

Attachment 1 – Avoidance and Minimization Measures¹

MSHCP Take Species

Indiana Bat

1. Conduct habitat assessment to determine presence of suitable summer habitat
2. Conduct assessments to determine presence of suitable winter habitat
3. *Survey to determine presence in suitable summer habitat*

AMMs 4-12 apply to 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.

¹ AMMs displayed in standard font are mandatory; AMMs displayed in *italics* are non-mandatory

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).

AMMs 13 – 26 apply to 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 \geq 5-inch diameter at breast height (dbh) in areas \leq 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.

AMMs 27 – 40 apply to 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 \geq 5 inches dbh in areas identified as known maternity colony summer habitat and \leq 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 \geq 5 inches dbh in areas identified as suitable summer habitat and \leq 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

1. Either assume wetlands are suitable for bog turtles OR use current Phase 1 survey protocols for all previously unsurveyed wetlands that are in bog turtle counties.

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" 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, 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.

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 undisturbed 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 unless an individual FWS FO prescribes a different active season based on site-specific location or species biology), 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.

AMMs 4 – 10 apply to 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, 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.

AMMs 11 – 24 apply to construction practices on 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 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.

AMMs 25 – 26 apply to routing criteria (replacements, loops, new ROWs, access roads:

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

1. NiSource shall conduct surveys to evaluate karst feature indicative of potential presence of the species within one year prior to the start of any earth disturbing activity.

2. NiSource will assume presence of the species along the 76 miles of ROW and mapped potential habitat for MCI (See MSHCP Figure 6.2.3.3-1). Once survey protocols are available, NiSource will

conduct surveys of suitable habitat within proposed disturbance areas where landowner permission has been granted.

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 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**).

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 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 .

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). 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 (**MSHCP 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.

18. When routing new or replacement facilities away from the existing ROW, 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.

Clubshell Mussel
Northern Riffleshell
Fanshell Mussel
Sheepnose

1. A survey may be conducted to determine the presence or probable absence of the species within suitable habitat. If no survey is conducted, presence will be assumed and all suitable habitat will be treated as occupied. Survey and/or relocation of mussels may be conducted as described in the MSHCP.
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, 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.

AMMs 3 – 8 apply to streambed construction:

3. For streambed construction 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 MSHCP Section 5.2.1.1 and Appendix J indicates otherwise. Drilling should be carefully undertaken and a plan must 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 must also consider the potential effects on mussels if drilling fluids are released into the environment. At a minimum, the plan must contain all information required for a FERC Section 7c filing.

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 geomorphic channel design methodology (Natural Resources Conservation Service, Part 654 Stream Restoration Design, National Engineering Handbook, 2007) 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).

AMMs 9 and 10 apply for the purpose of 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.

11. *Reserved.*

AMM 12 applies to 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.

AMMs 13 - 16 apply to activities to avoid/minimize exposure to 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 will document relevant EPA guidelines for application.

AMMs 17 and 18 apply to water withdrawal and discharge:

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. You may 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 to minimize effects to the waterbody.

AMM 19 applies to access and inspection 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.

AMM 20 applies to your activities to prevent exposure to zebra mussels and other invasive species:

20. Clean all equipment (including pumps, hoses, etc.) that has 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 (MSHCP 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). This AMM must be followed 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.

Site-specific AMMs:

21. Relative to **Clubshell** mussel, you shall implement HDD at the Elk River (West Virginia) crossings, if practicable. If not, implement dry-ditch techniques. Additionally, you must survey and translocate mussels when conducting dry-ditch crossings.

22. Relative to **Clubshell** mussel, you shall implement HDD at Little Darby Creek (Ohio) crossings, if practicable. If not, implement dry-ditch techniques. Additionally, you must survey and translocate mussels when conducting dry-ditch crossings.

23. Relative to **Clubshell** mussel, all Meathouse Fork (West Virginia) crossings shall be implemented using dry-ditch methodology.

24. Relative to **Northern Riffleshell**, you shall implement HDD at Allegheny River (Pennsylvania) crossing, if practicable. If not, you must survey and translocate mussels prior to completing crossing.

