of crayfish, the stream crossing will be classified as unoccupied habitat and the AMMs would not be mandatory. However, NiSource may employ some of the AMMs to maintain the

viability of the potentially suitable habitat.

**Maintaining Suitable Habitat Characteristics**

2. Utility line trenches shall be backfilled to within six inches of the original stream bottom with native material (stone or gravel). The remainder of the fill shall consist of slab rocks a minimum of 1.6 square feet.

**Pre-Construction Planning: Preparation of an EM&CP**

3. A detailed EM&CP will be prepared for any activity with potential effects (e.g., streambed or stream bank disturbance, impacts to riparian habitat, activities causing sediment) within 100 feet of the ordinary high water mark of occupied Nashville crayfish 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 waterbody crossing will be considered "high-quality" for the purpose of preparing this plan regardless of the actual classification. One chapter of the plan will describe in detail how NiSource will strive to avoid the take of Nashville crayfish in occupied habitat. It will provide information on how NiSource will minimize streambed and riparian disturbance since Nashville crayfish are very sensitive to loss of shade from riparian vegetation (including minimization of tree clearing within 25 feet of the crossing [**Figure 24, ECS**]), preventing downstream sedimentation (including redundant erosion and sediment control devices which would be designed to protect crayfish resources 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 the frac-out avoidance and contingency plans described in AMM #4 below. The EM&CP will also include a sediment control component for uplands reasonably likely to drain to and impact occupied habitat and specify detailed erosion control plans for slopes greater than or equal to 30% leading directly to occupied habitat. In areas with less than a 30% slope, ECS and AMM erosion control measures protective of mussels will be implemented. 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 Nashville crayfish AMMs that must be implemented.

**Streambed Construction**

4. For activities in occupied habitat, consider installing new or replacement pipelines and major repairs under the river bottom using HDD or other trenchless methods rather than open trenching (Section 5.2.1.1 and **Appendix J**). 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 specifically reference crayfish resources 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 by NiSource and the Service to protect this resource. The plan will also include a frac-out impact avoidance plan that will evaluate

the specific site in terms not only of feasibility of conducting HDD, but the likelihood of large scale frac-out and its effects on Nashville crayfish, and actions to address a large scale frac-out in occupied habitat. The plan should also consider the potential effects on Nashville crayfish if drilling fluids are released into the environment. The plan must contain all information required for a FERC Section 7(c) filing at a minimum.

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 trenchless method is not feasible, a report will be prepared and included in the annual report submitted to the Service.

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 (e.g., outside bend in the waterbody, highly erosive stream channel, anticipated future upstream development activities in the vicinity) 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. For repairs in occupied habitat, do not install in-channel repairs (bendway weirs, hardpoints, concrete mats, fill for channel relocation, or other channel disturbing measures) except when an HDD as described in AMM#4 above is not feasible from an engineering perspective, and then, only in conjunction with a stream restoration plan based on Rosgen (*see* Wildland Hydrology 2009 http://www.wildlandhydrology.com/html/references_.html) or other techniques mutually agreed upon by NiSource and the Service that result in no direct or lethal take of Nashville crayfish.

7. Use dry-ditch dam and pump methodology (do not use limestone or any fill for coffer-dam bags that could affect pH or otherwise affect the water quality of occupied habitat) for all new construction and repair unless HDD is determined through AMM #4 above to be feasible.

8. Remove equipment bridges as soon as practicable (this is typically interpreted to be a few days to a few weeks unless there are extenuating circumstances) after repair work and any site restoration is completed.

9. 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 mussel 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**

*10. Do not construct culvert and stone access roads and appurtenances (including equipment crossings) across the waterbody or within the riparian zone. Temporary equipment crossings utilizing equipment pads or other methods that span the waterbody are acceptable provided that in-stream pipe supports are not needed.*

**Pipeline Abandonment**

11. *Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to endangered crayfish.*

**Contaminants**

12. 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 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; and

b. call the appropriate Service Field Office to report the release, in addition to the National Response Center (800-424-8802).

13. 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.

14. Do not use fertilizers or herbicides within 100 feet of known or presumed occupied habitat. 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 Nashville crayfish habitat. The EM&CP prepared for this activity (AMM #3 above) will document relevant EPA guidelines for application.

**Withdrawal and Discharge of Water**

15. *Reserved.*

16. 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.

**Travel for O&M Activities**

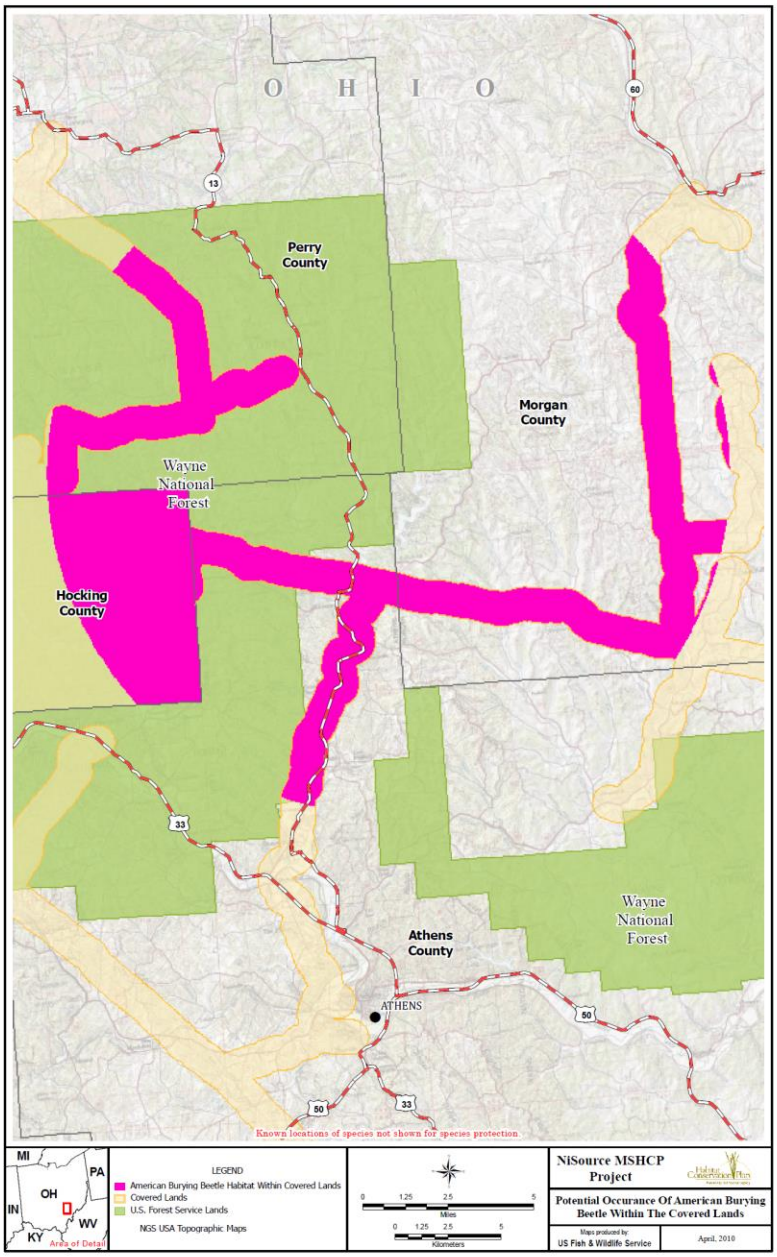
17. Do not drive across streams – walk these areas or visually inspect from bank and use closest available bridge to cross stream.

**Time-of-Year Restriction**

18. Do not work in the stream channel of Nashville crayfish presumed or occupied habitat between 1 October and 15 May.

**Location Specific BMPs for Nashville Crayfish**

- Do not authorize or permit the construction of looping or other projects, or the implementation of O&M activities that directly or indirectly impact Indian Creek in the Mill Creek Watershed.

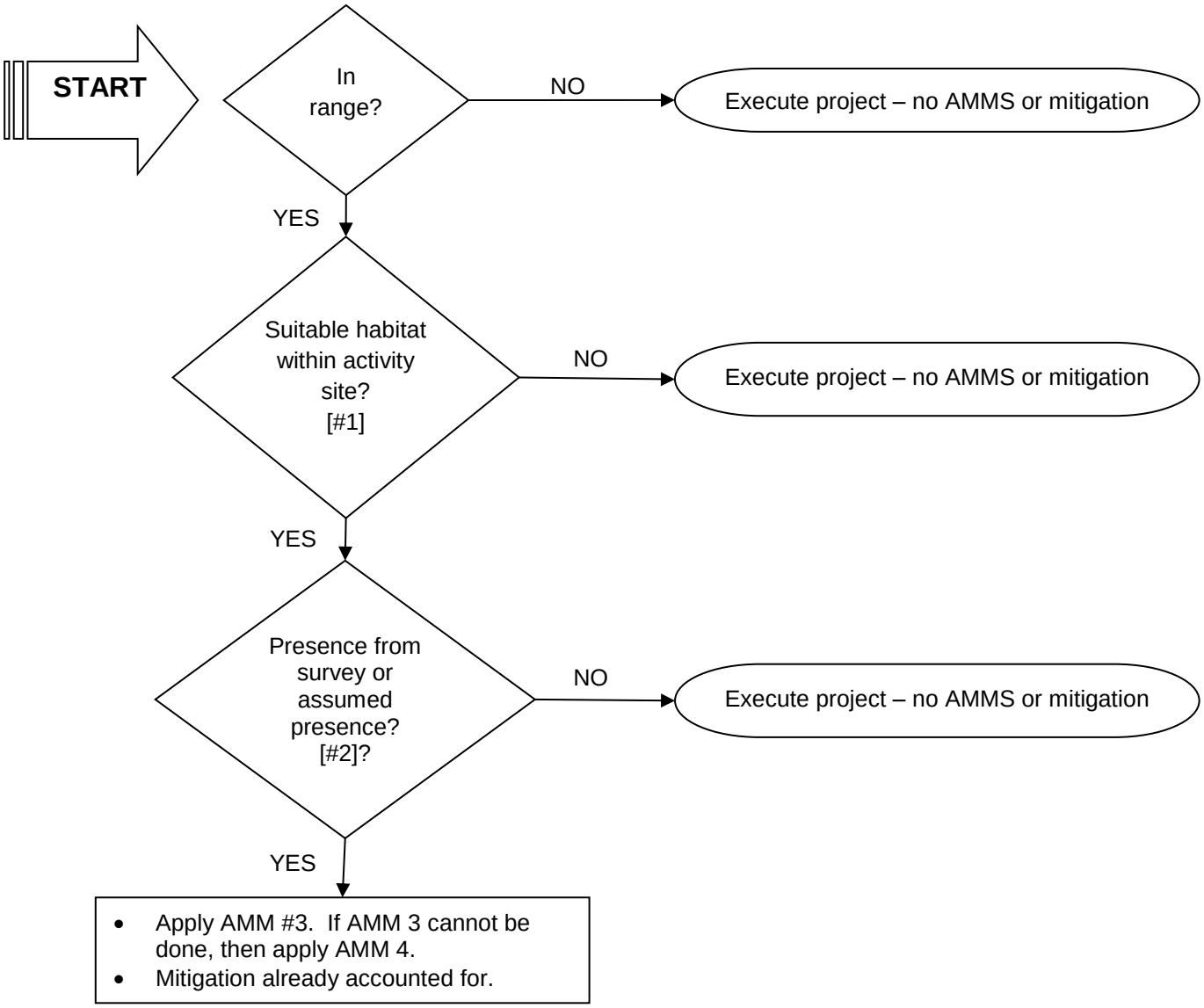



# AMERICAN BURYING BEETLE

## *Nicrophorus americanus*

Columbia Pipeline Group

## American Burying Beetle Compliance Flowchart




**NOTES**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

## American Burying Beetle

## Measures to Avoid and Minimize Impacts

These measures only apply to all covered activities within the 10-mile area of the 2008 American burying beetle (ABB) release site on the Wayne NF (Wayne NF Release Site) near where Perry, Morgan, and Athens counties meet in Ohio (**Appendix G, Figure 6.2.10.3-1**). American burying beetles are expected to disperse a maximum of 10 miles from the Wayne NF Release Site. These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

NiSource will use the process outlined below in order to determine the suitability of ABB habitat and presence of the species. NiSource will then implement all relevant AMMs.

**Determining ABB Habitat Suitability within the Wayne NF Release Site**

1. Essentially, all habitats within 10 miles of the Wayne NF Release Site are considered suitable for American burying beetles unless one of the following criteria is satisfied. Covered activities implemented in areas meeting any of these criteria are unlikely to adversely impact ABBs and NiSource can proceed without the need to employ ABB AMMs.

