United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
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State College, Pennsylvania 16801-4850

May 2, 2025

Jennifer A.G. Butler
Program Coordinator
Federal Highway Administration - PA Division Office
30 North 3rd Street, Suite 700
Harrisburg, PA 17101

RE: USFWS Project #2023-0058552 (formerly #2008-0491)

Dear Jennifer Butler:

This document transmits the U.S. Fish and Wildlife Service's (Service) programmatic biological opinion (Opinion) based on our review of the *Programmatic Biological Assessment for the Effects of Transportation Actions on the Bog Turtle (Glyptemys muhlenbergii) within the Commonwealth of Pennsylvania* (dated December 2, 2024) submitted by the Federal Highway Administration (FHWA) to initiate this Opinion.

This Opinion is issued to the FHWA, as the lead Federal action agency, in accordance with Section 7 of the Endangered Species Act of 1973 (16 USC 1536), as amended (ESA). We received FHWA's initial request for the re-initiation of formal consultation on December 10, 2024, and received final documentation for the request on December 18, 2024.

This Opinion is based on information provided in the programmatic biological assessment (PBA) dated December 2, 2024, as well as meetings, email correspondences, field investigations, and other sources of information. A complete decision file for this consultation is on file in this office.

We would like to highlight these changes from our previous version of the Opinion (dated April 10, 2019):

- The Programmatic Categories have changed to reflect those proposed in the 2024 PBA.
- The Pennsylvania Department of Transportation (PennDOT) has achieved the first Standard Measure on p. 10 of the previous version of the Opinion (to add language in

PennDOT's maintenance manuals to alert staff about activities that may affect the bog turtle). Therefore, we have removed this measure from this current Opinion.

- This current Opinion includes incidental take of bog turtles for in-stream activities.

- This current Opinion analyzes additional maintenance activities submitted in the 2024 PBA. The effects analysis is in Appendix A of this Opinion. Some effects determinations have changed since the previous version of the Opinion, including salt and deicing. This topic is addressed in the effects analysis and in a Conservation Recommendation.

- This current Opinion contains minor changes to the Avoidance and Minimization Measures (Table 4) to reflect changes proposed in the 2024 PBA.

- The Effects Pathway Analysis Table (Appendix B) has been reorganized.

If you have any questions regarding this Opinion or our shared responsibilities under the ESA, please contact Sze Wing Yu by telephone at 814-206-7461 or by email at szewing_yu@fws.gov. This Opinion is valid until May 2, 2030.

Sincerely,

JODIE MAMUSCIA
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Date: 2025.05.02 13:53:50 -04'00'

Jodie Mamuscia
Field Office Supervisor

Programmatic Biological Opinion for the Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania

Project Code #2023-0058552
(formerly #2008-0491)

May 2025

JODIE MAMUSCIA

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Date: 2025.05.02 13:54:15 -04'00'

Field Office Supervisor Date

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1 INTRODUCTION AND CONSULTATION HISTORY

The Federal Highway Administration (FHWA), Pennsylvania Department of Transportation (PennDOT), and U.S. Fish and Wildlife Service (Service) have collaborated to conserve the bog turtle (*Glyptemys muhlenbergii*) at a programmatic scale for over two decades. This effort began in 2003 as a Service review of the impacts of PennDOT's routine roadway maintenance activities on the species. Throughout 2017 and 2018, the three agencies collaborated on a Programmatic Biological Assessment (PBA) of the effects of PennDOT's transportation actions on the bog turtle, and this work resulted in a Programmatic Biological Opinion (Opinion) first issued in 2018. Table 1 provides a detailed history of the consultation and correspondences of this collaborative effort.

Table 1: Consultation History for the programmatic approach to bog turtle conservation for PennDOT transportation projects in Pennsylvania, leading up to this current Opinion.

January 23, 2003	The Service provided a review of roadway maintenance activities that may affect the bog turtle if conducted in, or near, occupied habitat. This consultation resulted in the concurrence that many routine maintenance activities that are conducted within the existing roadway corridor will not affect the species. However, activities that could ultimately affect wetland hydrology, migration corridors, and wetland habitat quality and characteristics either directly or indirectly were determined to potentially affect the species.
June 6, 2017	The PennDOT conducted a conference call with the Service to discuss the preliminary concept of a formal programmatic consultation process for transportation actions related to the bog turtle.
October 13, 2017	PennDOT provided a draft PBA to the FHWA, PennDOT Districts, the Pennsylvania Fish and Boat Commission (PFBC), and the Service for review and comment.
November 2, 2017	The Service provided comments to PennDOT on the draft PBA.
January 11, 2018	PennDOT conducted a conference call with PennDOT Districts 5-0, 6-0 and 8-0, FHWA, the Service, and PFBC to review comments, responses, and revisions to the draft PBA.
March 14, 2018	FHWA requested formal consultation on the *PBA for the Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania*.
April 2, 2018	PennDOT conducted a conference call to update the Service and summarize the PBA.
April 11, 2018	PennDOT conducted a conference call to clarify questions from the Service about the PBA.
April 16, 2018	The Service issued a letter to FHWA acknowledging receipt of the request for formal section 7 consultation and stated sufficient information was provided.
April 17, 2018	FHWA submitted a PBA amendment to the Service in response to the questions.

Nov. 21, 2018	The Service signed the Opinion and delivered it to PennDOT and FHWA.
April 10, 2019	The Service issued an amended Opinion to provide clarification and minor edits.
July 26, 2019	PennDOT and the Service initiated discussions about a user guide for the Opinion.
October 1, 2019	The Service provided comments on the user guide to PennDOT.
October 2, 2019	PennDOT provided the final draft of the user guide (Version 2.1) for the Service to review.
October 11, 2019	The Service provided a letter determining that the user guide accurately reflected the use of the Opinion, and that it can be used for project submittals.
November 19, 2019	PennDOT made corrections to the final version of the user guide.
February 22, 2024	FHWA, PennDOT, and the Service had a conference call to discuss reinitiating the Opinion.
March 29, 2024	FHWA and the Service had an email exchange for an extension of the existing Opinion.
April 15, 2024	The Service issued a letter extending the existing Opinion until early June of 2024.
July 8, 2024	PennDOT provided a draft PBA for preliminary review.
July 12, 2024	PennDOT, PFBC, consultants, and the Service met to discuss revisions to the PBA.
July 22, 2024	The Service provided PennDOT with comments on the draft PBA.
November 6, 2024	PennDOT provided an updated draft PBA to the Service for another preliminary review.
November 22, 2024	The Service provided comments on this updated draft PBA to PennDOT.
December 10, 2024	FHWA sent the final PBA to the Service for reinitiation of the Opinion. The Service found that the PBA's appendices were missing and asked for these on December 16, 2024.
December 18, 2024	The Service received the final PBA with appendices.
December 26, 2024	The Service issued a letter to FHWA acknowledging receipt of the request for the reinitiation of formal section 7 consultation and stated that sufficient information was provided.
April 30, 2025	The Service sent a draft Opinion to FHWA for review.
May 2, 2025	FHWA provided comments to the Service on the draft Opinion.

2 PROGRAMMATIC BIOLOGICAL OPINION

The two main purposes of this Opinion are to streamline the ESA section 7 consultation process and to promote better conservation outcomes for the bog turtle in Pennsylvania.

2.1 Programmatic Consultation Process

This Opinion addresses the actions of the Pennsylvania Department of Transportation (PennDOT) in coordination with FHWA and/or the U.S. Army Corps of Engineers (USACE). FHWA supports state and local governments, including PennDOT, in the design, construction, and maintenance of highway systems under the Federal Aid Highway Program. For transportation agency projects that involve Federal permits, such as USACE permits under the Clean Water Act, the FHWA will generally be the lead Federal agency for the purposes of consultation with the Service under section 7 of the ESA. The lead agency may use this consultation for included activities, consult on a case-by-case basis, or use any other applicable programmatic consultation for their actions.

FHWA has delegated PennDOT as a non-Federal representative for the purposes of conducting section 7 ESA interagency consultation. This Opinion applies to future projects that the FHWA or USACE may fund, approve, or carry out and is limited to the geographic region of Pennsylvania within the extant range of the bog turtle, a species that is federally listed as threatened. We first issued this Opinion on April 10, 2019, and we are now updating it to continue the streamlined and transparent process of expediting project reviews and providing conservation for the bog turtle.

The transportation activities included in this Opinion range in scope and complexity from routine maintenance activities to the construction of new roadways on new alignments. This Opinion addresses the comprehensive descriptions of the transportation activities, avoidance and minimization measures (AMMs), measures to reduce or offset the effect of take (characterized and proposed by FHWA as "compensatory mitigation measures" in the PBA), and conservation recommendations proposed in the PBA.

This Opinion applies to actions that meet the effect determinations, project conditions, and conservation measures described in this document and is intended to cover most transportation actions. However, some actions upon our review may exceed the scope of this consultation and require individual or additional section 7 consultation.

The programmatic consultation approach in this Opinion can be broadly summarized as: 1) screening projects with the Pennsylvania Natural Diversity Inventory (PNDI) environmental review tool and conducting bog turtle habitat assessments if needed; 2) modifying projects as possible to avoid and minimize potential adverse effects; and/or 3) providing measures to offset unavoidable adverse effects.

PennDOT has a user's guide with instructions for project submittals, reviews, incidental take tracking, monitoring, and annual reporting. The project proponents and action agencies submit project details to us using a standardized project submittal form. This form captures relevant site-specific information, AMMs, potential take, and offsetting measures to support our consistency

review. When the required information is provided and the project qualifies for this Opinion's programmatic coverage, we will complete informal consultations within 14 days as opposed to the normal 60-day timeframe (50 CFR 402.13(c)(2)). We will complete formal consultations within 30 days, recognizing that staffing shortages may prevent the Service's ability to meet these deadlines in limited circumstances. Early coordination is the key to ensuring these timeframes are attained.

2.2 Effect Determinations

Section 7 of the ESA requires that Federal agencies 1) use their authority to develop programs that conserve federally listed species [section 7(a)(1)], and 2) consult with the Service to ensure that their actions do not jeopardize the continued existence of federally-listed species [section 7(a)(2)]. Consequently, this Opinion considers the benefits of proposed conservation commitments associated with these actions, as well as whether implementation of these actions is likely to jeopardize the continued existence of listed endangered and threatened species.

Projects included in the programmatic scope of this consultation include those that result in a "no effect" or a "may affect" determination for the bog turtle. This consultation provides our advanced concurrence with "may affect, not likely to adversely affect" (NLAA) determinations with the implementation of AMMs. For "may affect, likely to adversely affect" (LAA) determinations, we have determined that projects that are consistent with the Opinion are not likely to jeopardize the continued existence of the bog turtle. Below we describe no effect, NLAA, and LAA categories of projects, and the corresponding project-level processes for using this document to comply with section 7 of the ESA.