25. Relative to **Northern Riffleshell**, you shall implement HDD at Big Darby Creek (Ohio) crossings, if practicable. If not, implement dry-ditch techniques. Additionally, you must survey and translocate mussels when conducting dry-ditch crossings.

26. Relative to **Fanshell** mussel, implement HDD at the downstream crossings (Nicholas-Robertson County Kentucky area) of the Licking River, if practicable. If not, implement dry-ditch techniques. Additionally, you must survey and translocate mussels when conducting dry-ditch crossings.

27. Relative to **Fanshell** mussel, implement crossings of Tygart's Creek and Lick Branch (Kentucky) using dry-ditch methodology.

28. Relative to **Sheepnose** mussel, implement HDD at the Big Sunflower River (Mississippi) crossing, if practicable. If not practicable, you must survey and translocate mussels when completing crossings.

29. Relative to **Sheepnose** mussel, implement HDD at the downstream Muskingum River crossings (Washington County, Ohio), if practicable. If not practicable, you must survey and translocate mussels.

James Spiny mussel

1. A survey may be conducted to determine the presence or probable absence of the species within suitable habitat. If no survey is conducted, presence will be assumed and all suitable habitat will be treated as occupied. Survey and/or relocation of mussels may be conducted as described in the MSHCP.

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, 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.

AMMs 3 – 10 apply to streambed construction:

3. For streambed construction 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 MSHCP Section 5.2.1.1 and Appendix J indicates otherwise. Drilling should be carefully undertaken and a plan must 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 must also consider the potential effects on mussels if drilling fluids are released into the environment. At a minimum, the plan must contain all information required for a FERC Section 7c filing.

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 geomorphic channel design methodology (Natural Resources Conservation Service, Part 654 Stream Restoration Design, National Engineering Handbook, 2007) 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.

AMM 11 is to minimize impacts 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 James Spinymussel (JSM) streams:

Upper James Watershed - Allegheny Co.: Potts Creek

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 may occur any time but will be subject to additional mitigation.

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.

AMMs 13 - 16 apply to activities to avoid/minimize exposure to 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 may 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:

- c. follow spill response plan; and
- d. 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 will document relevant EPA guidelines for application.

AMMs 17 and 18 apply to water withdrawal and discharge:

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. You may not discharge hydrostatic test water directly into known or presumed occupied habitat. Discharge water in the following manner (in order of priority and preference):

- d. Discharge water down gradient of occupied habitat unless on-the-ground circumstances (e.g., man-made structures, terrain, other sensitive resources) prevent such discharge.
- e. 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.
- f. If those circumstances occur, discharge water as far from occupied habitat as practical and utilize additional sediment and water flow control devices to minimize effects to the waterbody.

AMM 19 applies to access and inspection 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.

AMM 20 applies to your activities to prevent exposure to zebra mussels and other invasive species:

20. Clean all equipment (including pumps, hoses, etc.) that has 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 (MSHCP 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). This AMM must be followed 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.

Site-Specific AMMs:

21. Survey Swift Run (Virginia) and translocate JSM specimens.

22. 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 must be translocated outside of impact zone.

Nashville Crayfish

These AMMs apply to all known occupied and presumed occupied areas in the Mill Creek watershed in Davidson and Williamson counties, Tennessee.

AMMs within suitable habitat to remove and relocate individuals:

1. Stream crossing activities must 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 for Nashville crayfish by a qualified biologist; and (2) barriers to preclude re-entry of Nashville crayfish at the proposed 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 from which collected, 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, at its discretion, employ some of the AMMs to maintain the viability of the potentially suitable habitat.

AMM for Maintenance of Suitable Habitat:

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:

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 avoid/minimize 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 crayfish 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.

AMMs for Streambed Construction Activities:

4. 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 where practicable (See MSHCP Section 5.2.1.1 and Appendix J). Drilling must 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, its effects on Nashville crayfish, and actions to address a large scale frac-out in occupied habitat. The plan must consider the potential effects on Nashville crayfish if drilling fluids are released into the environment and must, at a minimum, contain all information required for a FERC Section 7(c) filing.