- NiSource total land disturbance of 1.2 acres or less in size.[8]
- Soil that is greater than 70% sand.
- Soil that is greater than 70% clay.
- Land where greater than 80% of the soil surface is comprised of rock.
- Land where greater than 80% of the subsurface soil structure within the top four inches is comprised of rock.

[8] Using recently collected survey data, the Service derived densities of ABBs in their known range within Oklahoma. Using the effective trapping area and number of ABBs collected, they estimated average ABB densities to be 0.0084 ABBs/acre for their known range in Oklahoma. A standard z test was then used to determine the probability of encountering an individual ABB in a given area. They determined that disturbance of less than 1.2 acres would have, on average, no more than a one percent chance of impacting an individual ABB.

- Land that has already been developed and no longer exhibits surficial topsoil or leaf litter.
- Agricultural land that is tilled on at least an annual basis.
- Land in an existing right-of-way or along an existing roadway.
- Urban areas.
- Stockpiled soil.
- Wetlands (defined as sites exhibiting hydric soils and vegetation).

**Surveys to Evaluate the Presence of ABBs within Suitable Habitat[9]**

*2. Surveys to Determine Presence/Absence within the Wayne NF Release Site*

*NiSource will conduct surveys to determine presence or probable absence of ABBs within suitable habitat for site-specific new construction projects. The "American Burying Beetle Nicrophorus americanus Survey Guidance for Oklahoma - Updated May 20, 2009" provided in* ***Appendix L*** *should be applied. Results of completed surveys will be submitted to the Service as part of the annual report. The Service will accept the results of these surveys for the purposes of determining whether take must be addressed as provided in the NiSource MSHCP.*

*Landowner permission is required to complete presence/absence surveys because surveys would take place outside of the immediate project footprint. If no ABBs are captured, no further AMMs are necessary. If ABBs are captured, the appropriate AMMs would apply. Alternatively, NiSource may elect to assume presence of ABBs in suitable habitat and apply the following AMMs.*

**Measures to Avoid and Minimize Impacts to ABBs in Known or Presumed Occupied Habitat**

*3. NiSource will implement the Service's "American Burying Beetle Nicrophorus americanus Baiting Away Guidance For Projects in Oklahoma - Updated May 20, 2009" (****Appendix L****) to avoid and minimize impacts to ABBs in documented or presumed occupied habitat within the Wayne NF Release Site by using bait to lure ABBs out of the impact area. Landowner permission is required to complete this avoidance and minimization measure because application of this measure would take place outside of the immediate project footprint. Release sites will not occur in an area where future NiSource activities could potentially impact ABB mitigation efforts.*

[9] Researchers conducting Presence/Absence surveys, as well as Bait Away and Trap and Relocate protocols for the American burying beetle must have a valid federal permit in their possession prior to their activities. In addition, these surveys and protocols are likely to be updated by the Service over time. The most recent versions of these documents must be used.

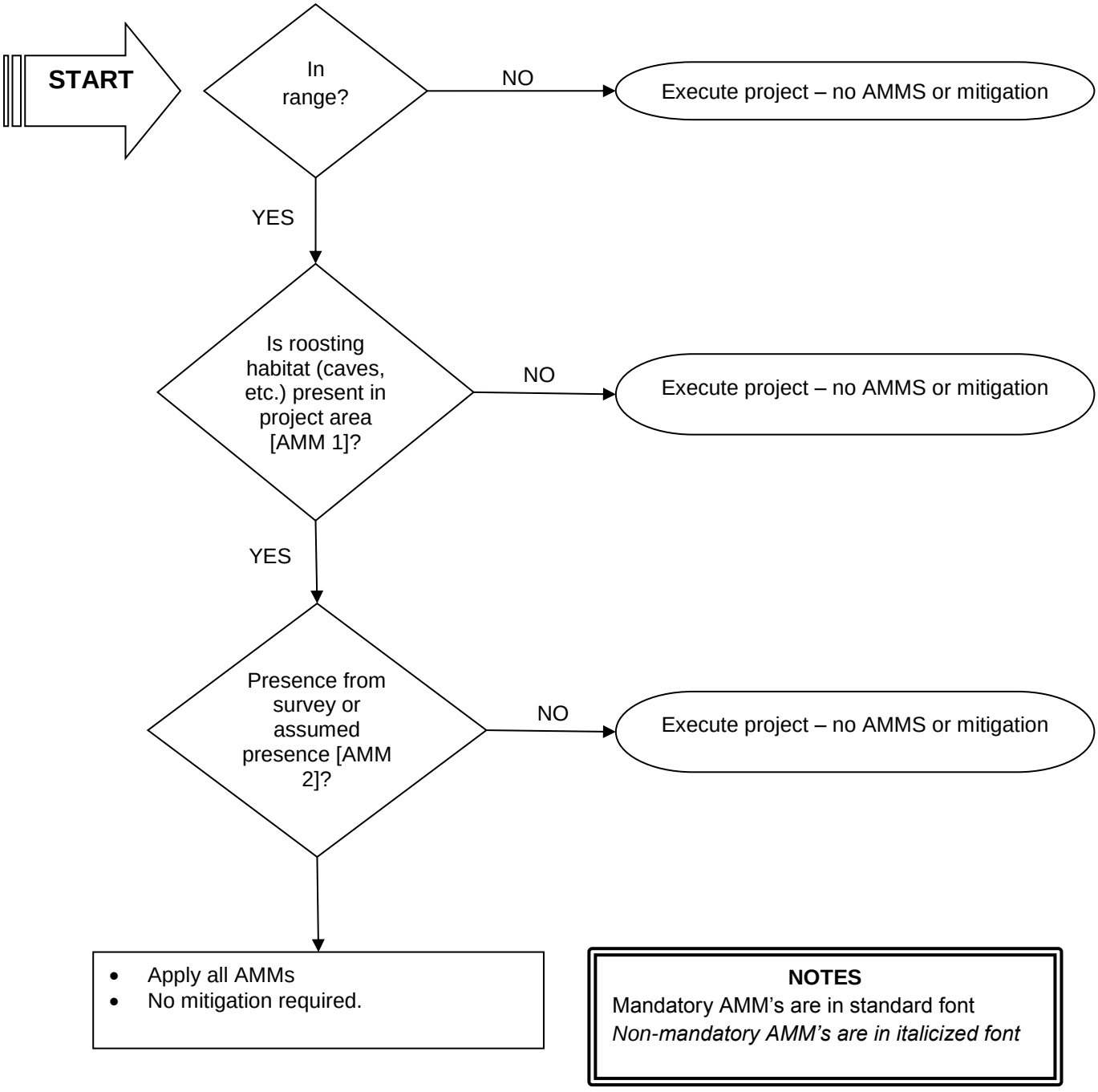
4. If implementation of #3 is not possible, NiSource will implement the Service's "*American Burying Beetle Nicrophorus americanus Trapping and Relocating Guidance in Oklahoma - Updated May 20, 2009*" (**Appendix L**) within the construction work area to avoid and minimize impacts to ABBs in documented or presumed occupied habitat within the Wayne NF Release Site by relocating ABBs collected within or adjacent to the construction work area to protected areas within the Future old forest management area on the Wayne NF within the 10-mile release unit. The relocation site would meet the criteria for suitable habitat for this species and would be removed from potential NiSource and other foreseeable impacts. The exact location of relocation would be determined on a case-by-case basis in consultation with the Wayne NF and the Ohio Field Office.

**GRAY BAT**

***Myotis grisescens***

| State | County |
|---|---|
| Kentucky | Adair, Allen, Carter, Clark Estill, Fayette, Garrard, Greenup, Lee, Letcher, Lincoln, Madison, Menifee, Metcalfe, Monroe Montgomery, Morgan, Powell, Rowan |
| Tennessee | Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson |

## Gray Bat Compliance Flowchart



## Gray Bat

## Avoidance and Minimization Measures

These species-specific AMMs apply to the covered lands within the following counties: Adair, Allen, Carter, Clark, Estill, Fayette, Garrard, Greenup, Lee, Letcher, Lincoln, Madison, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Powell, and Rowan counties, Kentucky; and Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson counties, Tennessee.

These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures to avoid and minimize impacts to the species in summer foraging habitat[10] (i.e., AMMs 11-18) have been identified to provide additional conservation benefits to the species within known and assumed occupied habitat. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

**Surveys to Determine Presence of Potential Summer Roosts and/or Winter Hibernacula**

1. NiSource will develop sufficient information as to whether potentially suitable summer and winter gray bat habitat exists within a proposed project area. This knowledge can be derived from several sources including, but not limited to, on-site visits, review of aerial photography and other maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of NiSource's consultants or other designees. Gray bats have been documented using caves, quarries, bridges, and other man-made sites that act as summer and winter roosting and hibernation habitat. NiSource personnel or its consultants will determine whether potentially suitable summer and winter habitat exists within the project area by conducting "Summer/Winter Habitat Pre-Surveys" as described below. The results of such pre-surveys will be recorded and documented in NiSource's annual compliance report. Pre-survey results will be valid for at least 2 years. The Summer/Winter Habitat Pre-Survey Protocols are:

i. The openings should be at least one (1) foot in diameter or larger.

ii. The passage should continue beyond the dark zone and not have an obvious end within 40 feet of entrance (Note: This may not be verifiable by surveyor due to safety concerns.).

iii. Entrances that are collapsed or otherwise inaccessible to bats will be excluded.

[10] Summer foraging habitat is defined as all perennial streams, ponds, and lakes within the covered lands that are located within 12-miles of a known and/or assumed occupied summer roosting cave for gray bats.

Abandoned mine (e.g., coal, limestone, etc...) openings that have occurred recently (i.e., within the past 12 months) due to creation or subsidence will be excluded however a written description and photographs of the opening must be included in the pre-survey report.

**Surveys to Confirm Use of Summer Roosts and/or Winter Hibernacula**

2. If potentially suitable summer and/or winter habitat is discovered as a result of the pre-survey above, do not alter, modify, or otherwise disturb entrances or internal passages of caves, mines, or other entrances to underground voids (potential summer roosts/hibernacula) within the covered lands of the MSHCP until further investigation is completed to determine if the potential habitat is in fact, occupied habitat. The winter survey protocols would follow those for "Determination of Potential Winter Habitat for Indiana Bat" due to the comprehensive overlap of range and habitat for these two species; however, a summer survey must also be completed for gray bats because this is a cave obligate species. The summer surveys must be completed between the dates of June 15th and August 15th. Summer survey protocols to determine whether potential summer roosting habitat for gray bats is occupied are provided in Attachment 1. *Otherwise, NiSource will assume presence of gray bats in this summer and/or winter habitat.* If surveys (conducted using approved methodology) fail to detect gray bats, AMMs in summer and/or winter habitat are not mandatory. However, NiSource may employ some of the AMMs to maintain the viability of the potentially suitable habitat.

**Measures to Avoid and Minimize Impacts to the Species in Known or Presumed Occupied Summer Roosts and/or Winter Hibernacula**

3. When burning brush piles within 0.25 miles of occupied summer roost and/or winter hibernacula, the brush piles can be no more than 25' by 25' and must be spaced at least 100 feet apart.

4. No woody vegetation or spoil (e.g., soil, rock, etc…) disposal within 100-feet of known summer roost and/or winter hibernacula entrances and associated sinkholes.

5. Protect recharge areas of cave streams and other karst features that are hydrologically connected to known summer roost and/or winter hibernacula by following relevant ECS standards such as Section III, Stream and Wetland Crossings; and Section IV, Spill Prevention, Containment and Control.

6. Blasting within ½ mile of known or presumed occupied summer roost and/or winter hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of known or presumed occupied site.

7. Drilling within ½ mile of known or presumed occupied summer roost and/or winter hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of known or presumed occupied site.

8. If authorized by the landowner block (e.g., gate) access roads and ROW's leading to known summer roost and/or winter hibernacula from unauthorized access.

9. Equipment servicing and maintenance areas will be designated to areas away from

streambeds, riparian zones, sinkholes, or areas draining into sinkholes.

10. Operators, employees, and contractors will be educated on the biology of the gray bat, identification of the bat, and its signs, activities that may affect bat behavior, and ways to avoid and minimize these effects.