2.2.1 No Effect

The following activities have been determined by FHWA and PennDOT to have no effect on the bog turtle and will not be discussed further in this Opinion. Although concurrence from the Service is not required for no effect determinations made by a Federal action agency or its designated non-Federal representative, we agree that the following transportation activities would have no effect to the bog turtle:

- Maintenance actions determined to have No Effect as identified in Appendix A, or
- Actions with no wetlands in or within a 300-foot buffer around the limit of disturbance and limit of indirect effect, or
- Actions for which a Phase I Habitat Assessment of the project area (including a 300-foot buffer around the limit of disturbance and limit of indirect effect) has determined the absence of habitat conditions that would support the species, or
- Actions within the main channels (within the ordinary high-water mark) of watercourses greater than 30 feet in width with persistent cobble/boulder substrate (Appendix C), or
- Actions that have been determined by the FHWA or PennDOT to completely avoid all potential effects on the species.

2.2.2 Not Likely to Adversely Affect

Appendix A of this Opinion describes maintenance projects that are NLAA for the bog turtle. Additional projects may also result in a NLAA determination for the bog turtle as detailed in the "Effects of the Action" section below. These projects may rely on this consultation with no additional site-specific consultation between the lead agency and the Service. PennDOT will complete a PNDI and send a project submittal form to the Service (if necessary) prior to project commencement. PennDOT will ensure that all submitted projects are within the scope of and adhere to the criteria of this Opinion. Upon receipt of the project submittal form, the Service will check for program consistency and may request additional information if necessary to verify such consistency. The Service has 14 calendar days to either 1) notify PennDOT that a particular project does not meet the criteria for NLAA, or 2) concur with the NLAA (often by signing the project submittal form and returning it to PennDOT). However, if PennDOT is not notified within 14 calendar days for NLAA projects, they may proceed under this programmatic consultation since we have provided our advanced concurrence based on PennDOT's commitment to implement the appropriate AMMs.

2.2.3 Likely to Adversely Affect

The "Effects of the Action" section of this Opinion summarizes the characteristics of transportation projects that are LAA for bog turtle. For projects that are LAA the bog turtle, PennDOT will submit a request for formal consultation accompanied by a complete PNDI and a project submittal form. The Service will respond within 30 calendar days.

However, if the project requires formal consultation for other listed species, not just the bog turtle, then the Service will respond with a project-specific biological opinion. This project-specific biological opinion will verify the project's consistency with this programmatic Opinion for the bog turtle. Because other species are included in the consultation, the standard consultation procedures and timeline (135 calendar days) apply, unless there are other established consultation timelines for those species (e.g., other programmatic consultations).

The Service response to a complete and correct effects determination (through the PNDI or the project submittal form) for projects that are LAA for the bog turtle will be to:

- Verify that all applicable conservation measures are included in the project proposal;
- Verify that the project is consistent with the programmatic sideboards as described in the "Description of the Proposed Action" section for covered projects;
- Describe the anticipated incidental take; and,
- Identify any project-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements for this Opinion.

2.3 Adaptive Management

Adaptive management can be useful in cases where natural resources are responsive to management, but there is also uncertainty about the impacts of management interventions

(Williams and Brown, 2012). Due to uncertainty regarding the type and location of actual projects and the response of the species to these actions and the proposed avoidance measures, the involved stakeholders (e.g., FHWA, PennDOT, and Service staff) will periodically review new information regarding the species' ecology, conservation, and monitoring results of project effects to adjust how the program is working. This effort would ensure the program's effects to the species, anticipated take of individuals, and conservation response from the species are occurring as expected.

The FHWA, PennDOT, and the Service will apply adaptive management strategies throughout the 5-year effective lifetime of this consultation. Incorporating new information on the effects of the action and the function of the program will allow FHWA, PennDOT, and the Service to ensure that effects of the proposed actions are effectively minimized and that the Opinion is consistent with stated efficiency and conservation goals. Changes to this consultation will be considered on an annual basis, but they may also occur at any time that the FHWA, PennDOT, and Service agree it is appropriate.

3 DESCRIPTION OF THE PROPOSED ACTION

As defined in the ESA section 7 regulations (50 CFR 402.02), "action" means "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas."

The following is a summary of the proposed action. A detailed description can be found in the *Programmatic Biological Assessment for the Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania* (dated December 2, 2024) submitted to initiate this Opinion.

3.1 Introduction

The FHWA provides stewardship over the construction, maintenance, and preservation of the nation's highways, bridges, and tunnels. FHWA also conducts research and provides technical assistance to federal, state, tribal, and local agencies to improve safety, mobility, and livability, and to encourage innovation.

PennDOT's mission is to provide a sustainable transportation system and quality services that are embraced by local communities and add value to its customers. PennDOT is directly responsible for nearly 40,000 miles of highway and approximately 25,000 bridges in a state that has the nation's fifth largest state-maintained road system and third largest bridge system.

On an annual basis, the number of existing road miles and bridges undergoing maintenance or improvements will largely be influenced by available funding. Maintenance and improvement projects are expected to occur on only a fraction of the total infrastructure network annually. PennDOT annually receives over a billion dollars from the FHWA to support design, construction, and maintenance activities within the state. Components of this funding are applied to PennDOT transportation actions throughout the 17-county extant range of the bog turtle. Transportation actions throughout this range are overseen and executed by PennDOT's Engineering Districts 5-0, 6-0, and 8-0 regional management network.

3.2 General Programmatic Activity Categories

All transportation activities in this Opinion fall within the nine programmatic activity categories described in this section. The categories are based on the activity's timing and location relative to bog turtle habitat, which inform the potential effects it may have on the bog turtle (Table 2, Table 4, and Table 5).

3.2.1 Programmatic Category 1

Actions under Programmatic Category 1 have temporary effects to potential hibernacula microhabitat without any hydrologic modification.

Hibernacula microhabitat have the persistent presence of groundwater discharge and depth of mucky soil substrate required to support bog turtle brumation (i.e., a hibernation-like state that cold-blooded animals use during very cold weather). Actions with temporary effects could include the placement of erosion and sedimentation control features, flow diversion measures, and species exclusionary barriers. These transportation actions would be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Although effects to the hibernacula microhabitat are temporary, these effects could be adverse if they occur during November 1 to March 31. During this period, bog turtles are brumating and unable to escape from disturbance activities, which would potentially expose them to lethal freezing conditions on the ground surface. Therefore, actions under this programmatic category should follow the AMMs for active season work from April 1 to October 31, when bog turtles have a higher likelihood of being active and therefore are able to escape from disturbance and acclimate to the translocation habitat. The AMMs also include removing and excluding bog turtles from the limits of disturbance prior to the activity.

3.2.2 Programmatic Category 2

Actions under Programmatic Category 2 have permanent effects to potential hibernacula microhabitat without any hydrologic modification.

Actions that place permanent fill materials or excavate the wetland would permanently impact hibernacula microhabitat. PennDOT would conduct these actions in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Bog turtles use hibernacula to brumate and survive through their winter inactive season. Therefore, actions under this category should follow AMMs for active season work from April 1 to October 31. Bog turtles are more likely to escape disturbance activities during this period of non-freezing surface conditions and acclimate to the translocation habitat. The AMMs include additional measures to salvage and relocate any turtles that may be present within the action's limits of disturbance and physically exclude the disturbance activities from other potentially migrating turtles. Due to the permanent loss of species supporting habitat, compensatory mitigation is proposed in the PBA to offset these habitat impacts.

3.2.3 Programmatic Category 3

Actions under Programmatic Category 3 have temporary effects to potential foraging microhabitat during the species' inactive season, November 1 to March 31, without any hydrologic modification.

Foraging microhabitat lacks persistent groundwater discharge and depth of mucky soil substrate, though it is hydrologically connected to areas with persistent groundwater and mucky soils. Bog turtles are expected to use foraging microhabitat only during the species' active season, April 1 to October 31, for breeding, feeding, sheltering, and migration.

Temporary impacts could include the placement of temporary crossing matting, erosion and sedimentation control features, flow diversion measures, and species exclusionary barriers. These actions would avoid any permanent effect on the hydrologic sources supporting the wetland and would follow inactive season AMMs for the species, November 1 to March 31. During the inactive season, bog turtles are likely brumating in hibernaculum microhabitat, away from the action's disturbance in foraging microhabitat.

3.2.4 Programmatic Category 4

Actions under Programmatic Category 4 have temporary effects to potential foraging microhabitat during the species active season, April 1 to October 31. The action should follow AMMs for relocating any turtles that may be present within the action's limits of disturbance and physically exclude the disturbance activities from other potentially migrating turtles.

3.2.5 Programmatic Category 5

Actions under Programmatic Category 5 have permanent effects to potential foraging microhabitat during the species inactive season of November 1 to March 31 without hydrologic modification.

Actions that place permanent fill materials or excavate the wetland would result in permanent loss of foraging microhabitat. These actions avoid any permanent effect on the hydrologic sources supporting the wetland.

Actions under this category should follow AMMs for inactive season work from November 1 to March 31. During the inactive season, bog turtles are likely brumating in hibernaculum microhabitat, away from the action's disturbance in foraging microhabitat. Due to the permanent loss of species supporting habitat, compensatory mitigation is proposed in the PBA to offset these habitat impacts.

3.2.6 Programmatic Category 6

Actions under Programmatic Category 6 have permanent effects to potential foraging microhabitat during the active season of April 1 to October 31 without any hydrologic modification. The action should follow AMMs for relocating any turtles that may be present within the action's limits of disturbance and physically exclude the disturbance activities from

other potentially migrating turtles. Due to the permanent loss of species supporting habitat, compensatory mitigation is proposed in the PBA to offset these habitat impacts.

3.2.7 Programmatic Category 7

Actions under Programmatic Category 7 occur within stream corridors or upland habitats in the vicinity of occupied (or assumed occupied) bog turtle wetland(s) during the species active season of April 1 to October 31. These actions avoid any permanent effect on the hydrologic sources supporting the wetland(s). The action should follow AMMs for relocating any turtles that may be present within the action's limits of disturbance and physically exclude the disturbance activities from other potentially migrating turtles.

3.2.8 Programmatic Category 8

Actions under Programmatic Category 8 occur within stream corridors or upland habitats in the vicinity of occupied (or assumed occupied) bog turtle wetland(s) during the species inactive season of November 1 to March 31. These actions avoid any permanent effect on the hydrologic sources supporting the wetland(s). During the inactive season, bog turtles are likely brumating in hibernaculum microhabitat, away from the action's disturbance in the stream corridor or upland habitat.

3.2.9 Programmatic Category 9

Actions under Programmatic Category 9 have permanent effects to the hydrologic source(s) of occupied (or assumed occupied) bog turtle wetland(s). These effects could be adverse if they occur during November 1 to March 31. During this period, bog turtles are brumating and unable to escape from hydrological changes to their hibernation microhabitat, which would potentially expose them to lethal freezing conditions on the ground surface.