If, after detailed engineering studies, NiSource determines 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 geomorphic channel design methodology (Natural Resources Conservation Service, Part 654 Stream Restoration Design, National Engineering Handbook, 2007) 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).

AMM for 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.

AMM for 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.

AMM to Address 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 may 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.

AMM for 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.

Additional Nashville Crayfish AMMs:

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

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

American Burying Beetle

1. To assess ABB habitat suitability within the Wayne National Forest release site, all habitats within 10 miles of the release site are considered suitable for ABBs unless one of the criteria listed below is satisfied. In other words, covered activities implemented in areas meeting any of these criteria are unlikely to adversely impact ABBs and NiSource may proceed without the need to employ ABB AMMs.

- NiSource total land disturbance will be 1.2 acres or less in size.²
- 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.
- 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).

*2. NiSource may conduct surveys to determine presence or probable absence of ABBs within suitable Habitat³ for site-specific new construction projects. The most up-to-date “American Burying Beetle (*Nicrophorus americanus*) Survey Guidance for Oklahoma” (MSHCP 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 apply. Alternatively, NiSource may elect to assume presence of ABBs in suitable habitat and apply the AMMs for known or presumed occupied habitat.

² 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.

³ 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.

3. *Within known or presumed occupied habitat, NiSource will implement the Service's current "American Burying Beetle (Nicrophorus americanus) Baiting Away Guidance For Projects in Oklahoma" (MSHCP 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.*

4. If implementation of #3 is not possible, NiSource will implement the Service's current "American Burying Beetle (Nicrophorus americanus) Trapping and Relocating Guidance in Oklahoma" (MSHCP 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.

Attachment 2. Conservation Measures (Avoidance) for MSHCP species (non-take) that may be affected by NiSource’s MSHCP.

SPECIES	LOCATION	AMM #	Measure
Gray bat	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	AMM-1	<p>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:</p> <ul style="list-style-type: none"> 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. 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.
Gray bat	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	AMM-2	<p>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.</p>
Gray bat	Covered lands within the following counties:	AMM-3	When burning brush piles within 0.25 miles of occupied summer roost and/or winter

SPECIES	LOCATION	AMM #	Measure
	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		hibernacula, the brush piles can be no more than 25' by 25' and must be spaced at least 100 feet apart.
Gray bat	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	AMM-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.
Gray bat	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	AMM-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.
Gray bat	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	AMM-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.
Gray bat	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	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	counties, Kentucky; and Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson counties, Tennessee		
Gray bat	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	AMM-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.
Gray bat	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	AMM-9	Equipment servicing and maintenance areas will be designated to areas away from streambeds, riparian zones, sinkholes, or areas draining into sinkholes.
Gray bat	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	AMM-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.
Gray bat	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	AMM-11	<i>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.</i>

SPECIES	LOCATION	AMM #	Measure
Gray bat	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	AMM-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.
Gray bat	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	AMM-13	<i>Abandon pipelines in place to avoid disturbance to perennial streams that would result from pipeline removal and thus affect potential gray bat prey.</i>
Gray bat	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	AMM-14	<i>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.).</i>
Gray bat	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	AMM-15	<i>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.</i>
Gray bat	Covered lands within the following counties: Adair, Allen, Carter, Clark, Estill, Fayette, Garrard, Greenup, Lee, Letcher, Lincoln, Madison, Menifee, Metcalfe, Monroe,	AMM-16	<i>Remove equipment bridges as soon as possible after repair work and any site reseeding is completed on perennial streams.</i>

SPECIES	LOCATION	AMM #	Measure
	Montgomery, Morgan, Powell, and Rowan counties, Kentucky; and Davidson, Hardin, Lewis, Macon, Maury, McNairy, Sumner, Trousdale, Wayne, Williamson, and Wilson counties, Tennessee		
Gray bat	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	AMM-17	<i>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.</i>
Gray bat	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	AMM-18	<i>Perennial stream crossings should be conducted during low flow conditions between the months of June 1 and November 30.</i>
Gray bat	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	AMM-19	<i>Avoid conducting perennial stream crossing construction activities after sunset in known or presumed occupied summer habitat to avoid harassment of foraging gray bats.</i>
Gray bat	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	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	counties, Tennessee		
Gray bat	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	AMM-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.
Virginia Big-eared Bat	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.	AMM-1	<p>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:</p> <ol style="list-style-type: none"> 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. 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.
Virginia Big-eared Bat	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,	AMM-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;