**Measures to Avoid and Minimize Impacts to the Species in Known or Presumed Occupied Summer Foraging Habitat**

11. *When performing vegetation management, tree clearing in known or presumed occupied summer habitat where gray bats forage (i.e., riparian corridors of perennial streams) should be kept to a minimum in order to preserve as much foraging area and tree cover as possible.*

12. Restrict use of herbicides for vegetation management near known or presumed occupied gray bat foraging habitat to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands) in order to not endanger their food source.

13. *Abandon pipelines in place to avoid disturbance to perennial streams that would result from pipeline removal and thus affect potential gray bat prey.*

14. *For repairs on perennial streams, replace damaged pipeline using HDD - do not install in-channel repairs (bendway weirs, hardpoints, concrete mats, fill for channel relocation, etc.).*

15. *Conduct repairs from a lay barge or temporary work bridges of the minimum length necessary to conduct the repairs rather than operating heavy equipment (e.g., backhoes, bulldozers) in perennial streams. Temporary construction and equipment bridges are not to be confused with stone or fill causeways with pipe structures, which should not be employed in occupied habitat.*

16. *Remove equipment bridges as soon as possible after repair work and any site reseeding is completed on perennial streams.*

17. *Site staging areas for equipment, fuel, materials, and personnel at least 300 feet from the waterway to reduce the potential for sediment and hazardous spills entering the waterway.*

18. *Perennial stream crossings should be conducted during low flow conditions between the months of June 1 and November 30.*

19. *Avoid conducting perennial stream crossing construction activities after sunset in known or presumed occupied summer habitat to avoid harassment of foraging gray bats.*

20. Contaminants, including but not limited to oils, solvents, smoke from brush piles, and others should be strictly controlled as provided for in the EMCS and ECS, Section II, C, 2; and Section IV so the quality, quantity, and timing of prey resources are not affected.

21. Implement erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible) as specified in the ECS upon completion of work within 12-miles of known or presumed occupied summer roosts.

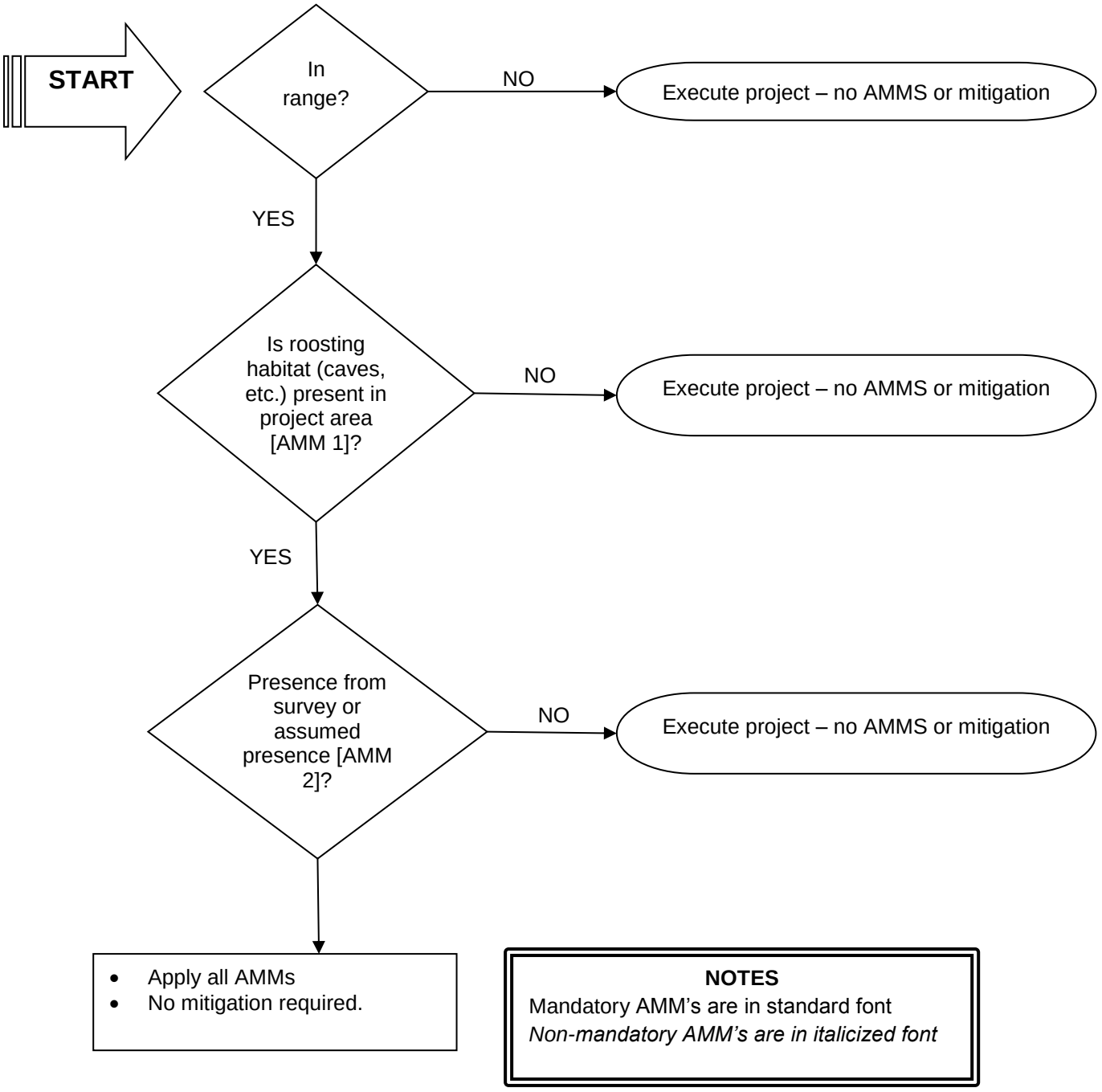
A detailed Environmental Management and Construction Plan (EM&CP) will be prepared for any project within gray bat habitat. The plan will incorporate the relevant requirements of NiSource's current ECS and include site-specific details particular to the project

area and potential impact. The plan will be strongly oriented towards minimizing disturbance of hibernation and roosting caves and minimization of stream and riparian zone impacts within known foraging areas. 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 hi-light the environmental sensitivity of the habitat and any gray bat BMPs which must be implemented.

# VIRGINIA BIG-EARED BAT
## *Corynorhinus townsendii*

| State | Counties |
|---|---|
| Kentucky | Bath, Carter, Estill, Lee, Madison, Menifee, Montgomery, Morgan, Owsley, Powell, Rowan, Jackson |
| Virginia | Augusta, Giles, Rockingham |
| West Virginia | Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker |

## Virginia Big-Eared Bat Compliance Flowchart



## Virginia Big-eared Bat

## Avoidance and Minimization Measures

These species-specific AMMs apply to the covered lands within the following counties: Bath, Carter, Estill, Lee, Madison, Menifee, Montgomery, Morgan, Owsley, Powell, Rowan, and Jackson counties, Kentucky; Augusta, Bland, Giles, Rockingham, and Shenandoah counties, Virginia; and Fayette, Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker counties, West Virginia. These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures to Avoid and Minimize Impacts to the Species in Summer Foraging and/or Fall Swarming Habitat[11] (i.e., AMMs 11-18) have been identified to provide additional conservation benefits to the species within known or presumed occupied habitat. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

**Surveys to Determine Presence of Potential Summer Roosts and/or Winter Hibernacula (i.e., caves, quarries, and abandoned mine portals)**

1. NiSource will develop sufficient information as to whether potentially suitable summer and winter Virginia big-eared bat roosting habitat exists within a proposed project area. This knowledge can be derived from several sources including, but not limited to, on-site visits, review of aerial photography and other maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of NiSource's consultants or other designees. Virginia big-eared bats have been documented using caves, quarries, and abandoned mine portals (and their associated underground workings) as summer and winter roosting and hibernation habitat. NiSource personnel or its consultants will determine whether potentially suitable summer and winter roosting habitat exists within the project area by conducting "Summer/Winter Habitat Pre-Surveys" as described below. The results of such pre-surveys will be recorded and documented in NiSource's annual compliance report. Pre-survey results will be valid for at least 2 years. The Winter Habitat Pre-Survey Protocols are:

i. The openings should be at least one (1) foot in diameter or larger.

ii. The passage should continue beyond the dark zone and not have an obvious end within 40 feet of entrance (Note: This may not be verifiable by surveyor due to safety concerns.).

iii. Entrances that are flooded or prone to flooding (i.e., debris on ceiling), collapsed, or otherwise inaccessible to bats will be excluded.

[11] Known or presumed occupied summer foraging and/or fall swarming habitat is defined as those habitats located within the covered lands where the bats would forage (i.e., woodlands, old fields, hayfields, and agricultural fields and night roost (i.e., rockshelters, abandoned houses, barns, outbuildings, and bridges) within 6 miles of known or presumed occupied summer and/or winter roosting caves.

iv. Abandoned mine (e.g., coal, limestone, etc...) openings that have occurred recently (i.e., within the past 12 months) due to creation or subsidence will be excluded however a written description and photographs of the opening must be included in the pre-survey report.

**Surveys to Confirm Use of Summer Roosts and/or Winter Hibernacula (i.e., caves, quarries, and abandoned mine portals)**

2. If potentially suitable summer and/or winter roosting habitat is discovered as a result of the pre-survey above, do not alter, modify, or otherwise disturb entrances or internal passages of caves, mines, or other entrances to underground voids (potential summer roosts/hibernacula) within the Covered Lands of the MSHCP until further investigation is completed to determine if the potential habitat is in fact, occupied habitat. The winter survey protocols would follow those for "Determination of Potential Winter Habitat for Indiana Bat" due to the comprehensive overlap of range and habitat for these two species; however, a summer survey must also be completed for Virginia big-eared bats because this is a cave obligate species. The summer surveys must be completed between the dates of June 15 and August 15 to document presence of or use by (i.e., guano) Virginia big-eared bats. Summer survey protocols to determine whether potential summer habitat for Virginia big-eared bat is occupied are attached. *Otherwise, NiSource may assume presence of Virginia big-eared bats in this summer and/or winter habitat.* If surveys (conducted using approved methodology) fail to detect Virginia big-eared bats, AMMs in summer and/or winter habitat are not mandatory. However, NiSource may employ some of the AMMs to maintain the viability of the potentially suitable habitat.

**Measures to Avoid and Minimize Impacts to the Species in Known or Presumed Occupied Summer Roosts and/or Winter Hibernacula (i.e., caves, quarries, and abandoned mine portals)**

3. When burning brush piles within 0.25 miles of known or presumed occupied summer roosts and/or winter hibernacula, the brush piles can be no more than 25' by 25' and must be spaced at least 100 feet apart.

4. No woody vegetation or spoil (e.g., soil, rock, etc…) disposal within 100-feet of known or presumed occupied summers roost and/or winter hibernacula entrances and associated sinkholes.

5. Protect recharge areas of cave streams and other karst features that are hydrologically connected to known or presumed occupied summer roosts and/or winter hibernacula by following relevant ECS standards such as Section III, Stream and Wetland Crossings; and Section IV, Spill Prevention, Containment and Control.

6. Blasting within ½ mile of known or presumed occupied summer roosts and/or winter hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of these habitats.

7. Drilling within ½ mile of known or presumed occupied summer roosts and/or winter hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of these habitats.

8. If authorized by the landowner, block (e.g., gate) access roads and ROW's leading to known or presumed occupied summer roosts and/or winter hibernacula from unauthorized access.

9. Equipment servicing and maintenance areas will be designated to areas away from streambeds, sinkholes, or areas draining into sinkholes.

10. Operators, employees, and contractors will be educated on the biology of the Virginia big-eared bat, identification of the bat, and its signs, activities that may affect bat behavior, and ways to avoid and minimize these effects.

**Measures to Avoid and Minimize Impacts to the Species in Known or Presumed Occupied Summer Foraging and/or Fall Swarming Habitat**

11. Within six miles of known or presumed occupied summer roosts and/or winter hibernacula, create or maintain a diversity of open, herbaceous habitats within the pipeline ROW.

12. *Avoid new ROW and appurtenant facility construction is prohibited within 200 feet of known or presumed occupied summer roosts and/or winter hibernacula.*

13. Contaminants, including but not limited to oils, solvents, smoke from brush piles, and others should be strictly controlled as provided for in the EMCS and ECS, Section II, C, 2; and Section IV so the quality, quantity, and timing of prey resources are not affected.

14. Implement erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible) as specified in the ECS upon completion of work within six miles of known or presumed occupied summer roosts and/or winter hibernacula.