Therefore, actions under this category should follow AMMs for active season work from April 1 to October 31. Bog turtles are more likely to escape disturbance activities during this period of non-freezing surface conditions and acclimate to the translocation habitat. The AMMs include additional measures to salvage and relocate any turtles that may be present within the within the entire affected wetland and physically exclude the disturbance activities from other potentially migrating turtles. Due to the permanent loss of species supporting habitat, compensatory mitigation is proposed in the PBA to offset these habitat impacts.

Table 2. Programmatic transportation action categories and their anticipated effects by habitat type, season, and extent of hydrologic modification.

Habitat type	Action Category	Anticipated effect
Winter (Hibernation) habitats	1	Temporary effects to potential hibernacula microhabitat are anticipated to occur without any hydrologic modification.
	2	Permanent effects to potential hibernacula microhabitat are anticipated to occur without any hydrologic modification.
Foraging and Nesting Habitats	3	Temporary effects to potential foraging microhabitat are anticipated to occur during the inactive season without any hydrologic modification.
	4	Temporary effects to potential foraging habitat are anticipated to occur during the active season without any hydrologic modification.
	5	Permanent effects to potential foraging microhabitat are anticipated to occur during the inactive season without any hydrologic modification.
	6	Permanent effects to potential foraging microhabitat are anticipated to occur during the active season without any hydrologic modification.
Travel Corridor Habitats	7	Proposed action will occur during the active season entirely in stream corridors or upland habitats near occupied (or assumed occupied) bog turtle habitat. No permanent hydrologic modification anticipated.
	8	Proposed action will occur during the inactive season entirely in stream corridors or upland habitats near occupied (or assumed occupied) bog turtle habitat. No permanent hydrologic habitat modification anticipated.
Hydrology of Wetlands	9	Permanent hydrologic effects to species supporting habitat are unavoidable.

3.3 Specific Activities

Descriptions of specific transportation activities are summarized in Table 3. A detailed description of the specific activities can be found in Section 4 of the PBA provided by FHWA/PennDOT as part of this consultation.

Table 3: A summary of PennDOT's transportation activities.

Activity	Description
New Road Construction	Can include but is not limited to stormwater facilities, construction, paving, bridges, and culverts
Roadway Widening/Shoulder Improvements	Can include but are not limited to stormwater facilities, construction, paving, side slope stabilization, bridges, and culverts
Culvert Installation	Can include but is not limited to dewatering, scour protection, armoring, headwalls, and vegetation disturbance
Bridge Replacement and Construction	Usually includes spanning a body of water, wetlands, or roadway
Bridge Maintenance and Rehabilitation	Any work conducted on a current bridge including but not limited to scour repair, deck repair and replacement, and general maintenance
Drainage System Repair	Maintenance of roadside ditches, channels, cross culverts and pipes, catch basins, and retention/detention basins
Pavement Preservation	Patching, repairing, and replacing roadway surfaces
Slide Abatement	Stabilization of landslides, rockfalls, debris flow, and slope erosion and settlement
Streambank Stabilization and Flood Damage Repair	Direct protection of embankments at bridges, culverts, and roadway sections from erosive flowing water
Sinkhole Repair	Repairing depressions or holes in the ground caused by surface layer collapse
Transportation Alternatives Set-aside Program	Using set-aside funds for small projects including pedestrian and bike facilities, recreational trails, school projects, and community improvements
Compensatory Mitigation Activities	Mitigation offsets associated with unavoidable permanent impacts to aquatic resources
Other Related Activities	Activities that support transportation improvements such as geotechnical investigations, use of herbicides, and public utility relocations
General Maintenance	General roadway repair, rehabilitation, and maintenance activities implemented to prolong use, ensure motorist safety, and protect the environment; corresponding to PennDOT's published maintenance assemblies in Section 4 of the PBA

3.4 Conservation Measures

The Services' Consultation Handbook (Service and National Marine Fisheries Service [NMFS] 1998) defines "Conservation Measures" (CMs) as "actions to benefit or promote the recovery of listed species that are included by a Federal agency as an integral part of a proposed action under ESA consultation. These actions will be taken by the Federal agency or applicant and serve to minimize or compensate for project effects on the species under review." CMs may include actions that the Federal agency or applicant have committed to complete in a biological assessment or similar document.

PennDOT has adopted the following CMs (separated into Standard Measures for the environmental compliance process and AMMs to reduce impacts during action implementation) to avoid, minimize, or compensate for project effects on the species.

3.4.1 Standard Measures

The FHWA and PennDOT routinely implement standard measures as part of the environmental compliance process [e.g., National Environmental Policy Act (NEPA); USACE and Pennsylvania Department of Environmental Protection (PADEP) wetland/watercourse permitting]. The approach used by FHWA and PennDOT can be broadly summarized as: 1) performing PNDI and habitat screening procedures; 2) modifying projects as possible to avoid and minimize environmental impacts; 3) conducting actions during the appropriate seasonal time period to avoid adverse effects on the species, 4) implementing appropriate measures for the relocation and exclusion of the species from disturbance areas during their active seasonal time period, or 5) providing compensatory mitigation for anticipated adverse effects.

The standard measures for this Opinion include:

- Completing PNDI evaluations for all maintenance activities and projects that may affect the bog turtle within its range in Pennsylvania;
- Conducting annual refresher training for environmental and wetland scientists that routinely conduct Phase I Habitat Assessments;
- Implementing QA/QC practices on a subset of wetland and Phase I Habitat Assessments when these activities are not conducted by qualified surveyors or trained staff with considerable experience in performing these assessments;
- Wetland and watercourse habitat avoidance/minimization/compensation;
- Clearly delineating project limits of disturbance on-site; and
- Compliance with state water quality standards through erosion and sediment pollution control plans, stormwater management plans, and spill pollution control plans.

3.4.2 Avoidance and Minimization Measures

In addition, for actions to be covered by this programmatic consultation, specific AMMs related to the species will be implemented where applicable (see Table 4 and Table 5). The AMMs included in the analysis, if executed under appropriate circumstances, are expected to reduce potential impacts of the stressors. In some cases, impacts will be reduced to levels that are insignificant (the magnitude or size of the impact will never reach the scale where take occurs) or discountable (the probability is extremely unlikely for take to occur) and, therefore, not likely to adversely affect the species. In other cases, some level of take of the species will be unavoidable even with the application of AMMs but will be offset through a compensatory AMM.

The AMMs will be applied to the actions encompassed by this programmatic consultation unless the action has been determined by the action agency to be no effect (as defined in the above "Effect Determinations" section), or a Phase II Presence/Probable Absence Survey or Phase III Trapping Survey conducted by a qualified species surveyor has determined that the species is not likely to be present within the project area and the Service has concurred with these findings.

The implementation of AMMs 1 to 9 is required for all other actions with the use of this programmatic consultation, while AMMs 10-19 are only required for specific programmatic categories (Table 5). The application of AMMs acknowledges the presence of potential species-supporting habitat and the confirmed or assumed presence of the species within the action area of the transportation activity. Table 4 provides a summary of the Programmatic Category Actions and the necessary AMMs for application with those actions. Changes to AMMs since our last Opinion are in **bold** font.

Table 4: Avoidance and minimization measures (AMMs)

AMM	DESCRIPTION
Required for all actions	
1	Ensure that all wetland, bog turtle habitat, and species surveyors, operators, employees, and contractors working in areas of known or assumed occupied bog turtle habitat are aware of and implement all PennDOT environmental commitments, including all applicable AMMs, PA DEP permit conditions, USACE permit conditions, and Bog Turtle Health Bulletin (2015) equipment disinfection and infected specimen protocols. Sensitivity training and briefing materials will be provided to all applicable personnel prior to the initiation of the action. Sensitive resource signage will be placed at the site of the action to notify personnel of the potential presence of the species.
2	All work associated with the action shall be conducted in accordance with the Erosion and Sediment Pollution Control Plan approved by the County Conservation District or PA DEP. Erosion and sediment control best management practices will be implemented before, during, and after all land disturbance to prevent the potential for asphyxiation and smothering of bog turtles as well as accidental sedimentation and filling of adjacent wetland habitats that may potentially support the species. All erosion and sediment control features will be properly installed and maintained in accordance with the County Conservation District and PA DEP. The project site will be monitored daily, as is also required for all Chapter 102 and NPDES permitting, to ensure the erosion and sedimentation control practices are implemented and properly maintained, and to identify any project related impacts due to sediment accumulation. The daily inspection may be completed by the on-site environmental monitor/inspector or project foreman.

3	All rock scour protection areas associated with an action will be completed in such a manner that precludes large voids for potential impingement and entrapment of bog turtles. Any voids in the rock scour protection will be choked with smaller rock and mineral material to avoid the creation of potential traps for the species. All rock scour protection areas must be installed and depressed below the appropriate stream water elevation as conditioned by PA DEP authorization. **Consider using natural channel stabilization techniques as an alternative to rip-rap scour protection/energy dissipation and bank armoring activities.**
4	**All storage and dispensing of vehicular fuels and fluids will occur at least 300 feet from any aquatic habitats present.** A hazardous material construction spill avoidance/remediation plan (Spill Prevention Control and Countermeasure Plan – SPCC Plan) will be developed and implemented during the fulfillment of the transportation action. The project site will be monitored daily to ensure spill avoidance/remediation practices are implemented. The daily inspection may be completed by the on-site environmental monitor/inspector or project foreman.
5	Project storage and staging areas will be located only in upland areas located as far as possible from wetland/watercourse habitat areas. This shall include all areas required for stockpiles, equipment storage, and parking.
6	All public utilities potentially associated with the action due to the necessary relocation of their services will be notified of the potential presence of the species and their need to consult with the Service and Pennsylvania Fish and Boat Commission (PFBC) on their respective relocation activities.
7	High visibility orange construction fencing shall be used to delineate avoidance areas during the action. The fencing will act as a visual warning to prevent construction equipment and personnel from entering and disturbing sensitive areas outside of the project limit of disturbance.
8	To avoid the introduction and spread of invasive species into supporting habitats and minimize the duration of exposed soils, use erosion control blankets **made of bio-degradable material** on disturbed areas immediately after project completion, and promptly re-vegetate areas of temporary disturbance with native wetland or upland seed mixes dependent on the location of the disturbance. Thoroughly wash construction equipment and vehicles offsite, especially the undercarriage and wheels, before use within 300 feet of supporting habitat. Thoroughly wash temporary crossing measures such as composite matting or timber matting before use within 300 feet of supporting habitat.
9	Specific coordination and construction operating procedures approved by the Service/PFBC shall be implemented if a bog turtle is encountered during preconstruction exclusion surveys, on-site monitoring, or within the vicinity of the limit of disturbance (LOD) during the action (i.e., construction). These specific procedures include the following: • If a turtle is encountered then all construction activities within 300 feet of the capture will cease immediately. The District Environmental Manager and qualified surveyor will be contacted immediately to inform them of the encounter. • If the turtle appears dead or immobile, then the turtle will be left where it was initially observed. If the turtle appears to be mobile, then efforts will be made to temporarily contain the turtle until the qualified bog turtle surveyor can take possession of it. Temporary containment will consist of placing the turtle in a thoroughly clean bucket that has a depth of more than 18 inches. Pieces of native vegetation and 0.5 to 1 inch of water will be placed in the bucket with the turtle to keep the animal cool and hydrated. The bucket will be placed in a quiet, well- shaded area. The turtle will be handled as little as possible, and temporary containment must not exceed 6 hours. The qualified bog turtle surveyor will take possession of the turtle and identify the species as well as document the capture location and condition of the turtle. The qualified surveyor will conduct a thorough search of the area within and in the vicinity of the limit of disturbance of the action to determine if any other turtles may be in the construction area. The qualified surveyor will also inspect the exclusion barrier fencing and direct any repairs as needed. If there are breaches in the exclusion barrier and/or the turtle is identified as a bog turtle, then construction will not resume until coordination with the Service and PFBC is completed and all breaches in the exclusion barrier are repaired. If the qualified bog turtle surveyor identifies the turtle species as a bog turtle, then the surveyor will immediately notify endangered species biologists at both the Service and PFBC. The elapsed time for contacting both agencies will be as soon as possible, but must not exceed 24 hours. Following the arrival