SPECIES	LOCATION	AMM #	Measure
	Preston, Randolph, and Tucker counties, West Virginia.		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. <i>If surveys (conducted using approved methodology) fail to detect Virginia big-eared bats, AMMs in summer and/or winter habitat are not mandatory.</i> However, NiSource may employ some of the AMMs to maintain the viability of the potentially suitable habitat.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	Covered lands within the following counties: Bath, Carter, Estill, Lee, Madison, Menifee, Montgomery, Morgan, Owsley, Powell, Rowan, and Jackson counties, Kentucky;	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	Augusta, Bland, Giles, Rockingham, and Shenandoah counties, Virginia; and Fayette, Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker counties, West Virginia.		
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-9	Equipment servicing and maintenance areas will be designated to areas away from streambeds, sinkholes, or areas draining into sinkholes.
Virginia Big-eared Bat	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,	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	West Virginia.		
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-12	<i>Avoid new ROW and appurtenant facility construction is prohibited within 200 feet of known or presumed occupied summer roosts and/or winter hibernacula.</i>
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	Covered lands within the following counties: Bath, Carter, Estill, Lee, Madison, Menifee,	AMM-15	<i>Avoid conducting construction activities after sunset in known or presumed occupied summer habitat to avoid harassment of foraging Virginia big-eared bats.</i>

SPECIES	LOCATION	AMM #	Measure
	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.		
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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.
Virginia Big-eared Bat	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.	AMM-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).
Virginia Big-eared Bat	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,	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	Grant, Hardy, McDowell, Pendleton, Preston, Randolph, and Tucker counties, West Virginia.		
Virginia Big-eared Bat	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.	AMM-20	<i>Within six miles of known or presumed occupied summer roosts and/or winter hibernacula, avoid new construction through cliffline habitat to protect night roosts.</i>
Louisiana Black Bear	All known breeding habitat (i.e., where females have been documented to occur) and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-1	<i>Conduct all vegetative clearing activities in breeding habitat between May 1st and November 14th.</i>
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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 precludes the potential habituation of bears to human-associated food sources.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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) shall be removed or damaged. “Tree damage” includes the trunk, limbs, and the entire root system, including soil compaction from heavy equipment.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll,	AMM-4	<i>Reserved. No AMM-4 at the time of permit issuance.</i>

SPECIES	LOCATION	AMM #	Measure
	Franklin, Iberia, Madison, Richland and St. Mary.		
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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...
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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).
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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.
Louisiana	All known breeding habitat and critical	AMM-10	New pipeline ROWs will be maintained in accordance with the NGTS ECS standards for

SPECIES	LOCATION	AMM #	Measure
Black Bear	habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.		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.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-11	<p>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.</p> <p>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).</p> <p>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).</p> <p>ii. No widening of an existing ROW will occur within Priority 1 corridors.</p> <p>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.</p> <p>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.</p> <p>i. Trenchless construction techniques are required through tracts whose cover is comprised of $\geq 50\%$ woody vegetation.</p> <p>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.</p> <p>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-foot wide maintained ROW combined.</p>
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-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.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the	AMM-13	Construction-related activities within breeding Louisiana black bear habitat are permissible provided that the following AMM is implemented in addition to AMMs 1-12 during the denning season. Previously identified potential den sites/habitat will be cleared of

SPECIES	LOCATION	AMM #	Measure
	following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.		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.
Louisiana Black Bear	All known breeding habitat and critical habitat as identified by the Service. Currently, these measures apply in the following parishes in Louisiana: East Carroll, Franklin, Iberia, Madison, Richland and St. Mary.	AMM-14	Construction-related activities within breeding Louisiana black bear habitat are permissible provided that the following AMM is implemented in addition to AMMs 1-12 during the denning season. 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	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.	AMM-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 Follow AMM-2
Interior Least Tern	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.	AMM-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).
Interior Least Tern	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,	AMM-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.