15. *Avoid conducting construction activities after sunset in known or presumed occupied summer habitat to avoid harassment of foraging Virginia big-eared bats.*

16. Remove buildings within six miles of known or presumed occupied summer roosts and/or hibernacula between November 16th and March 31st. Buildings may be removed other times of the year once a Service approved bat biologist evaluates the buildings' potential to serve as night roosting habitat and determines Virginia big-eared bats are not present and/or using the structure.

17. *Site staging areas for equipment, fuel, materials, and personnel at least 300 feet from the waterway to reduce the potential for sediment and hazardous spills entering the waterway.*

18. Restrict use of herbicides for vegetation management within six miles of known or presumed occupied summer roosts and/or winter hibernacula to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands).

19. Between April 1st and November 16th and within six miles of known or presumed occupied summer roosts and/or winter hibernacula, use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits.

20. *Within six miles of known or presumed occupied summer roosts and/or winter hibernacula, avoid new construction through cliffline[12] habitat to protect night roosts.*

A detailed Environmental Management and Construction Plan (EM&CP) will be prepared for any project within Virginia big-eared bat habitat. The plan will incorporate the relevant requirements of NiSource's current ECS and include site-specific details particular to the project area and potential impact. The plan will be strongly oriented towards minimizing disturbance of hibernation and roosting caves and impacts within known foraging and night roosting habitats. 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 hi-light the environmental sensitivity of the habitat and any Virginia big-eared bat AMMs which must be implemented.

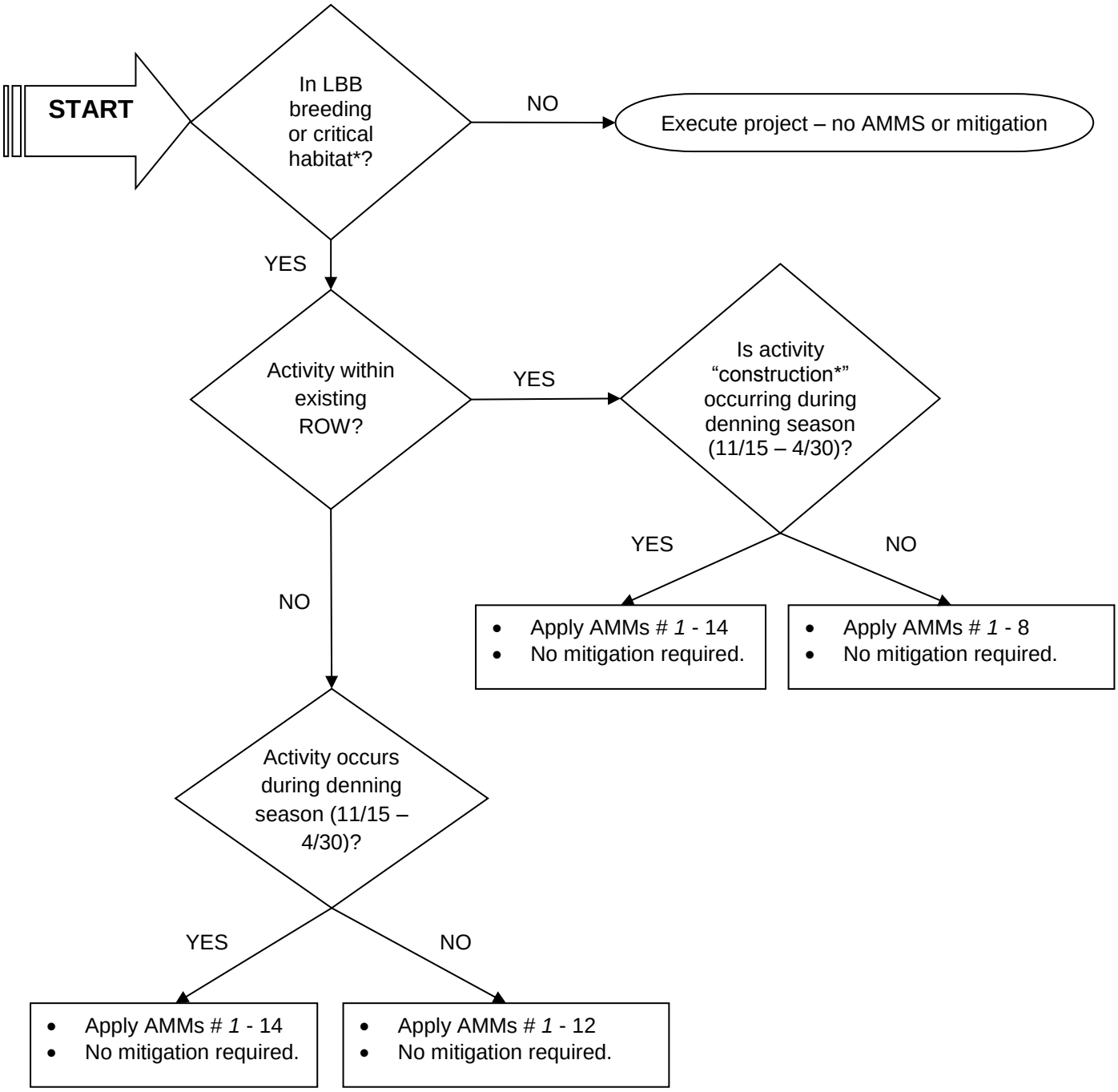
[12] A cliffline is defined as a naturally occurring, exposed vertical rock structure that is 10 feet or more in height and a minimum of 100 feet in length, of sandstone or limestone parent material. A cliffline may have boulders accumulated at its base. The cliffline usually contains fissures and openings of various sizes that have been created from rock sloughing, erosion, or geological forces. The cliffline is considered to be continuous if segments are separated by no more than 300 feet.

# LOUISIANA BLACK BEAR

## *Ursus americanus luteolus*

| State | Counties |
|---|---|
| Louisiana | East Carroll, Franklin, Iberia, Madison, Richland, and St. Mary |

## Louisiana Black Bear Compliance Flowchart




**NOTES**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

* **Designated LBB breeding and critical habitats are found in most recent version of species map from MSHCP App F or in IPaC system.**

* **Construction activity does not include ROW maintenance (mowing or herbicide use).**

## Louisiana Black Bear

## Avoidance and Minimization Measures

These measures apply to all known breeding habitat (i.e., where females have been documented to occur) and critical habitat as identified by the Service (Soileau 2008). Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary. These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, cost, and effectiveness as more fully described in Chapter 5 of this MSHCP.

**Avoidance and Minimization of Impacts to Individuals, Breeding, and Critical Habitat[13]**

*1. Conduct all vegetative clearing activities in breeding habitat between May 1st and November 14th.*

2. When conducting those activities identified as potentially causing take in breeding and critical habitat, NiSource shall ensure, through a program of continuing education and appropriate preventive actions, that all potential bear attractants (i.e., human garbage and food scraps) generated during both project construction, and subsequent operation and maintenance of the proposed facility, shall be strictly controlled by using "bear-proof" waste disposal containers specifically approved by the Louisiana Department for Wildlife and Fisheries, the installation of signs at work sites to remind workers they are in bear country, and providing brochures developed by the Service that discuss the need for attractant control to all workers on-site. Implementation of these measures preclude the potential habituation of bears to human-associated food sources.

3. In breeding habitat (Figure 1, attached), no actual den tree or candidate den tree (36 inches or more in dbh regardless of species with visible cavities[14]) shall be removed or damaged. "Tree damage" includes the trunk, limbs, and the entire root system, including soil compaction from heavy equipment.

*4. Reserved.*

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[13] Although the average statewide denning season for Louisiana black bears is approximately December 1 through April 30, the denning season for the purposes of implementation of the NiSource MSHCP will be November 15 through April 30. The departure from the statewide standard is primarily a result of research on southern breeding populations (*See* life history and other biological background, habitat use discussion above) that suggest pregnant female bears entered dens earlier than the statewide standard and the majority of NiSource covered lands through bear habitat occur in the southern breeding populations.

[14] An opening can be of any size as well as in any location (e.g.,. near the base, at the top of the trunk, etc…) on the ≥ 36 inches dbh tree to meet the definition of a cavity.

5. All woody vegetation (including trees and shrubs) proposed for removal shall be cut near ground level to the maximum extent practicable, leaving stumps and root systems in place. Examples of scenarios where stumps and root systems would be removed include side slopes, wet soils, the trench area, etc...

6. Revegetation success shall be monitored annually for the first three years following new pipeline construction or until revegetation is successful as described in the ECS. NiSource will include a monitoring report in its annual compliance report filed with the Service. Revegetation shall be considered successful if the vegetative coverage is at least 80 percent of the type, density, and distribution of the vegetation in adjacent areas not disturbed by construction. If revegetation is not successful at the end of three years, NiSource shall develop (in consultation with the Service) and implement a remedial revegetation plan to actively revegetate the area, and continue to do so until revegetation is successful.

7. Any mowing or widespread clearing of breeding habitat within the existing ROW, beyond the 10-foot width centered over each pipeline, will occur between May 1 and November 14 unless the area has been mowed within the last two years to ensure that Louisiana black bears and cubs using ground dens are not impacted (i.e., the area as maintained is not suitable for denning).

8. Existing ROWs located within designated critical habitat will be maintained in accordance with the NGTS ECS standards for environmentally sensitive areas specified on page 28, Section V.C. "Waterbodies, Wetlands, and Environmentally Sensitive Areas" provided however that only the center 10 feet of the ROW centered on the pipeline will be kept in an herbaceous state. Any trees greater than 15 feet tall located in the remaining portion of the ROW will either be selectively cut or treated with herbicides per NiSource policies on herbicide use.

**Establishing New Permanent Facilities, including ROWs in Breeding and Critical Habitat**

In addition to AMMs 1-8, the following measures will be followed for new construction activities within breeding and /or critical habitat.

9. New pipeline ROW shall be replanted with an appropriate conservation seed mix. Species planted should be native to Louisiana, appropriate to the soils, and provide soft or hard mast for bears and useful to other wildlife species. Annual rye should be planted within the 10-foot wide grass strip centered over the pipeline for quick cover as natives will colonize the area as long as there is an adequate seed source present. Previously forested portions of the construction ROW that will not be part of the permanent ROW will be planted with woody species (i.e., any bare root or containerized plants that are native and provide soft or hard mast and cover [e.g., bottomland hardwood, upland hardwood, or cypress-gum swamp for bears] is adequate). Typical plant spacing for woody species is 10-12 feet.

10. New pipeline ROWs will be maintained in accordance with the NGTS ECS standards for environmentally sensitive areas specified on page 28, Section V.C. "Waterbodies, Wetlands, and Environmentally Sensitive Areas" provided however that only the center 10 feet of the ROW centered on the pipeline will be kept in an herbaceous state. Any trees greater than 15 feet tall located in the remaining portion of the ROW will either be selectively cut or treated with herbicides per NiSource policies on herbicide use.

11. Critical forested bear travel corridors (**Figure 2, attached**) intersected by new pipeline ROW will be crossed using trenchless construction techniques such as HDD or horizontal bore. Trees greater than 15 feet tall in these areas will not be removed.

a) Priority 1 Critical Louisiana Black Bear Travel Corridors (blue polygons)- Lands within Priority 1 areas are extremely important to the bears (usually due to their already fragmented nature, narrow width or high quality habitat).

   i. These areas must be completely crossed using trenchless construction techniques with all entrance and exit holes outside of Priority 1 boundaries (i.e., no vegetation clearing).

   ii. No widening of an existing ROW will occur within Priority 1 corridors.

   iii. All Priority 1 lands, including those identified as non-bear habitat (e.g., agricultural lands), also identified by the Service and NRCS as WRP Special Project Areas will be crossed using trenchless technology should the landowners enroll those tracts into WRP or otherwise allow the tracts to revert or be restored to bear habitat. If WRP enrollment occurs after NiSource installs a pipeline, they will allow these tracts to revert or be restored to bear habitat provided however that only the center 10 feet of the ROW centered on the pipeline will be kept in an herbaceous state.

b) Priority 2 Critical Louisiana Black Bear Travel Corridors (orange polygons)- Lands within Priority 2 areas are still very important to the bears, but tend to be more expansive and intact.

   i. Trenchless construction techniques are required through tracts whose cover is comprised of ≥ 50% woody vegetation.

   ii. Clearing vegetation for entrance and exit holes to accomplish the construction process is allowed within these areas as multiple bores may be required for expansive areas.

   iii. Existing ROW may be widened to allow additional pipeline(s), but only as close to existing pipelines as the safety codes/requirements allow and not to exceed a 75-feet wide maintained ROW combined.