	of the qualified bog turtle surveyor at the project site, the turtle must be handled by the biologist according to the recommendations of the Service and PFBC. The qualified surveyor will consult with the Service and PFBC concerning the safe handling and necessary relocation of the turtle outside of the project disturbance area. Construction will resume only after the completion of this consultation. If the qualified bog turtle surveyor identifies the turtle as a species other than the bog turtle, and the turtle appears healthy, then the qualified surveyor will release the turtle unharmed no further than 300 feet from the site of discovery to a safe location outside of the limit of disturbance. Construction may continue once the turtle is relocated If any turtle found appears injured or dead, the qualified bog turtle surveyor will coordinate with the Service and PFBC concerning the safe handling of an injured turtle and the taking of possession of the specimen whether injured or dead by one of these agencies. Construction will resume only at the completion of this coordination. To offset the adverse effects of the take, compensatory mitigation credits will be calculated in accordance with Service credit metrics and acquired from a Service approved conservation bank.
Required for specific programmatic categories	
10	To avoid the killing, harm, or harassment of brumating bog turtles within hibernacula microhabitat during the species inactive period, the action will be completed during the active season for the species between April 1 and October 31.
11	To avoid the killing, harm, or harassment of bog turtles during the species active period, the action will be completed during the inactive season for the species between November 1 and March 31.
12	To avoid the killing, harm, or harassment of individual bog turtles during the species active period, a preconstruction exclusion survey to remove any bog turtle individuals within the LOD will be conducted by a Service/PFBC recognized-qualified bog turtle surveyor immediately prior to the commencement of the action. Exclusion surveys may also be necessary for the assembly/disassembly of temporary streamflow diversion measures; the placement of rock scour protection materials; and the internal confines of an existing bridge or culvert crossing structure. **Survey efforts within stream habitats may include the use of viewing buckets and snorkeling equipment to adequately search underwater habitats associated with existing culvert and bridge crossings, including cut banks and eroded areas under abutments. Survey efforts within existing culvert pipes may include the usage of cutting tools to dissect the culvert pipe for viewing, or the complete removal of the intact pipe for viewing of the pipe's internal area.** Any captured individuals will be relocated outside of the project disturbance area into suitable habitat. The Service/PFBC recognized- qualified bog turtle surveyor will oversee and supervise any necessary vegetation cutting or clearing (4 to 6 inches height) for the effective survey of the excluded area. All exclusionary surveys will be conducted according to the most current Phase 2/Phase 3 survey protocol(s) provided by the Service and PFBC.
13	To avoid the killing, harm, or harassment of individual bog turtles during the species active period, an exclusionary barrier (silt fence, super silt fence, adequate silt sock, sand bag wall, sheeting, Jersey barrier) will be erected immediately following the species exclusionary survey and prior to the commencement of the activity to isolate the disturbance area associated with the action (See Appendix D). Sand bag walls, sheeting, Jersey barrier, etc. may be necessary within watercourse channel environments to isolate in-stream disturbance areas. No other construction/maintenance activities may commence until the exclusionary barrier has been installed. The exclusionary barrier is to be installed a minimum of 6-inches into the underlying habitat where appropriate. The installation/removal of the exclusionary barrier must be completed by hand through wetland habitats. The installation/removal of the exclusionary barrier through upland habitats may be completed with the assistance of equipment. The exclusionary barrier shall be installed and removed under the supervision of a Service/PFBC recognized- qualified bog turtle surveyor. While in use, the exclusionary barrier shall be inspected daily to ensure its competency and function. The daily inspection may be completed by the on-site environmental monitor/inspector or project foreman. Straw bales, sand bags, or temporary fencing may be used as temporary barriers at ingress/egress locations to provide access to equipment/personnel through the exclusionary barrier.

	Should the exclusionary barrier become compromised during its use, then all construction/maintenance activities will cease until an exclusionary survey of the action area has been completed by a Service/PFBC recognized-qualified bog turtle surveyor and the compromise has been remediated. The exclusionary barrier is to be removed immediately following the completion of the action. The Service/PFBC recognized-qualified bog turtle surveyor will ensure that potential pitfalls are not created by trenching associated with the installation and/or removal of the exclusionary barrier.
14	All temporary streamflow diversion measures must be implemented in a manner that will not result in the possible collection and entrainment of species individuals into pumping equipment.
15	To avoid the killing, harm, or harassment of species individuals during the species active period, a Service/PFBC recognized-qualified bog turtle surveyor shall conduct inspections of wetland spoil materials from excavation areas within core supporting habitat to ensure that species individuals are recovered and relocated. **The need for wetland spoil inspection shall be determined by the Service/PFBC recognized-qualified bog turtle surveyor and PennDOT/FHWA.**
16	To avoid the killing, harm, or harassment of individual bog turtles during the species active period, a Service/PFBC recognized-qualified bog turtle surveyor may provide continuous monitoring during the active construction. **The need for continuous monitoring shall be determined by the Service/PFBC recognized-qualified bog turtle surveyor and PennDOT/FHWA**.
17	A Service/PFBC recognized-qualified bog turtle surveyor will be retained throughout the duration of the transportation action to monitor the effectiveness of the implemented AMMs. The surveyor will also provide recommendations to PennDOT and the FHWA concerning the implementation of the necessary measures.
18	To reduce the amount of take associated with the permanent loss of habitat, a salvage survey effort will be undertaken in conjunction with the Service/PFBC to relocate any individuals within the impact area prior to disturbance. Any recovered individuals will be relocated a maximum of 300 feet from the impact area within the same drainage basin.
19	To offset the adverse effects for the permanent loss of supporting habitat and/or incidental take, **compensatory species mitigation will be provided. The determination of the amount of compensation to be provided, and the means of achievement will be addressed with the Service on an individual project basis. Potential strategies for compensatory species mitigation could include, but are not limited to, the purchase of credits from a Service approved conservation bank, construction of a PennDOT advanced compensation conservation bank, vegetation management activities at an occupied species site, restoration of supporting hydrology conditions to an altered occupied species site, species passage improvements at an occupied species site associated with documented vehicular conflicts, the provision of nest protection/predator control measures at an occupied species site, and the provision of in lieu fee monetary funds dedicated to habitat management activities at an occupied species site, purchasing and preserving an occupied species site, re-evaluating roadside mowing practices in proximity to an occupied species site, or acquiring and operating an FHWA/PennDOT-sponsored conservation "bundling" site or conservation easement**.

Table 5: Programmatic Category actions and their applicable avoidance and minimization measures.

PROGRAMMATIC CATEGORY	DESCRIPTION	AMMS 1-9	AMM 10	AMM 11	AMM 12	AMM 13	AMM 14	AMM 15	AMM 16	AMM 17	AMM 18	AMM 19 REQUIRED FOR MITIGATION
PC1 **Temporary Hibernacula Habitat Effects**	Actions where temporary effects to potential hibernacula are anticipated to occur without any hydrologic modification.	X	X		X	X	X	X	X	X		X
PC2 **Permanent Hibernacula Habitat Effects**	Actions where permanent effects to potential hibernacula microhabitat are anticipated to occur without any hydrologic modification.	X	X		X	X	X	X	X	X	X	X
PC3 **Temporary Foraging Habitat Effects – Inactive Season Work**	Actions where temporary effect to potential foraging habitat are anticipated to occur during the *inactive* bog turtle season without any hydrologic modification.	X		X								
PC4 **Temporary Foraging Habitat Effects – Active Season Work**	Actions where temporary effect to potential foraging habitat are anticipated to occur during the *active* bog turtle season without any hydrologic modification.	X			X	X	X	X	X	X	X	
PC5 **Permanent Foraging Habitat Effects – Inactive Season Work**	Actions where permanent effects to potential foraging habitat are anticipated to occur during the *inactive* bog turtle season without any hydrologic modification.	X		X								X
PC6 **Permanent Foraging Habitat Effects – Active Season Work**	Actions where permanent effects to potential foraging habitat are anticipated to occur during the *active* bog turtle season without any hydrologic modification.	X			X	X	X	X	X	X	X	X
PC7 **Upland/Stream Corridor Habitat Effects – Active Season Work**	Actions which will occur within stream corridors or upland habitats in the vicinity of occupied/assumed supporting wetland habitat during the *active* bog turtle season with exclusionary measures. No permanent hydrologic impacts to aquatic habitats are anticipated to occur.	X			X	X	X	X	X	X		
PC8 **Upland/Stream Corridor Habitat Effects – Inactive Season Work**	Actions which will occur within stream corridors or upland habitats in the vicinity of occupied/assumed supporting wetland habitat during the *inactive* bog turtle season. No permanent hydrologic impacts to aquatic habitats are anticipated to occur.	X		X								
PC9 **Permanent Hydrologic Effects**	Actions where the hydrology of supporting habitat will be permanently altered by the action, resulting in take due to modified hydrology.	X	X		X	X	X	X	X	X	X	X

4 ACTION AREA

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The action area for this project is the extant range of the bog turtle within a 17-county area in southeastern Pennsylvania (Figure 1).

Figure 1.