SPECIES	LOCATION	AMM #	Measure
	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.		
Interior Least Tern	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.	AMM-4	Restore sandbar to previous contours and substrate after any operations and maintenance activities.
Interior Least Tern	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.	AMM-5	Avoid any activities within 650 feet of nesting colonies (sandbar/island) between May 15 and August 31.
Interior Least Tern	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	AMM-6	<i>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</i>

SPECIES	LOCATION	AMM #	Measure
	crossings and AMMs should be applied whenever sandbars/islands are within 650 feet of the crossings.		<i>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).</i>
Interior Least Tern	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.	AMM-7	<i>Abandon pipelines in place to avoid suitable habitat disturbance that would result from pipeline removal</i>
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands.	AMM-1	<p>Consider conducting field surveys within the mapped potential range of the Cheat Mountain salamander 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.</p> <p>If a field survey is not conducted, assume the entire project area as potential habitat, go to step 1.</p> <p>For any activity within the mapped potential range that involves disturbances within 300 feet of known or assumed habitat.</p> <p>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.</p> <p>Potential habitat present?</p> <ul style="list-style-type: none"> If no, document for future NiSource activities and annual compliance report and no further Cheat Mountain salamander AMMs are needed.

SPECIES	LOCATION	AMM #	Measure
			<ul style="list-style-type: none"> • 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? <ul style="list-style-type: none"> • 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.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-2	Conduct covered activities within existing ROWs.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-3	Minimize annual mowing of herbaceous layer to 10-foot width directly over pipeline(s).
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-4	Minimize permanent ROW width mowed an approximate 5 year cycle near known or potential Cheat Mountain salamander sites to 50 feet or less.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-6	Herbicide application: <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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

SPECIES	LOCATION	AMM #	Measure
			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.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-7	Vegetation Disposal a. <i>If clearing trees or other native woody vegetation in areas close to known Cheat Mountain salamander populations, shred or cut these materials into large chunks 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.</i> 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.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-8	<i>Reserved.</i>
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-9	Right of Way Repair - Conduct covered activities within existing ROW
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-11	Avoid abandoning pipe (leaving on surface) adjacent to or within Cheat Mountain salamander habitat. Below-grade abandonment is acceptable.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-12	<i>Avoid vehicle-use in ROWs with enhancements for Cheat Mountain salamander. Conduct patrols, vegetative maintenance, etc., by foot whenever practical.</i>

SPECIES	LOCATION	AMM #	Measure
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-13	Conduct covered activities within existing ROW.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-15	<i>Avoid pulling woody vegetation out by the roots to avoid destruction of potential nests.</i>
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-16	Avoid withdrawing water from sources that may affect known or assumed Cheat Mountain salamander habitat for hydrostatic testing.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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 to minimize effects to the Cheat Mountain salamander habitat.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-18	Re-vegetate all disturbed areas in accordance with the ECS (e.g., use indigenous, non-invasive species).
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-19	Avoid use of fertilizers within 100 feet of known or assumed Cheat Mountain salamander habitat.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-20	Refuel equipment and check for leaks each day as described in the ECS section on "Spill Prevention, Containment and Control".
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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.

SPECIES	LOCATION	AMM #	Measure
			OR Further consultation with the Service is necessary.
Cheat Mountain Salamander	All known occupied and potential habitat within the covered lands as shown on Figure 1.	AMM-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, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel	Streams with known important mussel populations: Allegheny River (PA), Big Darby Creek (OH), Big Sunflower River (MS), Elk River (WV), Kanawha River (WV), Licking River (downstream crossing sites Nicholas-Robertson County, KY), Little Darby Creek (OH), Little Kanawha River (WV), Muskingum River (OH), and Swift Run (VA).	AMM-1	<p>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 in the MSHCP. 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.</p> <p>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).</p> <p>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.</p> <p>*survey involving handling of endangered mussels must be permitted under a separate Federal permit or authorization, pursuant to Section 10 (e.g., 10(a)(1)(A) permit, jurisdiction by regulation, or specifically authorized by a Section 7 consultation).</p>
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster		AMM-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]),

SPECIES	LOCATION	AMM #	Measure
Mussel			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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking		AMM-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-

SPECIES	LOCATION	AMM #	Measure
Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel			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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel,		AMM-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).