12. Prior to any clearing of breeding habitat, conduct a habitat assessment to record the number of potential den trees and amount of ground denning habitat that would be affected.

**Construction Activities During the Denning Season (November 15 through April 30)**

Construction-related activities within breeding Louisiana black bear habitat are permissible provided that the following AMMs are implemented in addition to AMMs 1-12 during the denning season.

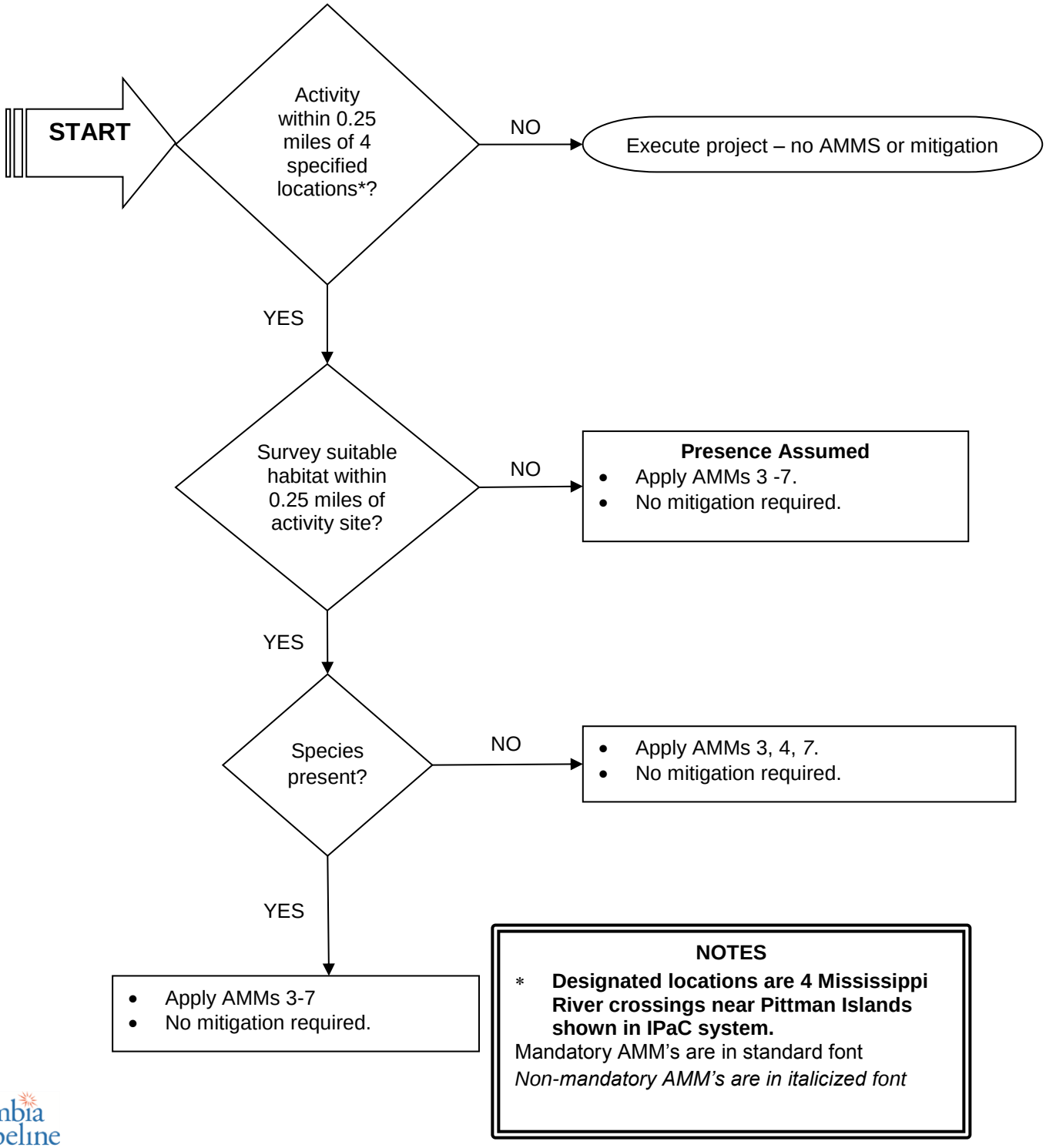
13. Previously identified potential den sites/habitat will be cleared of vegetation outside of the denning season (i.e., work window is May 1 through November 14) to ensure no direct take of bears and/or cubs.

14. A constant level of noise/disturbance (generally equivalent in type and volume to that created by the proposed covered activities) is maintained throughout the project area through the denning season (i.e., November 15 through April 30) until work has finished. The amount of disturbance/noise shall be generated for at least 24 continuous hours every 14 days in all portions of the project area that are within 750 feet of the active construction site.

# INTERIOR LEAST TERN
## *Sterna antillarum*

| State | Counties/ Parish |
|---|---|
| Louisiana | East Carroll Parish |
| Mississippi | Issaquena |

**Interior Least Tern Compliance Flowchart**

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## Interior Least Tern

## Avoidance and Minimization Measures

These measures apply to all known occupied locations (i.e., where individuals have been documented to occur) and/or suitable habitats where breeding occurrence may be presumed in East Carroll Parish, Louisiana; and Issaquena County, Mississippi, as indicated below. There are currently only four pipeline crossings of concern for this species near Pittman Island. Sandbars may migrate around these four crossings and AMMs should be applied whenever sandbars/islands are within 650 feet of the crossings.

These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

The main conservation objective for ROW vegetation maintenance and all other O&M activities is to avoid or minimize impacts to breeding habitat for the interior least tern and avoid/minimize impacts to interior least tern. The main conservation objective for all construction projects (i.e., off existing ROW) is to avoid or minimize impacting breeding habitat (e.g., through project routing).

**Surveys to Evaluate Presence of the Species within Suitable Breeding Habitat**

1. Prior to initiation of activities, conduct least tern surveys within a 0.25-mile buffer of proposed activity within suitable habitat (i.e., sandbars, sandy shorelines, or islands) at 4 specified pipeline crossings of the Mississippi River. Surveys will be conducted by a biologist experienced in least tern surveys. If interior least terns are identified during surveys, implement AMMs #5-6. If no least terns are identified during surveys, proceed with proposed activities, implement AMM 3-4 and consider #7 regardless of any surveys.

OR

2. Assume presence of interior least terns within suitable habitat (i.e., sandbars, sandy shorelines, or island along and within the 4 specified pipeline crossings of the Mississippi River) and implement AMMs 3-7. (NiSource has the option of implementing either AMM#1 (surveys) or AMM#2 (assume presence), but one of these must be implemented).

**Maintaining Suitable Nesting Habitat**

3. Do not utilize occupied or suitable habitat for staging areas (i.e., sandbars, sandy shores, or islands). Use of staging area outside these areas will reduce direct impacts to potential nesting habitats.

4. Restore sandbar to previous contours and substrate after any operations and maintenance activities.

**Avoiding Sandbars During Nesting Season**

5. Avoid any activities within 650 feet of nesting colonies (sandbar/island) between May 15 and August 31.

*6. Install new or replacement pipelines and utility lines under the river bottom using horizontal directional drilling (HDD) rather than open trenching. Drilling should be carefully undertaken and a plan should be in place to minimize and address the risk of habitat disturbance due to frac-outs and the appropriate distance of the staging area from interior least tern nesting habitat. If, after detailed engineering studies (e.g., geotechnical, physiological, topographical, and economic studies), it is determined (and agreed to by NiSource Natural Resources Permitting personnel) that HDD is not feasible, a report will be prepared and included in the annual compliance report submitted to the Service.*

*HDDs under the stream channel are permissible any time of the year. However, proximity of the HDD noise producing equipment should be placed at least 0.25 mile from the known or presumed occupied nest location (and preferably as far as possible from the nest as practical given the design of the drill).*

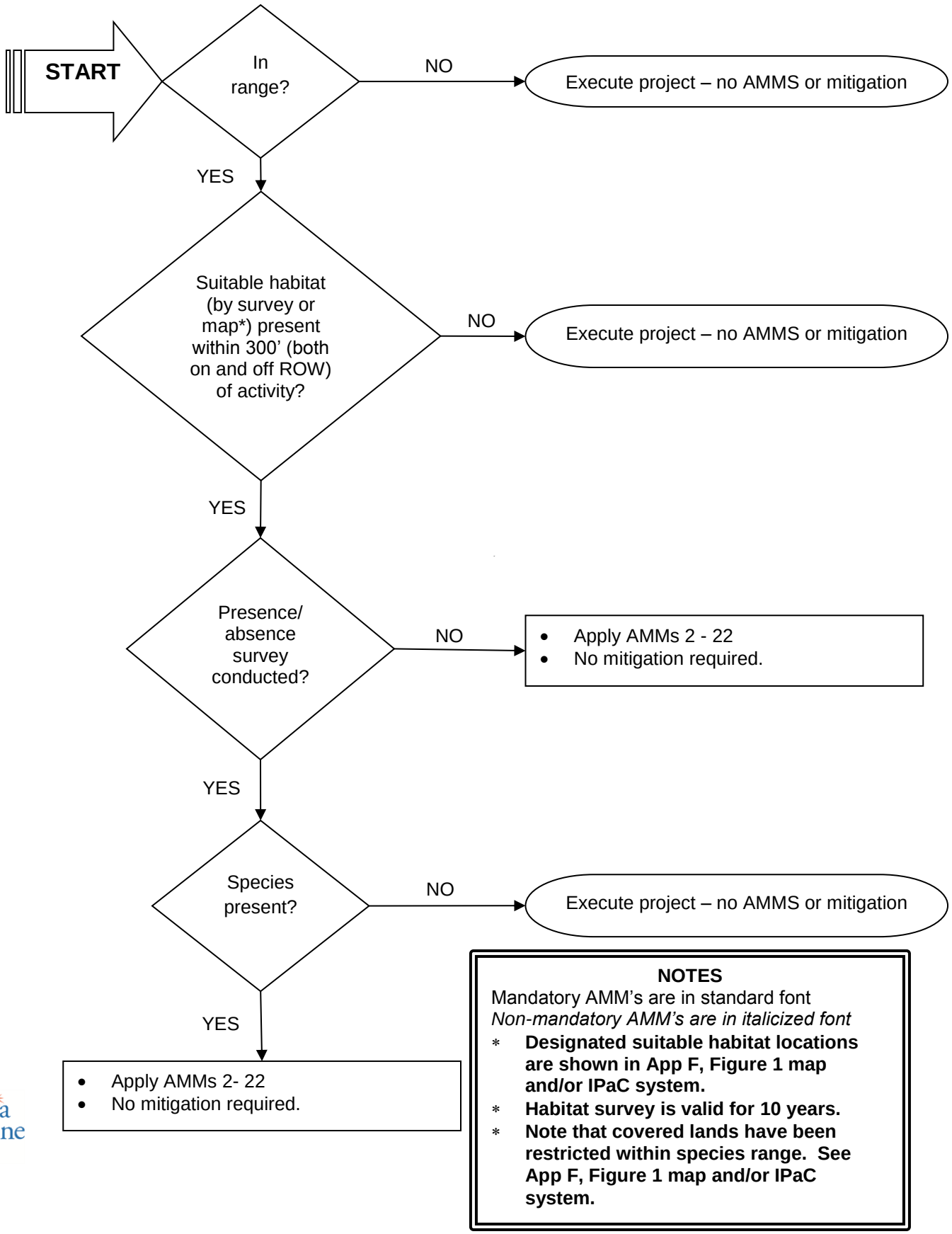
**Pipeline Abandonment**

7. *Abandon pipelines in place to avoid suitable habitat disturbance that would result from pipeline removal.*

# CHEAT MOUNTAIN SALAMANDER
## *Plethodon nettingi*

| State | Counties |
|---|---|
| West Virginia | Grant, Pendleton, Pocahontas, Randolph, and Tucker |

## Cheat Mountain Salamander Compliance Flowchart




**NOTES**

Mandatory AMM's are in standard font

*Non-mandatory AMM's are in italicized font*

* **Designated suitable habitat locations are shown in App F, Figure 1 map and/or IPaC system.**
* **Habitat survey is valid for 10 years.**
* **Note that covered lands have been restricted within species range. See App F, Figure 1 map and/or IPaC system.**

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## Cheat Mountain Salamander

## Avoidance and Minimization Measures

NiSource would apply the NGTS ECS document for all construction and O&M activities within the range of the species where it overlaps with the covered lands.