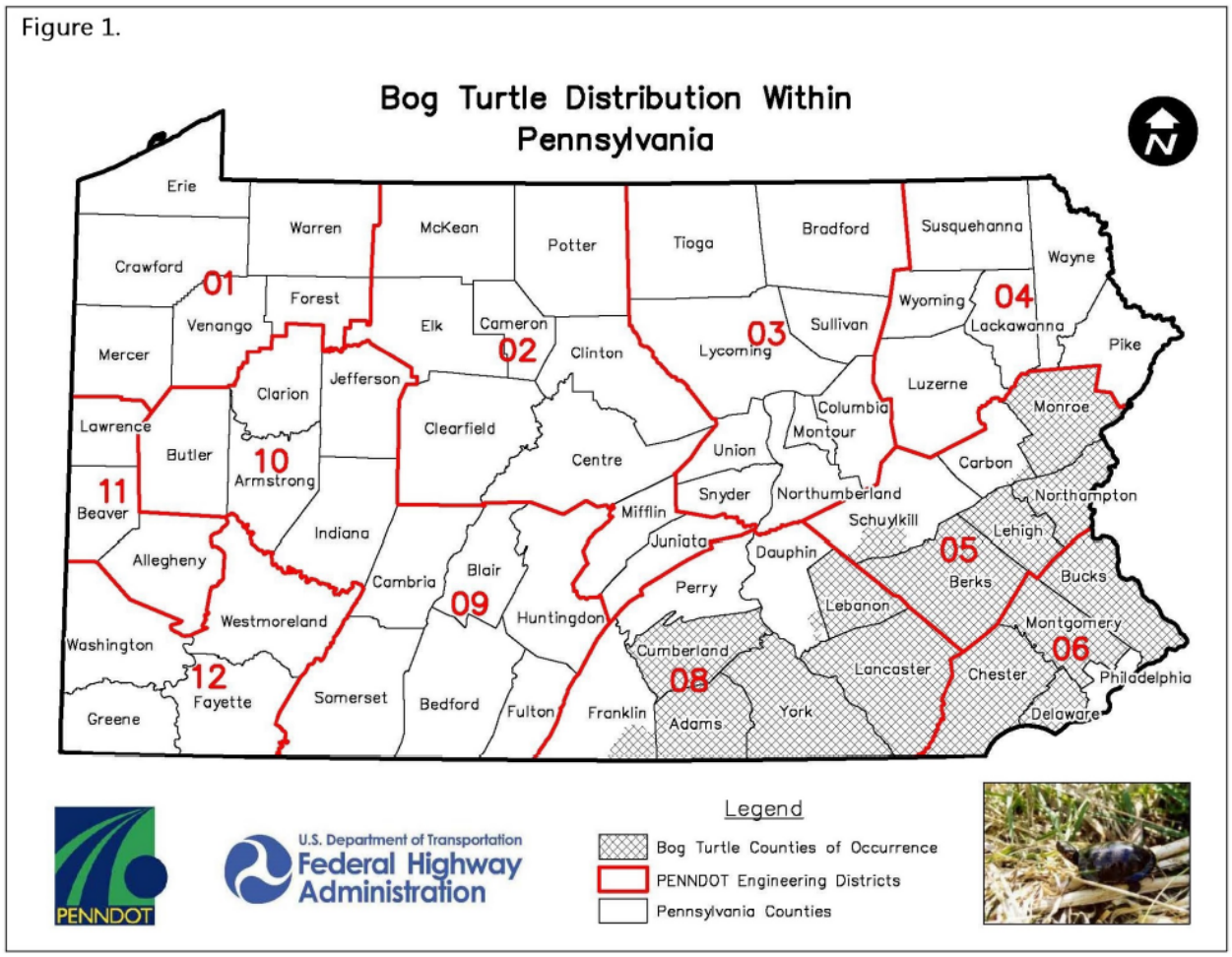

Figure 1: The action area is the extant range of the bog turtle in Pennsylvania, which spans 3 PennDOT Engineering Districts and 17 counties.

5 STATUS OF THE SPECIES AND CRITICAL HABITAT

5.1 Status of the Species

Per 50 CFR 402.14(g)(2), the Service must "Evaluate the current status and environmental baseline of the listed species or critical habitat." The following summarizes the species' general life history, threats, demographics and population trends, and recovery strategy drawn primarily from Service assessment, listing, and recovery documents.

5.1.1 Listing and Life History

We listed the northern population of the bog turtle as a threatened species under the ESA on November 4, 1997 (Service 1997). The northern population extends from southern New York and western Massachusetts south through western Connecticut, New Jersey, eastern Pennsylvania, and northern Delaware and Maryland (Service 1997).

The bog turtle is the smallest member of the genus *Glyptemys* and one of North America's smallest turtles (Service 2001). They usually occur in small discrete populations occupying suitable wetland habitat dispersed along a watershed. Within a watershed, bog turtles inhabit a variety of wetland types that are generally small, spring/seepage-fed, open-canopy, herbaceous sedge meadows and fens bordered by more thickly vegetated and wooded areas. Bog turtles nest, bask, forage, and hibernate in these wetlands which contain native sedges, grasses, forbs, scattered shrubs, saturated mucky soils, and shallow to deep rivulets/watery trails created by naturally flowing water or by wildlife. Areas with these soil, hydrology, and vegetation characteristics are known as core habitat (Service 2022a). While bog turtles spend most of their time in core habitat, they have been documented in atypical habitats such as ponds, lakes, pipes, and ditches (Service 2022b).

Bog turtles disperse between habitat patches via stream corridors and uplands (Service 2022a). For example, Pittman et al. (2009) documented bog turtles frequently traveling in stream habitat adjacent to their typical wetland habitat, even when the bog contained considerable water. They also documented bog turtles overwintering in the stream habitat when their wetland dried up. Smith et al. (2016) documented an adult male bog turtle emigrating a wetland population via a river, and Somers et al. (2007) tracked a female bog turtle that spent at least 43 days using a variety of stream and streamside habitat including undercut banks and root wads. Studies have documented travel distances of up to 2.5 miles (Jones et al. 2024) and across terrain including a pine plantation (Carter et al. 2000), roads (Jones et al. 2024, Morrow et al. 2001), and residential areas (Jones et al. 2024). Dispersal allows for genetic exchange between populations (Service 2022b).

5.1.2 Threats

The main threats to the bog turtle are the loss, alteration, and fragmentation of its highly specialized wetland habitat, and poaching of long-lived adults from wild populations for the illegal wildlife trade (Service 2001). Habitat loss, alteration, and fragmentation result from altered hydrology (due to development, roads, and intensive agriculture) and changes in vegetation (due to invasive species encroachment and vegetation succession from open-canopy

emergent wetland to forest). Other threats include road mortality, predation, and pollution and contaminants. Potential future threats include disease and climate change (Service 2022a).

5.1.3 Demographics and Population Trends

The northern population of the bog turtle has had a range reduction (primarily in New York) since the 1800s (Service 1997, Erb 2019). At the time of listing, the northern population of the bog turtle was thought to be extant in 191 individual populations in 7 states (Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, and Pennsylvania). Since listing, new bog turtle wetlands and populations have been found (primarily in Pennsylvania) and progress has been made in managing the primary threat of habitat loss and alteration. We are now aware of 330 extant metapopulations[1] comprising of 508 populations[2] (Service 2022b).

5.1.4 Recovery

To assess the status of the species, we need to understand the species' conservation needs described in terms of resiliency, redundancy, and representation. Resiliency is the ability of species and populations to withstand stochastic events, measured in metrics such as numbers and growth rates. Redundancy is the ability of a species to withstand catastrophic events, measured in metrics such as number of populations and their distribution. Representation is the variation or ability of a species to adapt to changing conditions and may include behavioral, morphological, genetic, or other variation. These three terms are collectively known as the three Rs (Wolf et al. 2015, Smith et al. 2018).

We divided the northern population of the bog turtle into five recovery units[3] based on habitat distinctiveness, biogeographical and ecological affinities, and variation in the intensity and severity of threats to the species' survival (Service 2001). Two recovery units overlap with Pennsylvania – the Susquehanna/Potomac and the Delaware. The Susquehanna/Potomac recovery unit is characterized by historic and current agriculture usage with major threats being the conversion of wetlands to farm ponds, non-point source pollution, lack of wetland buffers, and hydrological impacts from residential development. The Delaware recovery unit is ecologically diverse and its main threats are urban sprawl, habitat fragmentation, and changes to groundwater quality and quantity (Service 2001).

To address resiliency, redundancy, and representation, we developed a Recovery Plan in 2001 that outlines the following four criteria as targets for delisting:

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[1] The Bog Turtle Conservation Plan for the Northern Population (2019, p.xi) defines a metapopulation as populations with genetic exchange feasible through occasional dispersal events within one generation time (10–40 years) of an individual: < 3 km of contiguous wetland, < 2 km of intermediate or mosaic upland-wetland habitat, or < 1.5 km undeveloped upland habitat.

[2] The Bog Turtle Conservation Plan for the Northern Population (2019, p. xii) defines a population as a functionally reproductive group of individuals (e.g. at least one individual from each sex or evidence of reproduction such as presence of a hatchling or juvenile) using one or more core habitat areas, which are within 300 m of each other with no major barriers between them. Movement between core habitat patches likely occurs every 1–10 years.

[3] Recovery units are management subsets of a listed species that are created to establish recovery goals or carry out management actions.

- Long range protection is secured for at least 185 populations[4] distributed among five recovery units: Prairie Peninsula/Lake Plain Recovery Unit (10 populations), Outer Coastal Plain Recovery Unit (5 populations), Hudson/Housatonic Recovery Unit (40 populations), Susquehanna/Potomac Recovery Unit (50 populations), and Delaware Recovery Unit (80 populations);

- Monitoring at 5-year intervals over a 25-year period shows that these 185 populations are stable or increasing;

- Illicit collection and trade no longer constitute a threat to this species' survival; and

- Long-term habitat dynamics, at all relevant scales, are sufficiently understood to monitor and manage threats to both habitats and turtles, including succession, invasive wetland plants, hydrology, and predation.

Overall, there is no significant change to the status of the species since its listing because none of the above recovery criteria have been met. While the northern population of the bog turtle appears to have high redundancy and representation (large number of metapopulations distributed across the range), few of these metapopulations have high resiliency (Table 8 of Service 2022b). The primary threat of habitat loss or alteration remains, and ongoing management of restored wetlands continues to be a challenge (Service 2022b).

5.2 Status of the Critical Habitat

No critical habitat for the species has been designated.

6 ENVIRONMENTAL BASELINE

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, state, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated and/or ongoing impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress.

6.1 Status of the Species within the Action Area

The action area of Pennsylvania contains 186 extant bog turtle populations and 145 metapopulations which make up 37 and 44 percent of the species' range-wide extant populations and metapopulations (Service 2022). Pennsylvania is the only state in the species' northern range

[4] The Bog Turtle Northern Population Recovery Plan (2001, p. 4) defined a population as the bog turtles occupying a single wetland site. This definition does not reflect movements between sites and the ecological function of the population. Therefore, The Bog Turtle Conservation Plan for the Northern Population (2019) revised the definitions of population and metapopulation (noted above), and the Bog Turtle 5-Year Review (2022) recommends revising the recovery criteria to reflect the health and viability of populations and metapopulations, and not just track the numbers of occupied sites.

where new populations are regularly being discovered, while the rest of the northern range is stable (Service 2022).