SPECIES	LOCATION	AMM #	Measure
Oyster Mussel			
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-9	<i>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.</i>
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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).
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-11	<i>Reserved.</i>
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-12	<i>Abandon pipelines in place to avoid in-stream disturbance that would result from pipeline removal unless the abandonment would be detrimental to endangered mussels.</i>
Birdwing		AMM-13	As described in the ECS section on "Spill Prevention, Containment and Control," site staging

SPECIES	LOCATION	AMM #	Measure
Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel			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).
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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 population or habitat through acquisition of materials at an appropriate quarry or other such measures.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking Pearlymussel,		AMM-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

SPECIES	LOCATION	AMM #	Measure
Cumberland Monkeyface Pearlymussel, Oyster Mussel			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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-19	<i>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.</i>
Birdwing Pearlymussel, Cracking Pearlymussel, Cumberland Monkeyface Pearlymussel, Oyster Mussel		AMM-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.

Attachment 3. Non-MSHCP Species that may occur within NiSource Covered Lands

Common Name	Scientific Name	Federal Status	Determination (Section 7)
Mammals			
West Virginia northern flying squirrel	<i>Glaucomys sabrinus fuscus</i>	DR ¹	NLAA
Birds			
Kirtland's warbler	<i>Setophaga kirtlandii</i>	E ²	NLAA
Piping plover	<i>Charadrius melodus</i>	E and T ³	NLAA
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	NLAA
Reptiles			
Eastern Massasauga Rattlesnake	<i>Sistrurus catenatus</i>	C ⁴	LAA
Fish			
Kentucky arrow darter	<i>Etheostoma sagitta spilotum</i>	C	NLAA
Pallid sturgeon	<i>Scaphirhynchus albus</i>	E	NLAA
Pygmy madtom	<i>Noturus stanauli</i>	E	NLAA
Spotfin chub	<i>Erimonax monachus</i>	T	NLAA
Diamond Darter	<i>Crystallaria cincotta</i>	E	LAA
Roanoke Logperch	<i>Percina rex</i>	E	LAA
Mollusks			
Fat pocketbook	<i>Potamilus capax</i>	E	NLAA
Fluted kidneyshell	<i>Ptychobranthus subtentum</i>	PE ⁵	NLAA
Ring pink mussel	<i>Obovaria retusa</i>	E	NLAA
Orangefoot pimpleback pearl mussel	<i>Plethobasus cooperianus</i>	E	NLAA
Rough pigtoe	<i>Pleurobema plenum</i>	E	NLAA
Slabside pearl mussel	<i>Lexingtonia dolabellloides</i>	PE	NLAA
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	E	LAA
Pink mucket pearl mussel	<i>Lampsilis abrupta</i>	E	LAA
Rabbitsfoot	<i>Quadrula cylindrica cylindrical</i>	PT ⁶	LAA
Rayed bean	<i>Villosa fabalis</i>	E	LAA
Snuffbox	<i>Epioblasma triquetra</i>	E	LAA
Spectaclecase	<i>Cumberlandia monodonta</i>	E	LAA
Plants			
American chaffseed	<i>Schwalbea americana</i>	E	NLAA
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	T	NLAA
Globe (Short's) bladderpod	<i>Lesquerella globosa</i>	C	NLAA
Harperella	<i>Ptilimnium nodosum</i>	E	NLAA
Leafy-prairie clover	<i>Dalea foliosa</i>	E	NLAA
Leedy's roseroot	<i>Rhodiola integrifolia leedyi</i>	T	NLAA
Michaux's sumac	<i>Rhus michauxii</i>	E	NLAA
Northern monkshood	<i>Aconitum noveboracense</i>	T	NLAA
Pondberry	<i>Lindera melissifolia</i>	E	NLAA
Running buffalo clover	<i>Trifolium stoloniferum</i>	E	NLAA
Sensitive joint-vetch	<i>Aeschynomene sensitive</i>	T	NLAA
Shale barren rock cress	<i>Arabis serotina</i>	E	NLAA
Short's goldenrod	<i>Solidago shortii</i>	E	NLAA
Small whorled pogonia	<i>Isotria medeoloides</i>	T	NLAA
Smooth coneflower	<i>Echinacea laevigata</i>	E	NLAA
Spring creek bladderpod	<i>Lesquerella perforate</i>	E	NLAA