Measures within the NGTS ECS are designed to minimize impacts on the landscape and improve restoration success. More specifically, it appears that the Cheat Mountain salamander would benefit from maintaining existing upper soil profiles and allowing the return of native vegetation. Topsoil segregation, among other measures, as stated in the NGTS ECS will help to meet these objectives.

Cheat Mountain salamanders are unlikely to occupy existing maintained ROWs. Therefore, to avoid/minimize impacts to Cheat Mountain salamanders, NiSource reduced the covered lands to the existing ROW for approximately 103 miles of the species range.

In addition, the following AMMs were developed to further reduce potential impacts. These measures apply to all known occupied and potential habitat within the covered lands as shown on **Figure 1,** attached. Refer to POPULATION DISTRIBUTION, STATUS, AND TREND (populations potentially impacted) for applicable counties. These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP.

The main Cheat Mountain salamander conservation objective for ROW vegetation maintenance and all other operation and maintenance activities is to avoid or minimize impacts to known or potential Cheat Mountain salamander habitat and avoid or minimize impact to Cheat Mountain salamanders (e.g., crushing/killing/chemical application).

The main Cheat Mountain salamander conservation objective for all construction projects is to avoid or minimize impacting known or potential Cheat Mountain salamander habitat (e.g., through project routing) and avoid or minimize impact to Cheat Mountain salamanders (crushing/killing).

**Surveys to Evaluate Presence of the Species and/or Suitable Habitat**

1. Consider conducting field surveys within the mapped potential range of the Cheat Mountain salamander (Figure 1) for all previously unsurveyed areas to determine whether potential habitat occurs in the project vicinity (the project footprint and a 300-foot buffer). These surveys can be conducted by surveyors deemed to be qualified by the Service and the West Virginia Department of Natural Resources (as demonstrated by obtaining a valid WV State Collecting Permit for Cheat Mountain salamander). A list of currently recognized surveyors can be obtained from the West Virginia Field Office or the WVDNR on an annual basis. These habitat surveys will be accepted for ten years. NiSource will ensure that surveyors have information regarding known locations, 300-foot buffers, and potential habitat of Cheat Mountain salamanders.

If a field survey is not conducted, assume the entire project area as potential habitat, go to step 1.

**For any activity within the mapped potential range that involves disturbances within 300 feet of known or assumed habitat.**

Step 1. Consider conducting habitat surveys of project area that has not previously been surveyed. Maintain positive and negative findings in a GIS database. The results will be submitted to the Service in the annual compliance report. If the project area has been previously surveyed and no potential habitat is present, no further surveys, or AMMs are needed. If the project area has previously been surveyed and potential habitat is present, go to step 2. If project area has previously been surveyed and Cheat Mountain salamanders are known to be present, go to step 3. If a habitat survey is not conducted, assume the entire project area as potential habitat, go to step 2.

Potential habitat present?

- If no, document for future NiSource activities and annual compliance report and no further Cheat Mountain salamander AMMs are needed.
- If yes, conduct Cheat Mountain salamander surveys or assume Cheat Mountain salamander presence.

Step 2a. If conducting Cheat Mountain salamander surveys:

Cheat Mountain salamander found?

- If no, document for future NiSource activities and annual compliance report and no further Cheat Mountain salamander AMMs are needed.
- If yes, conduct further Cheat Mountain salamander AMMs – go to step 3.
- Submit both positive and negative survey reports to the Service annually.

Step 2b. If assuming presence, employ further Cheat Mountain salamander AMMs – go to step 3.

Step 3. Employ further Cheat Mountain salamander AMMs.

**Vegetation Management on the Existing ROW**

2. Conduct covered activities within existing ROWs.

3. Minimize annual mowing of herbaceous layer to 10-foot width directly over pipeline(s).

4. Minimize permanent ROW width mowed an approximate 5 year cycle near known or potential Cheat Mountain salamander sites to 50 feet or less.

5. Leave small piles of woody debris on ground along edge of (but within) existing ROW after side-trimming of trees to provide shade/cover for Cheat Mountain salamander.

6. Herbicide application:

   a. Apply herbicides in accordance with NiSource policy and procedures, EPA guidelines and requirements, state requirements, and the manufacturer's label. Prior to herbicide

use, consult with the timing requirements specified previously.

b. Avoid aerial herbicide application over mapped potential range.

c. For application of herbicides (vehicle or hand) within known or presumed Cheat Mountain salamander sites, follow the following herbicide guidelines.

   i. All herbicide will be sprayed within existing ROW. Ensure that no "overspray" or drift goes off the existing ROW.

   ii. Apply herbicides during fall (after August 30)

   iii. Inject pellets of glyphosate or imazapyr directly into trunks of woody vegetation (red maple, alder, poison sumac)

   iv. Hack and squirt (frill or drill and fill) – cut trunk of tree and apply glyphosate using backpack sprayer, squirt bottle, syringe, or tree injector

   v. Cut stump/stem – cut tree or shrub and apply glyphosate to cut surface using spray bottle or wick applicator

   vi. Wick application – apply glyphosate directly to leaves and/or stem via "glove application" or paint stick with a contained reservoir to hold the herbicide

   vii. Spot spray – spray glyphosate directly onto leaves or stem via backpack sprayer, squirt bottle, or modified low volume hydraulic applicator – no high pressure sprayers

   viii. Herbicide will not be applied using an open container of herbicide for any application to reduce risk of spills

   ix. When conducting foliar application of glyphosate, the surfactant LI-700 may be used in accordance with EPA-approved label instructions

   x. Filling and emptying of herbicide containers will occur in upland areas

   xi. All applicators will have a spill kit available

   xii. All hoses, tanks, and clamps will be inspected in uplands prior to use each treatment day

   xiii. Apply herbicide when wind speed at treatment height is ≤ 5 miles per hour.

7. Vegetation Disposal

   *a. If clearing trees or other native woody vegetation in areas close to known Cheat Mountain salamander populations, shred or cut these materials into large chucks to create cover boards or slabs and then place them along the edge of and up to 20 feet from the edge of the ROW.*

   b. Avoid dragging vegetation through known or assumed Cheat Mountain salamander habitat (carry pieces and if too large, cut into smaller pieces).

   c. Keep in any piles or stacks of vegetation in existing ROW.

d. Avoid burning brush piles in the known or assumed Cheat Mountain salamander habitat.

8. *Reserved.*

**Other Operation & Maintenance Activities**

9. Right of Way Repair - Conduct covered activities within existing ROW

10. Existing Access Road Maintenance and Culvert Replacement

    a. Avoid staging equipment in known or assumed habitat

    b. Avoid additional clearing of trees

    c. Avoid channelizing streams

11. Avoid abandoning pipe (leaving on surface) adjacent to or within Cheat Mountain salamander habitat. Below-grade abandonment is acceptable.

12. *Avoid vehicle-use in ROWs with enhancements for Cheat Mountain salamander. Conduct patrols, vegetative maintenance, etc., by foot whenever practical.*

**Construction Practices (Looping projects considered in new routing section below)(Existing or Future ROW)**.

13. Conduct covered activities within existing ROW.

14. Employ silt fences around construction/soil disturbance activities adjacent to known or assumed Cheat Mountain salamander sites. The silt fencing should completely isolate the work area from adjacent Cheat Mountain salamander habitat, and to ensure silt does not enter un-disturbed parts of the habitat.

15. *Avoid pulling woody vegetation out by the roots to avoid destruction of potential nests.*

16. Avoid withdrawing water from sources that may affect known or assumed Cheat Mountain salamander habitat for hydrostatic testing.

17. Avoid discharging hydrostatic testing water into known or assumed Cheat Mountain salamander habitat.

    Discharge hydrostatic testing water down gradient of known or assumed Cheat Mountain salamander habitats.

    OR

    Discharge water >300 feet from known or assumed Cheat Mountain salamander habitat.

    OR

    Discharge water as far as practical from Cheat Mountain salamander habitats and utilize additional sediment and water flow control devices (Figures 6A&B, 7, 8,14A&B; ECS) to minimize effects to the Cheat Mountain salamander habitat.

18. Re-vegetate all disturbed areas in accordance with the ECS (e.g., use indigenous, non-invasive species).

19. Avoid use of fertilizers within 100 feet of known or assumed Cheat Mountain salamander habitat.

20. Refuel equipment and check for leaks each day as described in the ECS section on "Spill Prevention, Containment and Control".

**New Construction Routing Criteria**

21. Construct loops entirely within existing ROW.

    OR

    Route new pipelines to avoid being within 300 feet of known or assumed Cheat Mountain salamander sites.

    OR

    Conduct horizontal directional drilling (HDD) or horizontal bore to install pipe under Cheat Mountain salamander sites. Boring should occur at least 8 feet below the surface.

    OR

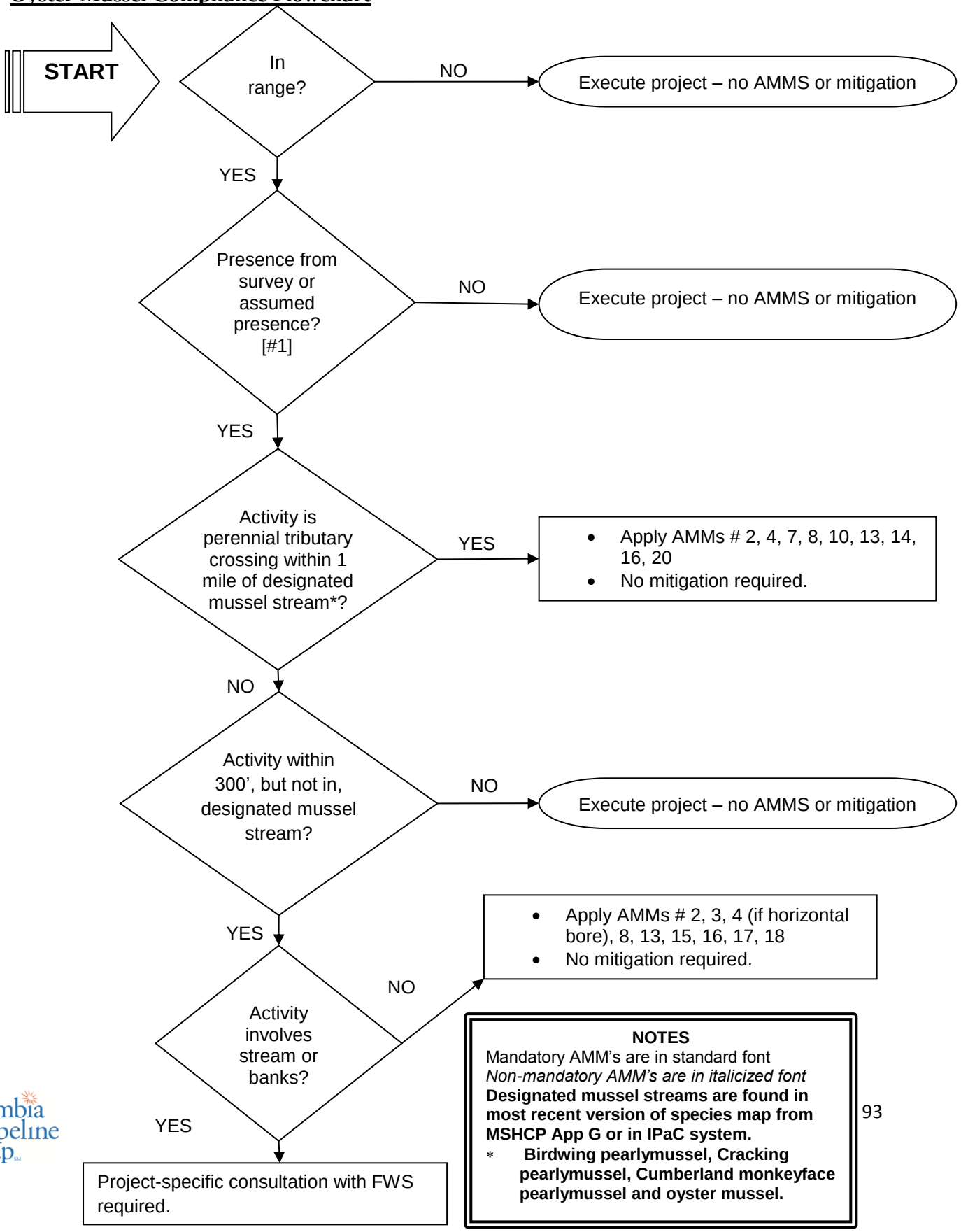
    Further consultation with the Service is necessary.

22. Route new access roads at least 300 feet away from known or assumed Cheat Mountain salamander sites. If not feasible, further consultation with the Service is necessary.