The bog turtles within the action area suffer from habitat loss, alteration, and fragmentation; poaching; road mortality; predation; and disease (Service 2001, Service 2022b). Despite these threats, their status appears to be stable because of 1) improved regulatory mechanisms[5]; 2) habitat protection (i.e., conservation easements)[6]; and 3) habitat management that has resulted in the creation or expansion of optimal habitat.

6.2 Factors Affecting the Condition of the Species in the Action Area

The action area is in the rapidly developing Baltimore-Washington and Philadelphia-New York metropolitan corridors. Expanding residential, commercial, and industrial development has and continues to subject the bog turtle to the above threats. These ongoing threats are expected to continue (Service 2022b, p.25).

The bog turtle is also affected by existing state and local transportation activities, including those reviewed under the previous version of this Opinion. The action area encompasses 3 PennDOT Engineering Districts that maintain 12,136 road miles and 8,299 bridges (FHWA and PennDOT 2024, p. 8). Existing roadways expose the bog turtle to mortality from construction and traffic; stressors such as increased noise and chemical pollutants; habitat alterations from changes in hydrology, chemistry, and vegetation; increased human access potentially leading to poaching; and potentially decreased genetic exchange from habitat fragmentation and the inability to disperse. These effects are expected to continue given the proximity of transportation infrastructure and activities to bog turtle sites.

7 EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, "effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but that are not part of the action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action."

We analyzed the effects of all the components of the proposed action in Appendix B. The table contains a deconstruction of the proposed action into the sub-activities and structures that have the potential to affect bog turtles. In addition, the table describes the relationships between the sub-activities, stressors, direct interactions, AMMs, and the resulting effects on individual bog turtles.

[5] In Pennsylvania, wetlands supporting threatened and endangered species are called "exceptional value" wetlands and have more stringent requirements for state permitting of wetland encroachment, though the requirements do not extend to upland buffers (Service 2022b, p.29).

[6] Pennsylvania has 47 permanently protected bog turtle populations (Service 2022b, p. 10).

In most cases, the following project actions are NLAA the bog turtle because the AMMs will reduce the potential adverse effects to be insignificant and/or discountable, as described in Appendix B:

- Programmatic Category 3 actions,
- Programmatic Category 8 actions,
- Transportation actions for which the species has been determined to be absent from the action area (including a 300-foot buffer around the limit of disturbance/limit of indirect effect) through the performance of Phase II/Phase III species surveys approved by the Service, and
- Transportation maintenance actions identified as "may affect" in Appendix A that fit into Programmatic Categories 3 and 8 and follow the AMMs identified in Table 4.

The following actions are LAA bog turtles:

- Programmatic Category 1 actions,
- Programmatic Category 2 actions,
- Programmatic Category 6 actions,
- Programmatic Category 9 actions,
- Transportation activities in any Programmatic Category that introduces vehicle traffic in proximity to an occupied or assumed occupied bog turtle site where there previously was none,
- Transportation activities in any Programmatic Category that increase pedestrian traffic leading to an increased risk of poaching and bog turtle interaction with domesticated animals, and
- Transportation maintenance actions identified as "may affect" in Appendix A that fit into Programmatic Categories 1, 2, 6, and 9 and follow the AMMs identified in Table 4.

The following actions can be NLAA or LAA, depending on the individual project's context:

- Programmatic Category 4 actions,
- Programmatic Category 5 actions,
- Programmatic Category 7 actions, and
- Transportation maintenance actions identified as "may affect" in Appendix A that fit into Programmatic Categories 4, 5, and 7 and follow the AMMs identified in Table 4.

A summary of the potential effects of the proposed action are described below.

7.1 Direct Effects

Direct effects to bog turtle adults, juveniles, hatchlings and nests/eggs can vary within the transportation programmatic activities. Potential direct effects include:

- Killing, harm, and harassment of individuals from crushing, entrapping, smothering, and injury;

- Harm of individuals due to the temporary or permanent loss and degradation of suitable foraging, basking, escape habitat and hibernaculum habitat; and

- Harm and harassment of individuals due to construction-related noise, percussion, and vibration; heavy equipment operation; trenching; grading; isolation created by operation of heavy construction equipment; installation, use, and removal of erosion and sedimentation pollution control measures; installation, use, and removal of temporary access measures including crossing matting and causeway structures; installation, use, and removal of temporary species exclusion measures; and use of temporary stream diversion and/or bypass dewatering measure; and

- Hunting, trapping, capture, and collecting of individuals during the preconstruction survey and salvage efforts (AMMs 12 and 18, which may be covered by the qualified bog turtle surveyor's PA Fish and Boat Commission permit)

7.2 Indirect Effects

Indirect effects to bog turtle adults, juveniles, hatchlings and nests/eggs can vary within these transportation programmatic activities. Potential indirect effects include killing, harm, and harassment of individuals following transportation activities due to increased risk for injury and mortality from vehicular collisions, modification of animal behavior, fragmentation of populations and habitat linkages, potential alteration of the supporting physical and chemical habitat environment through hydrologic modifications and nonpoint source runoff, and introduction and spread of invasive and exotic species.

7.2.1 Indirect Effects of Salt and Deicing Agents

Routine application of deicing materials is necessary for the safe operation of the road network but is known to impact wetlands and other aquatic environments (Trombulak and Frissell 2000). The use of road salt results in accumulation of sodium and chloride ions in runoff, thereby increasing concentrations of those ions in the soil, groundwater, and surface waters. The increase in the concentrations of ions reduces the soil's ability for ion exchange, decreasing permeability and aeration, and increasing alkalinity of the soil. Chloride may also combine with heavy metals in wetland soils, rendering the metals more water-soluble and more available for uptake by plant roots. Elevated chloride levels have been documented up to 1,000 feet from the road, and chloride concentrations found in roadside soils often exceed the tolerance thresholds of nearby wetland vegetation. Many plant species are sensitive to high chloride levels and may die back or

fail to germinate under these conditions. Runoff contaminated with road salt can cause a shift in plant community structure when salt-sensitive plant species are replaced by less sensitive species, such as cattails (*Typha* spp.), giant reed (*Phragmites australis*), and purple loosestrife (*Lythrum salicaria*). Salt-related vegetation changes can also affect wildlife by adversely altering habitat, inhibiting road crossing by amphibian species, and causing behavioral and toxicological impacts on birds and mammals. Both acute and chronic toxic effects of chloride on aquatic systems have been well documented. Chronic concentrations of chloride as low as 210 milligrams per liter have been found to be harmful to some forms of aquatic life. Chloride levels exceeding 1,000 milligrams per liter can have lethal and sublethal effects on a wide range of aquatic plants and invertebrates. Harmful effects of deicing materials have been documented in amphibian species. Wetlands receiving excessive chloride are likely to experience reduced biodiversity, a loss of sensitive species, and an increase in salt-tolerant invasive species (NRC 2005, Wright et al. 2006, Karraker et al. 2008).

We are not aware of any studies looking at direct physiological effects of contaminants on bog turtle health, survival, or reproduction. Some studies of other turtle species have found elevated contaminant levels or adverse effects (Manolis 2002, Tuberville et al. undated, Rowe 2008, Green et al. 2010, Haskins et al. 2017), but other studies have not (Albers et al. 1986, Gibbs et al. 2017). Long-lived species of high trophic status, such as turtles, are subject to having contaminants accumulated or trophically magnified in their prey and are therefore most likely to establish high body burdens of persistent, bioaccumulative contaminants. In addition to trophic position, models suggest that air-breathing animals (like turtles) have a reduced capacity to eliminate some contaminants and thus a greater propensity for bioaccumulation, relative to organisms possessing aquatic respiration. Contaminants can be passed from females to offspring, either from body stores or from the female's diet during egg development (Rowe 2008). Turtles are late-maturing, long-lived, and largely sedentary higher-order predators. These attributes may make turtles useful meters of bioaccumulation of contaminants, but poor indicators of contaminant effects on populations. This is because the demographic parameters perhaps most sensitive to contaminant-associated effects, such as clutch size, egg survival, and hatchling survival, are also those to which population growth in turtles is least sensitive (Gibbs et al. 2017).

7.3 Additional Indirect Effects

Additional indirect effects may occur from public utility relocations, pre-construction geo-technical investigations, off-site staging and storage areas, offsite waste and borrow areas, use of temporary detour routes, increased transportation infrastructure usage and maintenance, and land development activities that otherwise would not occur but for the proposed action.

8 CUMULATIVE EFFECTS

Cumulative effects are those "effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area" of the Federal action considered in this Opinion (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation under section 7 of the ESA.

Non-Federal activities that are reasonably certain to occur in the action area include: residential and commercial development; road construction and maintenance; construction and maintenance of utility infrastructure (e.g., pipelines, power lines, water and sewer lines, telecommunications, and energy infrastructure); resource extraction (e.g., oil and gas, water, minerals); and agricultural activities. These activities may adversely affect the bog turtle populations through 1) loss, degradation, and fragmentation of habitat; 2) degradation of water quality; 3) incidental killing, injury, and disturbance to individuals; and 4) an increased risk of nest predation due to an increase in the prevalence of predators, including dogs, that thrive near human developments. The threat of illegal collection will likely continue[7].

PennDOT and FHWA expect land and infrastructure development activities within the 17-county action area to continue. The impacts attributed to land development activities in greenspace areas will likely be focused on the conversions of agricultural lands and early successional herbaceous habitats (FHWA and PennDOT 2024). Many activities that impact streams and wetlands require Federal permits from the Corps under the Clean Water Act, often under the Pennsylvania State Programmatic General Permit (PA-SPGP). Therefore, these potential future actions (State, Tribal, local, and private) that may affect bog turtles will be subject to ESA section 7 (a)(2) consultation.

9 ANALYTICAL FRAMEWORK FOR JEOPARDY DETERMINATION

9.1 Jeopardy Determination

Section 7(a)(2) of the ESA requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species.

9.2 Jeopardy Analysis Framework

"Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). In this section, the Service adds "the effects of the action and cumulative effects to the environmental baseline and in light of the status of the species…formulate[s] the Service's opinion as to whether the action is likely to jeopardize the continued existence of listed species ...." (50 CFR 402.14(g)(4)).

Per the Service's consultation handbook (Service and NMFS 1998), survival is defined as "the species' persistence as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow for the potential recovery from endangerment. Said another way, survival is the condition in which a species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a species with a sufficient population, represented by all necessary age classes, genetic heterogeneity, and

[7] For more information on the illegal turtle trade, see the Collaborative to Combat the Illegal Trade in Turtles (https://parcplace.org/species/collaborative-to-combat-the-illegal-trade-in-turtles/) and this recent case (https://www.justice.gov/opa/pr/chinese-national-sentenced-smuggling-turtles-united-states-hong-kong).

number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter."