Common Name	Scientific Name	Federal Status	Determination (Section 7)
Swamp pink	<i>Helonias bullata</i>	T	NLAA
Virginia sneezeweed	<i>Helenium virginicum</i>	T	NLAA
Virginia spiraea	<i>Spiraea virginiana</i>	T	NLAA
Northeastern bulrush	<i>Scirpus ancistrochaetus</i>	E	LAA
Lakeside daisy	<i>Hymenoxy acaulis var. glabra</i>	T	NE
Peter's Mountain mallow	<i>Iliamna corei</i>	E	NE
Price's potato-bean	<i>Apios priceana</i>	E	NE
White-haired goldenrod	<i>Solidago albopilosa</i>	T	NE

¹ D = Delisted due to recovery

² E = Endangered

³ T = Threatened

⁴ C = Candidate

⁵ PE = Proposed Endangered

⁶ PT = Proposed Threatened

Attachment 4. Species Analyzed in the MSHCP that are Non-Take Species

	Scientific Name	Federal Status	Determination
Mammals			
Delmarva Peninsula fox squirrel	<i>Sciurus niger cinereus</i>	E ¹	No Effect
Gray bat	<i>Myotis grisescens</i>	E	NLAA
Louisiana black bear	<i>Ursus americanus luteolus</i>	T ²	NLAA
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	E	NLAA
West Indian manatee	<i>Trichechus manatus</i>	E	No Effect
Birds			
Interior least tern	<i>Sterna antillarum</i>	E	NLAA
Amphibians			
Shenandoah salamander	<i>Plethodon shenandoah</i>	T	No Effect
Cheat Mountain salamander	<i>Plethodon nettingi</i>	T	NLAA
Fish			
Blackside dace	<i>Phoxinus cumberlandensis</i>	T	No Effect
Cumberland snubnose darter	<i>Etheostoma susanae</i>	C ³	No Effect
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	No Effect
Maryland darter	<i>Etheostoma sellare</i>	E	No Effect
Scioto madtom	<i>Noturus trautmani</i>	E	No Effect
Slackwater darter	<i>Etheostoma boschungii</i>	T	No Effect
Mollusks			
Birdwing pearlymussel	<i>Lemiox rimosus</i>	E	NLAA
Cracking pearlymussel	<i>Hemistena lata</i>	E	NLAA
Cumberland bean pearlymussel	<i>Villosa trabalis</i>	E, XN ⁴	No Effect
Cumberland monkeyface pearlymussel	<i>Quadrula intermedia</i>	E	NLAA
Dromedary pearlymussel	<i>Dromus dromas</i>	E, XN	No Effect
Louisiana pearlshell	<i>Margaritifera hembeli</i>	E	No Effect
Oyster mussel	<i>Epioblasma capsaeformis</i>	E	NLAA
Pale Lilliput pearlymussel	<i>Toxolasma cylindrellus</i>	E	No Effect
Purple cat's paw pearlymussel	<i>Epioblasma obliquata obliquata</i>	E	No Effect
Tan riffleshell	<i>Epioblasma florentina walkeri</i>	E	No Effect
White cat's paw pearlymussel	<i>Epioblasma obliquata perobliqua</i>	E	No Effect
White wartyback pearlymussel	<i>Plethobasus cicatricosus</i>	E	No Effect
Insects			
Karner blue butterfly	<i>Lycaeides melissa samuelis</i>	E	No Effect
Mitchell's satyr butterfly	<i>Neonympha mitchellii mitchellii</i>	E	No Effect
Puritan tiger beetle	<i>Cicindela puritana</i>	T	No Effect
Plants			
Braun's rock-cress	<i>Arabis perstellata</i>	E	No Effect
Mead's milkweed	<i>Asclepias meadii</i>	T	No Effect
Pitcher's (sand dune) thistle	<i>Cirsium pitcheri</i>	T	No Effect