# BIRDWING PEARLYMUSSEL (*Conradilla caelata*), CRACKING PEARLYMUSSEL (*Hemistena lata*), CUMBERLAND MONKEYFACE PEARLYMUSSEL (*Quadrula intermedia*), & OYSTER MUSSEL( *Epioblasma capsaeformis*)

| State | County/ Waterbody |
|---|---|
| Tennessee | Maury County, Clinch, Powell, Duck, and Elk Rivers |
| Virginia | Swift Run |
| Ohio | Big Darby Creek, Little Darby Creek, Muskingum River |
| Kentucky | Nicholas and Robertson Counties, Licking River |
| Pennsylvania | Allegheny River |
| West Virginia | Kanawha River |
| Mississippi | Big Sunflower River |

**Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel & Oyster Mussel Compliance Flowchart**



## Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel & Oyster Mussel

## Avoidance and Minimization Measures

These measures apply to all known occupied and presumed occupied areas in Maury County and Clinch, Powell, Duck, and Elk Rivers in, Tennessee; Swift Run in Virginia; Big Darby Creek, Little Darby Creek, and Muskingum River in Ohio; Nicholas and Robertson Counties and Licking River in Kentucky; Allegheny River in Pennsylvania; Kanawha River in West Virginia; and Big Sunflower River in Mississippi. These species-specific measures supplement (and supersede where conflicting) the general BMPs specified in the NGTS ECS. Measures in standard font text will be applied for all activities. Measures in *italic* font text will be applied on a case-by-case basis depending on the requirements of the activity. These requirements include consideration of customer and business needs, practicality, and effectiveness as more fully described in Chapter 5 of this MSHCP. Details on selecting the appropriate waterbody crossing method are provided in Section 5.2.1.1.

The main conservation objective for these mussels during ROW maintenance and O&M activities is to avoid or minimize impacts to known or presumed occupied habitat (e.g., minimize impacts to stream banks and bed) and avoid/minimize impact to the mussels (e.g., crushing, killing, sedimentation). The main conservation objective for all HCP NLAA mussel species on construction projects (i.e., off existing ROW) is to avoid or minimize impacting known or presumed occupied habitat (e.g., use of trenchless installation) and avoid/minimize impact to HCP NLAA mussels (e.g., crushing, killing, sedimentation). If, after detailed engineering and environmental studies, it is determined (and agreed to by NiSource Natural Resources Permitting [NRP] personnel) that avoidance is not feasible, a report will be prepared and NiSource will consult with the Service before proceeding with the project.

**Surveys to Evaluate Presence and Relocation of Species in NiSource Action Areas**

1. A survey can be conducted to determine the presence of this mussel species. Mussel survey protocols designed to detect endangered mussels that often occur in low densities; protocols as of 2009 are provided in **Appendix L**. Survey methodologies must be evaluated at minimum every five years and be updated to the most effective survey methods currently available. If the most current methodology implemented by a biologist, qualified to conduct the survey, does not indicate the presence of the species, it will be classified as unoccupied habitat and the AMMs will not be mandatory.[15]

If a survey is not completed, presence will be assumed. In that case, all suitable habitat would be treated as occupied, and all mandatory AMMs must be followed. NiSource or its contractors will follow the Service approved relocation plan as referenced below. Survey and relocation may be implemented in the same time period (as one action) as long as both survey and

[15] However, NiSource may implement some of these measures if appropriate to protect potentially suitable habitat.

relocation protocols are followed (general relocation protocols are identified in **Appendix L**, but may be modified in conjunction with Service Field Office based on conditions).

Relocation may be implemented only if: (1) all required permits are in place, (2) a Service-approved relocation plan documenting all relevant protocols including how and where the mussels will be moved is in place, (3) a contingency plan is in place to conduct additional consultation with the Service should the actual field survey not reflect the conditions identified in the approved relocation plan, and (4) a monitoring program to evaluate the effects of the relocation is in place. Relocation will include at least all individuals of the federally endangered species identified in the impact area and may include other species based on the assessment of the Service Field Office and other regulatory agencies. A copy of the survey and any reports will also be included in the annual report submitted to the Service.

**Pre-Construction Planning: Preparation of an EM&CP**

2. A detailed EM&CP will be prepared for any activity with potential effects (e.g., streambed or stream bank disturbance, impacts to riparian habitat, activities causing sediment) within 100 feet of the ordinary high water mark of occupied mussel 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 waterbody crossing 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 streambed and riparian disturbance (including minimization of tree clearing within 25 feet of the crossing [**Figure 24, ECS**]), preventing downstream sedimentation (including redundant erosion and sediment control devices that would be designed to protect mussel resources as appropriate), and weather monitoring by the Environmental Inspector to ensure work is not begun with significant precipitation in the forecast. The plan will comprehensively address all activities needed to complete the work and minimize take of mussels in occupied habitat including crossing the streams during dry periods when practical and using dry-ditch crossing techniques for intermittent streams leading to mussel habitat. The EM&CP will include the frac-out avoidance and contingency plans described in AMM#3 below. 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% leading directly to occupied habitat. These plans will include techniques such as hard or soft trench plugs, temporary sediment barriers, a wider trench at the slope base, and/or temporary slope drains (plastic). In areas with less than a 30% slope, ECS and AMM erosion control measures protective of mussels will be implemented. 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 mussel AMMs which must be implemented.

**Streambed Construction**

3. For activities in occupied habitat, install new or replacement pipelines and major repairs under the river bottom using horizontal directional drilling (HDD) or other trenchless methods rather than open trenching unless the crossing evaluation report prepared in accordance with 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 specifically reference mussel resources 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 mussels, and actions to address a large-scale frac-out in occupied habitat. The plan should also consider the potential effects on mussels if drilling fluids are released into the environment. The plan must contain all information required for a FERC Section 7(c) filing at a minimum.

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. However, due to the significant listed mussel assemblages known to occupy the Duck and Tennessee Rivers in the state of Tennessee, open trenching in these rivers is not a "covered activity" as part of the NiSource MSHCP.

4. 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) 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.

5. For repairs in occupied habitat, do not install in-channel repairs (bendway weirs, hardpoints, concrete mats, fill for channel relocation, or other channel disturbing measures) except when measures in AMM#3 above are not feasible from an engineering design perspective, and then, only in conjunction with a stream restoration plan based on Rosgen (*see* Wildland Hydrology 2009 http://www.wildlandhydrology.com/html/references_.html) or other techniques mutually agreed upon by NiSource and the Service that result in no direct or lethal take of listed mussels.

*6. Conduct replacements/repairs from a lay barge or temporary work bridges of the minimum length necessary to conduct the replacements/repairs rather than operating heavy equipment (e.g., backhoes, bulldozers) in-stream. Temporary construction and equipment bridges are not to be confused with stone or fill causeways with pipe structures, which should not be employed in known or presumed occupied waterbodies.*

7. Remove equipment bridges as soon as practicable (this is typically interpreted to be a few days to a few weeks unless there are extenuating circumstances) after repair work and any site restoration is completed

8. 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 mussel 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**

*9. Do not construct culvert and stone access roads and appurtenances (including equipment crossing) across the waterbody or within the riparian zone. Temporary equipment crossings utilizing equipment pads or other methods that span the waterbody are acceptable provided that in-stream pipe supports are not needed.*

10. For equipment crossings of small streams, use half pipes of sufficient number and size that both minimize impacts to streambed and minimize flow disruption to both upstream and downstream habitat (**ECS, Figure 22**).

11. *Reserved.*

**Pipeline Abandonment**

*12. Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to endangered mussels.*

**Contaminants**

13. 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 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; and

b. call the appropriate Service Field Office to report the release, in addition to the National Response Center (800-424-8802).

14. 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.

15. 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, 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.

16. Do not use fertilizers or herbicides within 100 feet of known or presumed occupied habitat. 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 mussel habitat. The EM&CP prepared for this activity (AMM#2 above) will document relevant EPA guidelines for application.

**Withdrawal and Discharge of Water**

17. Hydrostatic test water and/or water for storage well O&M will not be obtained from known or presumed occupied habitat unless other water sources are not reasonably available. To prevent desiccation of mussels, water from known or presumed occupied habitat 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.

18. 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.

**Travel for O&M Activities**

*19. Do not drive across known or presumed occupied streams – walk these areas or visually inspect from bank and use closest available bridge to cross stream.*

**Zebra Mussels and Other Invasives**

20. Clean all equipment (including pumps, hoses, etc.) that have been in a perennial waterbody for more than four hours within the previous seven days and will work in occupied or potential federally listed mussel habitat; following established guidelines to remove zebra mussels (and other potential exotic or invasive species) before entering a known or presumed occupied stream for a federally listed mussel, which is not known to be infested with zebra mussels (**Appendix L**). 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 these mussels since, once introduced into a watershed, invasive species could move and eventually affect the federally listed mussels.

# NON-HCP SPECIES BMPs

## Pygmy madtom

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: The Duck River, Tennessee

BMPs

- Where species may be present, either avoid the habitat or conduct all activities with implementation of the HCP mussel AMMs.
- NiSource will only use HDD for new crossings on the Duck River.

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## Spotfin chub

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of the Buffalo River system, including the Rush branch and Grinder's Creek, in Lewis County, Tennessee.

BMPs

- Where species may be present, either avoid the habitat or conduct all activities with implementation of the HCP mussel AMMs.

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## Red-cockaded woodpecker

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Parishes: Calcasieu, Evangeline, Grant, La Salle, and Rapides Parishes, Louisiana. Additionally, the potential for rediscovery of the species within portions of its historic range exists in; Catahoula Parish, Louisiana; and Southampton and Sussex Counties, Virginia. Populations in these areas would be found in association with open, mature pine woodlands

BMPs

- 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.
- 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 survey guidance (survey guidance can be found in the 2013 NiSource Consultation Document, Appendix B.

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## Michaux's sumac

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: The NiSource project may affect the Michaux's sumac in portions of Brunswick, Chesterfield, Dinwiddie, Greensville, Mechlenburg, 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.

BMPs

- 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, Mechlenburg, 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.
- Avoid all activities in newly discovered upland plant populations or further consultation with the Service will be needed.

**********

## Eastern prairie-fringed orchid

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: 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.

BMPs

- Route new ROW alignments to avoid all activities in 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.
- 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 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.

- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Short's goldenrod

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of Nicholas and Robertson Counties, Kentucky

BMPs

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.

- Avoid execution of project activities in those areas representing suitable habitat.
- 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Northern monkshood

Determination without BMPs: LAA in OH; NE in NY
Determination with BMPs: NLAA in OH; NE in NY
Range: One location in Hocking County, Ohio. Populations in these areas would be found in association with high-elevation headwaters and stream crevices in New York, and in association with shaded or partially shaded cliffs and talus slopes in Ohio.

BMPs

- 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.

**********

## Pondberry

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of Sharkey and Sunflower Counties, Mississippi.

BMPs

While no known populations will be impacted by the NiSource project, surveys for this species are incomplete and NiSource activities may impact unknown populations.

- 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

**********

## Running buffalo clover

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: 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.

BMPs

There are no known occurrences within the ROW proper. However, there are six known populations of running buffalo clover within covered lands in Augusta and Hocking counties in Ohio, and Preston, Brooke, and Tucker (1) counties in 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. We further believe that additional populations

may occur within the covered lands.

- Route new ROW alignments to avoid all activities in 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.
- 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 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.

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## Globe (Short's) bladderpod

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: 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. The species is generally found on dry limestone rocks or open rock ledges.

BMPs

- 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.
  Avoidance Area: All areas designated by the Kentucky Natural Heritage Database.

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## Shale barren rock cress

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of Alleghany, Augusta, Botetourt, Page, Rockbridge, Rockingham, Shenandoah, and Warren Counties in Virginia; Greenbrier, Hardy, and Pendleton Counties in West Virginia.

BMPs

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.

- Avoid all activities in known population(s) of shale barren rock cress within covered lands (one currently within George Washington National Forest).
- 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 coordinated with the local FWS field office and survey results provided to the local FWS field office.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Smooth coneflower

Determination without BMPs: LAA

Determination with BMPs: NLAA

Range: Portions of Albermarle, Allegheny, 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.

BMPs

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 the covered lands given the amount of suitable habitat.

- 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.

- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Swamp pink

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of Woolwich Township, Gloucester County, Mount Olive, Roxbury, and Randolph Townships, Morris County, and Salem County, New Jersey; and Albermarle, 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.

BMPs

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.