Per the Service's consultation handbook (Service and NMFS 1998), recovery is defined as "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4(a)(1) of the [ESA]." The "criteria set out in Section 4(a)(1)" means determining when a species no longer meets the definition of an "endangered species" or a "threatened species" because of any of the following factors: (A) present or threatened destruction, modification, or curtailment of habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequate existing regulatory mechanisms; or (E) other natural or manmade factors affecting the species continued existence (16 USC 1533(a)(1)). An endangered species is "in danger of extinction throughout all or a significant portion of its range" (16 USC 1532(6)). A threatened species is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 USC 1532(20)).

To analyze whether the Federal action addressed in this Opinion will jeopardize the continued existence of the bog turtle, we assess project impacts at the individual, population, and species levels.

Impacts to Individuals

First, we determine how individuals are likely to respond upon exposure to the stressors and/or beneficial actions associated with the proposed action. The response of an individual can be measured by impacts to its breeding, feeding, and/or sheltering. This assessment of effects to individuals provides the basis for the subsequent two steps, in which we determine whether any appreciable reduction of reproduction, numbers, or distribution (RND) is expected at the population or species level.

Impacts to Populations

Because many species are composed of multiple populations and there may be meaningful differences in those populations (e.g., genetics, morphology, size) related to the overall species survival and recovery, it is a logical intermediate step to evaluate the effects of impacts to individuals on the population(s) to which they belong. Specifically, we are analyzing how the change in breeding, feeding, and/or sheltering at the individual level affects the population's abundance, reproduction, or growth rates to make inferences about the population's future reproductive success and its viability. If our analyses indicate that reductions in the condition of the population(s) are not likely to occur, then there can be no appreciable reductions in the RND at a species level and we conclude that the agency has ensured that its' action is not likely to jeopardize the continued existence of the species (i.e., not likely to affect the overall species survival and recovery range-wide).

Impacts to Species

If there are reductions in the condition of the population(s) impacted, we then assess impacts to the species by determining whether the anticipated impacts on the population(s) are likely to reduce the likelihood of both survival and recovery of the species by impacting its RND. Our analysis evaluates how the population-level effects determined above influence the likelihood of progressing towards or maintaining the conservation needs of the species range-wide. To complete this analysis, we evaluate the relative importance of the impacted population(s) within range-wide status of the species (provided in the Status of the Species section) and evaluate the impacts to those populations (positive and negative) from the proposed action.

9.3 Analysis for Jeopardy

9.3.1 Effects to Individuals

The proposed action will kill or injure individual bog turtles and cause permanent and temporary impacts to habitat that supports bog turtle breeding, feeding, and sheltering. However, the conservation measures proposed (including the completion of PNDI evaluations, use of project category AMMs, and compliance with state water quality standards) will reduce most of the potential adverse effects to individual bog turtles. Compensatory mitigation measures will offset effects and will provide a conservation benefit if it involves permanent protection and management of an otherwise unprotected occupied bog turtle habitat.

Because this is a programmatic consultation, the extent of the affected individuals cannot be calculated. Therefore, the amount of anticipated impacts to habitat is capped annually (Table 6) to facilitate this analysis.

Table 6: Maximum annual impact to habitat from implementation of projects.

Habitat Impacts			
Non-mucky Wetland (Temporary)	**Non-mucky Wetland (Permanent)**	**Mucky Wetland (Temporary)**	**Mucky Wetland (Permanent)**
1-acre	0.25-acre	0.25-acre	0.10-acre

9.3.2 Effects to Populations

The action area of Pennsylvania contains 186 extant bog turtle populations and 145 metapopulations that make up the Susquehanna/Potomac and Delaware recovery units.

The proposed action would affect the reproduction, numbers, and distribution of any population(s) within the above annually capped impacted area. However, only a small portion of these populations would be present in the above annually capped impacted area. Most of the habitat impacts caused by the proposed action will be temporary and the surrounding turtles should recolonize the impacted area as it recovers. The proposed action also includes

conservation measures designed to offset loss of populations and habitats to ensure species survival within its Pennsylvania range. In addition, mitigating for impacts through the purchase of bog turtle credits from a Service-approved bog turtle conservation bank will enhance the species survival across a broader geographic area and aid in offsetting the adverse impacts associated with the proposed action.

Due to the above rationale, it is unlikely that the action would rise to the level of reducing the RND of most populations, and therefore metapopulations, of bog turtles within the Susquehanna/Potomac and Delaware recovery units.

9.3.3 Effects to Species

We have concluded that the bog turtle metapopulations of the Susquehanna/Potomac and Delaware recovery units are unlikely to experience reductions in RND, so there will be no appreciable reduction in RND on the bog turtle as a species. Because there will not be an appreciable reduction in RND at the species level, the proposed action is not likely to affect the overall species survival and recovery range wide.

9.4 Conclusion

We considered the current overall status of the bog turtle and the condition of the species within the action area (Environmental Baseline). We then assessed the effects of the proposed action and the potential for cumulative effects in the action area on individuals, populations, and the species. The effects of the proposed action are considered primary factors influencing the status of the bog turtle; however, we do not anticipate any reductions in the overall reproduction, numbers, and distribution of the bog turtle due to the widely scattered and localized effects of the action and PennDOT's commitment to avoid and offset the effects. It is the Service's opinion that the action, as proposed, is not likely to jeopardize the continued existence of the bog turtle.

10 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined in Section 3 of the ESA as "harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct" (16 USC 1532(19)). Incidental take "refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity …." (50 CFR 402.02). Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA if such taking follows the terms and conditions of this incidental take statement (ITS).

10.1 Amount or Extent of Take Anticipated

We anticipate incidental take of bog turtles from the proposed action. We must specify the amount or extent of such incidental taking. "A surrogate (*e.g.*, similarly affected species or habitat or ecological conditions) may be used to express the amount or extent of anticipated take provided that the biological opinion or incidental take statement describes the causal link

between the surrogate and take of the listed species, explains why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species, and sets a clear standard for determining when the level of anticipated take has been exceeded." 50 CFR 402.14(i)(1)(i).

Here, we use acres of suitable wetland habitat impacted as a surrogate for take of bog turtles. For take during in-stream activities, we use the area of the stream impact. As described in the Effects of the Action section, there is a causal link between habitat impacted and take of the species due to injury, death, or reduced fitness from the crushing or smothering of individuals and/or the loss and alteration of the impacted habitat. The incidental take is expected to be in the form of harm, harass, and kill.

It is not practical to express the amount or extent of anticipated take in terms of individuals of the listed species for the following reasons: (1) the abundance of bog turtles within any given wetland with suitable habitat can range widely; and (2) the action encompasses future widely scattered projects and the final locations of these projects in relation to bog turtle sites is unknown. Thus, quantifying the specific number of individuals reasonably certain to be affected by the action is not practicable.

It is likewise not practical to monitor take-related impacts in terms of individual bog turtles because the species is difficult to detect during survey efforts. Individuals are small and cryptic (particularly juveniles and hatchlings), and they have a habit of burying in mucky substrate to escape detection. For these reasons, monitoring take-related impacts in terms of individuals would likely underestimate the amount of take. Instead, we use acres of habitat impacted as a surrogate for monitoring take (Table 7).

Table 7: Annual Incidental Take Estimate for the Bog Turtle.

Amount of Take Anticipated	Life Stage when Take is Anticipated	Type of Take	Take is Anticipated as a Result of
All turtles in the 1 acre of non-mucky wetland habitat that will be temporarily impacted	Adults & Juveniles	Harmed	Reduced fitness associated with the temporary loss or alteration of foraging and basking habitat.
All turtles in the 0.25 acres of non-mucky wetland habitat that will be permanently impacted	Adults & Juveniles	Harmed	Reduced fitness associated with the permanent loss or alteration of foraging and basking habitat.
All turtles in the 0.25 acres of mucky wetland habitat that will be temporarily impacted	Adults, Juveniles, Hatchlings, & Eggs	Killed, Harmed	Crushing or smothering; reduced overwinter survival associated with a temporary loss of or alteration of hibernating habitat; Reduced fitness associated with the temporary loss or alteration of foraging and hibernating habitat

All turtles in the 0.10 acres of mucky wetland habitat that will be permanently impacted	Adults, Juveniles, Hatchlings, & Eggs	Killed, Harmed	Crushing or smothering; reduced overwinter survival associated with a permanent loss of or alteration of hibernating habitat; Reduced fitness associated with the permanent loss or alteration of foraging and hibernating habitat
All turtles in stream areas that will be temporarily or permanently impacted during the active season, after minimizing the amount of in-stream impact to the extent possible	Adults and Juveniles	Killed, Harmed	Temporary loss or alteration of stream habitat. Crushing or smothering.
All turtles in culverts during culvert replacement or maintenance activities	Adults, Juveniles, and Hatchlings	Killed, Harmed	Crushing or smothering; reduced overwinter survival if hibernating in the culvert

10.2 Reasonable and Prudent Measures

"Reasonable and prudent measures refer to those actions the Service Director considers necessary or appropriate to minimize the effect of the incidental take on the species." (50 CFR §402.02). "Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action, may involve only minor changes, and may include measures implemented inside or outside of the action area that avoid, reduce, or offset the of incidental take." (50 CFR §402.14(i)(2)). "Priority should be given to developing reasonable and prudent measures and terms and conditions that avoid or reduce the amount or extent of incidental taking anticipated to occur within the action area. To the extent it is anticipated that the action will cause incidental take that cannot feasibly be avoided or reduced in the action area, the Services may set forth additional reasonable and prudent measures and terms and conditions that serve to minimize the effect of such taking on the species inside or outside the action area." (50 CFR §402.14(i)(3)).

The measures described below are nondiscretionary and must be undertaken by the FHWA so that they become binding conditions of any grant or permit issued by the FHWA, as appropriate, for the exemption in Section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this Incidental Take Statement (ITS). If the FHWA: (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of Section 7(o)(2) may lapse.

The Service considers the following reasonable and prudent measures necessary or appropriate to minimize the effects of incidental take on bog turtles:

1. The FHWA will ensure that all Conservation Measures of the proposed action as described above are implemented.

10.3 Terms and Conditions

To be exempt from the prohibitions of Section 9 of the ESA, FHWA/PennDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. FHWA/PennDOT will implement all avoidance and minimization actions, and measures to offset, monitor, and report take, as described above and in the PBA.

10.4 Monitoring and Reporting Requirements

1. FHWA/PennDOT will provide the Service a project submittal form for every action submitted for inclusion within this programmatic consultation that may affect bog turtles prior to the commencement of the transportation action.