¹ E = Endangered

² T = Threatened

³ C= Candidate

⁴ XN = Experimental, Non-essential



November 19, 2012

Tom Melius
Regional Director, Region 3
U.S. Fish and Wildlife Service
5600 American Blvd. West, Suite 990
Bloomington, MN 55437-1458

RE: NiSource Multi-Species Habitat Conservation “No Surprises” Assurances

Dear Mr. Melius,

As you know, NiSource and the U.S. Fish & Wildlife Service (Service) are collaborating on a Multi-Species Habitat Conservation Plan (MSHCP) that will address a suite of NiSource’s construction, operation, and maintenance activities associated with its existing facilities within defined covered lands. The MSHCP, which contains robust avoidance, minimization, and mitigation measures and a comprehensive adaptive management plan, is intended to support NiSource’s application for an incidental take permit (ITP). NiSource has requested a 50-year permit duration for the ITP similar to durations issued for other applicants.

The draft MSHCP was circulated for public review and comment in July 2011. The Service received a number of comments that raised concerns about the 50-year permit term. NiSource believes that the monitoring, reporting, changed circumstances, and adaptive management provisions of the MSHCP are more than adequate to address any uncertainty associated with the requested permit term and to provide for continued conservation of the covered species. For example, the MSHCP provides that NiSource, the Service, and other stakeholders, as appropriate, will convene as needed during the first year of implementation of the MSHCP, at least annually until the fifth year of implementation, and at least every five years thereafter, unless the Service determines that more frequent meetings are needed. The purpose of these meetings will be (1) to review the data provided in the annual reports NiSource will be required to file, (2) to address any issues with implementation of the MSHCP, (3) to consider whether implementation could be streamlined, whether the avoidance, minimization, and mitigation measures have been effective, whether effectiveness goals have been achieved, and whether any adaptive management triggers were met, and (4) to address any other MSHCP-related concerns.

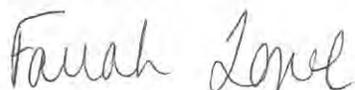
Nevertheless, to respond to the commenters’ concerns about the duration of the requested permit, NiSource is committing at this time to a one-time waiver of the No-Surprises Assurances provided for in the Service’s permit regulations when the ITP has been implemented for 25 years. The No-Surprises Rule states that, in the event there are unforeseen circumstances, the Service “will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed upon for the species covered by the

conservation plan without the consent of the permittee.” 50 C.F.R. §§ 17.22(b)(5)(iii); 17.32(b)(5)(iii).

NiSource envisions that, through the five-year MSHCP implementation review meeting that will occur at Year 25, NiSource and the Service – with the input of other stakeholders – will evaluate whether any unforeseen circumstances may require the additional commitment of additional land, water, or financial resources or restrictions on the use of land, water, or other natural resources. Once that decision is made and, if necessary, the MSHCP is amended to reflect any additional commitments or restrictions, NiSource once again would be entitled to the No-Surprises Assurances for the remainder of the permit term.

This advanced consent provides another tool – in addition to the existing mechanisms in the MSHCP, such as periodic review meetings, changed circumstances commitments, and adaptive management – for the Service to ensure that the implementation of the MSHCP is consistent with conservation needs of listed species. NiSource requests that the Service recognize NiSource’s commitment as outlined in this letter in the ITP. We appreciate the Service’s continued work on this MSHCP effort.

Sincerely,

A handwritten signature in cursive script that reads "Farrah Lowe".

Farrah Lowe
Natural Resource Permitting, Director
713.267.4737 (office)
flowe@nisource.com

cc: T.J. Miller, Chief, Endangered Species
Lisa Mandell, Regional Coordinator - Endangered Species Permits/Grants