- Route new ROW alignments to avoid all activities in known population of swamp pink within covered lands in Augusta County, Virginia.
- 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 Rockbridge, Henrico, Botetourt, Rockingham, Greene, Fairfax, Prince George, Albermarle, 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Virginia sneezeweed

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: Portions of Augusta, Botetourt, Page, Rockbridge, and Rockingham Counties, Virginia. Overall, the covered lands intersect with approximately 600 acres of mapped suitable habitat.

BMPs

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.

- Route new ROW alignments to avoid all activities in known population of Virginia sneezeweed within covered lands in Augusta, Botetourt, Page, Rockbridge, and Rockingham Counties, Virginia.
- Conduct surveys 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Virginia spiraea

Determination without BMPs: LAA in WV (NE in OH)
Determination with BMPs: NLAA in WV (NE in OH)
Range: 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 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.

BMPs

There are no known occurrences within the ROW proper in West Virginia, but 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 West Virginia. There are seven known occurrences in West Virginia counties crossed by the covered lands with the closest approximately 2.7 miles (4.3 km) from the covered lands in Raleigh County. Given

several nearby populations, we believe that it is likely that other populations may occur within the covered lands in West Virginia.

Population avoidance

1. Conduct surveys for Virginia spirea prior to construction of new alignment or ground disturbing (e.g., pipeline replacement) activities through riparian vegetation in modeled suitable habitat 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.
2. Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Leedy's roseroot

Determination without BMPs: LAA

Determination with BMPs: NLAA

Range: one location in Schuyler County, New York. Found on north or east-facing talus slopes or cliff ledges

BMPs

- 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 office.
  Avoidance Area: Area designated by the NY Heritage Database, with a 50 meter buffer on all sides.

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## Leafy prairie-clover

Determination without BMPs: LAA

Determination with BMPs: NLAA

Range: 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.

BMPs

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.

- 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 local FWS field office.

- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Sensitive joint-vetch

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: 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.

BMPs

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.

- 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).
- 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Small-whorled pogonia

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: 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.

BMPs
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.
O&M:

- 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.
  Avoidance Area: Camp OtyOkwa, Benton Township, Hocking County, Ohio.
- 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 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 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.
- Avoid all activities in newly discovered populations or further consultation with the Service will be needed.

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## Fat pocketbook, Fluted Kidney shell pearlymussel, Orangefoot pimpleback pearlymussel, Ring pink mussel, Rough pigtoe & Slabside pearlymussel

Determination without BMPs: LAA
Determination with BMPs: NLAA
Ranges: See attachment

BMPs

- Implement the HCP mussel AMMs for all projects in areas specified for these species.

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## Rabbitsfoot, Rayed Bean, Spectaclecase, Dwarf Wedgemussel, Pink Mucket, & Snuffbox

Determination without BMPs: LAA
Determination with BMPs: LAA
Ranges: See attachment

General BMPs

- Implement the HCP mussel AMMs for all projects in areas specified for these species.

Species-specific BMPs

Rabbitsfoot

- Implement HDD at Little Darby Creek crossings if practicable, if not survey and cross Little Darby Creek using dry-ditch techniques 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.

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## 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.

BMPs

- Implement the AMMs for the mussel species from the MSHCP for all activities within identified streams.

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## West Virginia northern flying squirrel

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: The known WVNFS population centers which overlap or are in close proximity to 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)
The majority of the WVNFS population centers within the NiSource MSHCP area are found within the Monongahela NF. The WVNFS habitat locations are provided on attached WVNFS Modeled Habitat Detail.

BMPs

- 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).
- Employ all practical measures to minimize the area of disturbance when conducting O&M activities in occupied or potential habitat.
- Avoid aerial application of herbicides within mapped WVNFS habitat.
- When possible select routes that avoid tree clearing in suitable habitat.
- When working within WVNFS habitat, all work will occur within existing ROW and a 25-foot temporary workspace without further consultation.
- No new access roads will be constructed within WVNFS habitat without further consultation.
- No new storage well pits will be constructed within WVNFS habitat without further consultation
- Employ all practical measures to minimize the area of disturbance when conducting construction activities in occupied or potential habitat.

- 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.
- Re-vegetate all disturbed WVNFS habitat within the non-permanent ROW with appropriate native species (red spruce).
- Monitor all restoration plantings for proper establishment and implement supplemental plantings as necessary.
- 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.

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## 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.

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## Eastern Massasauga snake

Determination without BMPs: LAA
Determination with BMPs: NLAA
Range: See maps

**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 species. 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**

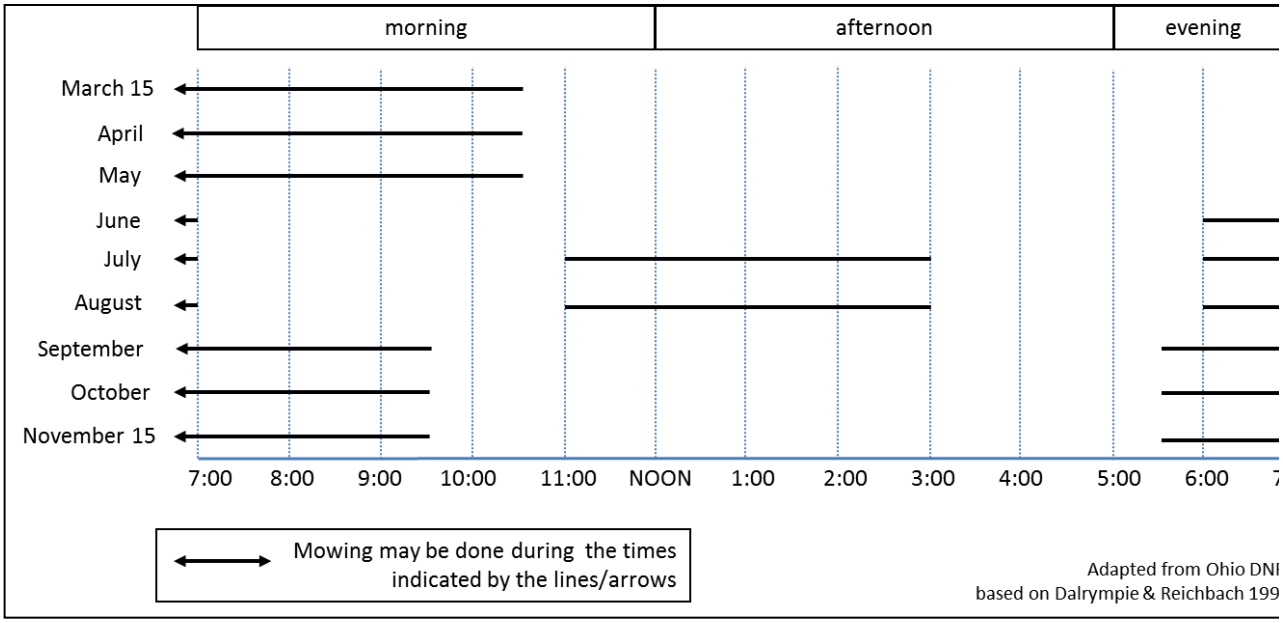
(8) Do not burn brush piles along ROW within known/presumed EMR habitat during the active season (March 15-October 30). Where possible, leave brushpiles in place or transport them off-site for disposal. If they must be burned, burn on the same day they are created if during the active season or they 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. If an EMR is found, the Service must be notified and the snake must be moved from the area. This person must be qualified, and approved by the Service, to search an area for snakes. If this person is not also permitted to handle massasaugas, a qualified person, with necessary state and federal permits for capturing and handling EMR, must be called to the site to do so. If two (2) harmed EMR are found during follow-up walkovers anywhere in the covered lands, implement requirements of BMP #10 for mowing ROWs for all presumed habitat. As an alternative to BMP #10, NiSource can implement additional pre-activity surveys as agreed to in writing by the

Service.
c. Conduct mowing in accordance with the attached schedule (EMR Active Season Mowing Schedule) developed by the Ohio DNR as much as reasonably practical.
(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 (EMR Active Season Mowing Schedule).




**EMR Active Season Mowing Schedule**

**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 - September 15 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[16] 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[17] 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.

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[16] Snake monitors must have a letter of reference from a qualified and permitted EMR surveyor confirming rattlesnake field identification capabilities. The snake monitor will not handle, collect, or attempt to relocate any EMR.

[17] A qualified EMR surveyor must have necessary state and federal permits for capturing and handling EMR.

**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.
(28) 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.
(29) Ensure that all fill material is free from exotic or invasive species.

**Other measures**
(30) Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to EMR.
(31) 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.
(32) 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.
(33) 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.
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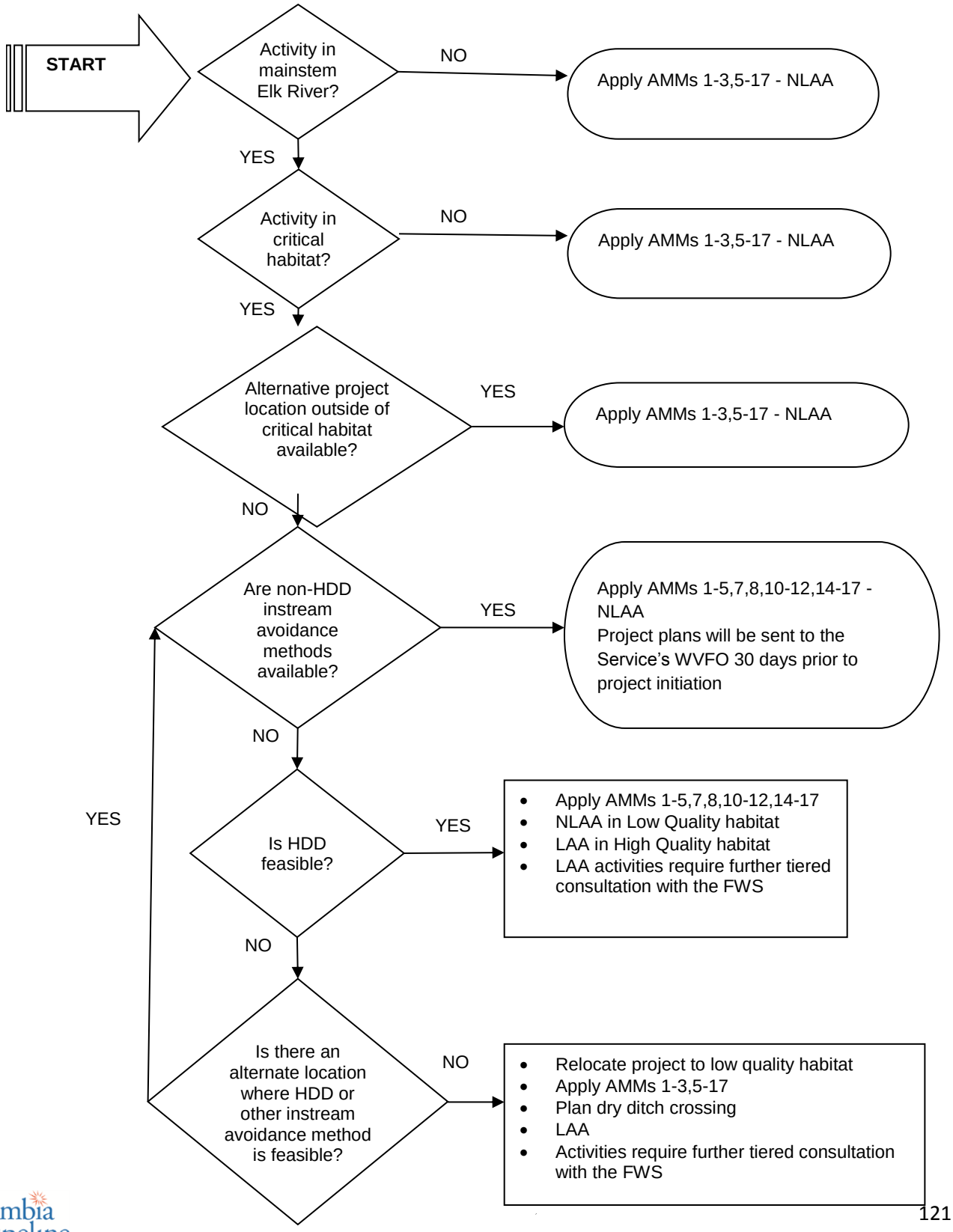
## Diamond Darter Compliance Flow Chart



## Diamond Darter

Determination without BMPs: LAA
Determination with BMPs: NLAA – LAA (see attached Diamond Darter compliance flowchart)
Range: Elk River, WV.

BMPs (used in conjunction with attached Diamond Darter compliance flowchart)

**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 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.