The standard project submittal form will:

- describe the proposed action (e.g., type of action, location, involved Federal agencies);
- verify that the project is within the scope of the programmatic consultation;
- provide an amount of temporary and permanent impacts (e.g., square feet or acres of wetland, linear feet of watercourse channel); and
- verify that the action meets the requirement of implementing all applicable AMMs to avoid, minimize, and/or compensate for the impacts of the action.

2. FHWA/PennDOT will conduct two (1-year and 4-years post-construction) mark/recapture surveys (using a qualified bog turtle surveyor) on all bog turtle wetlands with impacts (both temporary and permanent) to hibernating habitat following a Service-approved protocol. The surveys will assess the extent of bog turtle reestablishment in the areas of impact and the overall status of the bog turtle population in the wetlands. The survey report will be submitted to the Service within 30 days of the survey being completed.

3. FHWA/PennDOT will conduct vegetation monitoring of impacted bog turtle wetlands (known sites and sites with assumed bog turtle presence) annually for a minimum of 3 years post-construction. FHWA/PennDOT will provide annual reports to the Service, including written and photo documentation of the site. The report will document the progression of revegetation, noting the types and densities of native and exotic plant species present. The presence of invasive species and/or non-native species within the site will be documented during each vegetation monitoring event. If invasive plants and/or non-native species are found within the former construction area, the applicant will prepare a proposal to implement an invasive species control plan in coordination with the Service.

4. FHWA/PennDOT will generate an annual report for the Service, in addition to conducting an annual program review with the Service. This report will summarize program activities and any "incidental take" for the reporting year and any information that may inform potential effect assumptions, and implementation of conservation measures. The annual review will serve as the regular forum for all parties to discuss program changes and the need for reinitiation of consultation.

5. If a dead bog turtle is found, the individual(s) should be flash frozen on dry ice to preserve biological materials in the best possible state for later analysis. The individual should then be held in a freezer until it can be transferred to the Service. In conjunction with the care of injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. The Service is to be notified within one (1) calendar day upon locating a dead or injured bog turtle. Initial notification must be made to the nearest Service Office of Law Enforcement, at (717) 221-4425, then the Pennsylvania Ecological Services Field Office, at (814) 234-4090. Notification must include the date, time, precise location of the injured animal or carcass, and any other

pertinent information, including age, sex, and reproductive condition of the individual(s). Formal written notification also must be submitted.

11 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are defined in the regulations as "suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information." (50 CFR 402.02).

1. Fill the knowledge gap of the effects of salt and deicing agents on bog turtles by conducting studies on this topic in coordination with the Service.

2. Identify locations with chronic transportation maintenance issues throughout the action area associated with inadequate or improper roadway drainage or crossing features. Then, in coordination with the Service, develop permanent corrective actions to remedy these issues and facilitate bog turtle movement.

3. Where feasible and safe to roadway users, construct permanent curbing or some other type of protective barrier around roadway culvert/bridge crossings of occupied species habitat to minimize roadway mortality.

4. During the design and implementation of culvert and bridge improvement projects, use stream restoration measures that restore and facilitate the use of potential travel corridors near occupied habitat.

5. Maintain open passage corridors through the removal or improvement of impediments that result in flooding events. Remedial actions include upgrading existing culvert crossings to clear span structures along existing travel corridors between occupied species habitats.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

12 REINITIATION NOTICE

This concludes consultation on the actions outlined in request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action

that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. This Opinion is valid until May 2, 2030.

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14 APPENDICES

14.1 Appendix A: The Effects Determinations for PennDOT's Maintenance Assemblies

This table contains our concurrence of 2003 and our concurrence for the recently added maintenance assemblies of the 2024 PBA (see consultation history section for more information).

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
UNPAVED – ROAD				
711-7112-01	**Shaping**	Shaping operations, such as scarifying, grading and shaping, and compacting on long sections of unpaved roads to restore cross section, or eliminate corrugations and potholes. This may include a ditch or drainage channel with an excavator taking care to cut ditch/channel to original contour by removing only debris or deposited material.	**MAY AFFECT**[9]	
711-7113-01	**Restabilization**	The application of stabilization material to long sections of unpaved roads, such as adding, shaping and compacting stabilizing material. Fine material may be graded up from the ditch and blended with the added material to improve compaction.	**MAY AFFECT**[9]	
711-7114-01	**Dust Palliative - Bit./Calcium Chloride/Other Product**	The placing of bituminous or calcium chloride materials on unpaved roads to prevent dust formation including spot treatments.	**NO EFFECT**	
711-7115-01	**Patch/Base Repair**	Repairing potholes, isolated depressions, etc. on unpaved roads.	**NO EFFECT**	
711-7116-01	**Emergency Truck Escape Ramps**	Maintenance of unpaved portion of emergency truck escape ramps.		**NO EFFECT**
PAVED – ROAD				
711-7113-01	**Dust Palliative - Bit./Calcium Chloride/Other Product**	Spot application of dust palliatives on paved roads to prevent dust formation.	**NO EFFECT**	
711-7115-01	**Patch/Base Repair**	Repairing potholes, isolated depressions, etc. on paved roads.	**NO EFFECT**	
711-7121-01	**Patching - Manual**	This activity includes all actions to manual patching operations, such as, preparing (milling is included) and sweeping the hole, tacking (hot mix only), manually placing bituminous patching material, and compaction on paved roads.	**NO EFFECT**	
711-7121-02	**Road - Paved Manual Patching Non-Standard**	Manual patching using emergency repair patching procedures such as filling and compacting.	**NO EFFECT**	
711-7121-04	**Road – Paved Spray Patch Manual or Mechanized**	Pothole repair spray patching operations such as removing weakened material, cleaning, application of liquid bituminous and aggregate on paved road including rigid pavement.	**NO EFFECT**	

[8] New Assemblies added or modified between 2019-2024, as submitted in the 2024 PBA.
[9] If conducted in or near wetlands occupied or assumed to be occupied by bog turtles.

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7121-05	**Manual Patching Mechanized Cutting**	Manual patching/mechanized cutting repair of potholes in limited areas		**NO EFFECT**
711-7122-01	**Patching – Mechanical – Tow Paver**	Mechanical patching operations of limited areas (less than 500 feet continuous, 1300 linear feet per mile or 1750 square yards per lane mile), such as application of tack coat, placing hot plant mix material with paver and compaction on paved roads.	**NO EFFECT**	
711-7122-02	**Patching – Mechanical – Mixer Paver**	Mechanical patching operations of a limited area (less than 500 feet continuous, 1300 linear feet per mile, or 1750 square yards per lane mile) using a mixer paver to place a layer of liquid bituminous and aggregate blended mix on paved roads.	**NO EFFECT**	
711-7122-03	**Patching – Mechanical – Paver Finisher**	Mechanical patching operations of limited areas (less than 500 feet continuous, 1300 linear feet per mile, or 1750 square yards per lane mile); such as application of tack coat, placing hot plant mix material with a paver finisher and compaction on paved roads.	**NO EFFECT**	
711-7122-04	**Patching – Edge – Mechanical**	Mechanized edge patching to repair extensive deterioration and re-establishment of roadway width over existing base, including cleaning, placement of tack coat, placement of hot plant bituminous mix, shaping and compacting. The re-established pavement width shall be equal to the roadway width as recorded in the straight-line diagram or the width of the base material as indicated by field conditions.	**NO EFFECT**	
711-7122-05	**Plant Mix Patching – Partial Depth (Milling Machine and Widener) Mechanized**	Placement of mechanized bituminous patches over surface distresses in a limited area. Includes milling machine in high-productivity surface repair operations.		**NO EFFECT**
711-7124-01	**Surface Treatment – Liquid Bituminous Seal Coat Mechanical**	Liquid bituminous surface treatment operations such as sweeping, application of liquid bituminous material and placing and seating the cover aggregate on paved roads. The sweeping and cleaning of the road prior to the surface treatment, such as cleaning up aggregate, re-application of aggregate made necessary by bleeding, etc., should be charged to this code.	**NO EFFECT**	
711-7124-02	**Surface Treatment – Sand Bleeding Roads**	Placing sand and/or appropriate aggregates on roads flushing/bleeding due to liquid bituminous operations including mechanized skin patching operations.	**NO EFFECT**	
711-7124-03	**Surface Treatment – Slurry Seal and Ralumac and Nova Chip**	The application of slurry seal, ralumac, or nova chip surface treatments.		**NO EFFECT**
711-7124-04	**Surface Treatment – Liquid Bituminous – Seal Coat – Double Application**	The application of liquid bituminous immediately followed by the rolling in of course aggregates repeated twice to result in a double application of each material.		**NO EFFECT**
711-7124-09	**Surface Treatment – Seal Coat Stockpiling Material**	Stockpiling (hauling) costs for surface treatment/seal coat operations where excess aggregate is stored for future use.		**NO EFFECT**
711-7126-01	**Base/Subbase Repair – Flex. Base – Light Duty**	Base/subbase repair operations, such as removal of surface and base/subbase material, placing of u-drains and bleeders, adding new material and compaction on pie crust (pancake) and light duty roads. Pie crust is defined as a roadway with less than two (2) inches total depth of bituminous surface including surface treatment build up.	**NO EFFECT**	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7126-02	**Base/Subbase Repair – Flex. Base – Heavy Duty**	Base/subbase repair operations, such as removal of surface and base/subbase material, placing drains and bleeders, new material, and compaction on flexible base (heavy duty) roads.	**NO EFFECT**	
711-7126-03	**Base/Subbase Repair – Rigid Base**	Base/subbase repair operations, such as removal of surface and base/subbase material, placing of drainage, new material, and compaction.	**NO EFFECT**	
711-7126-04	**Base/Subbase Repair – Widener**	High productivity base/subbase repair operations utilizing a milling machine and a mechanized widener such as removal of surface material with a milling machine, adding bituminous base/subbase material with a widener and compaction.	**NO EFFECT**	
711-7127-02	**Skin Patch – Liquid Bituminous – Mechanical**	Mechanized liquid bituminous skin patching of limited areas such as sweeping, application of liquid bituminous material and placing and seating the cover aggregate on paved roads.	**NO EFFECT**	
711-7128-01	**Crack Sealing – Bituminous Surface Lane**	Crack sealing bituminous surfaces with pre-packaged material in a non-over-banding operation. Activity includes routing of cracks where required (working transverse and single random cracks), cleaning of cracks, applying material, and squeegeeing on rigid or flexible base roads.	**NO EFFECT**	
711-7129-01	**Hot Pour Mastic**	Hot applied pourable asphalt material containing aggregate used to repair pavement deficiencies which exceed parameters of crack sealing. This includes heating the material, cleaning and drying of cracks or repair areas, applying material and leveling the sealant material on rigid or flexible base roads.		**NO EFFECT**
711-7131-01	**Leveling – <2" - Tow Pav./Pav. Finish – Mechanical**	Applying a leveling course to re-establish the roadway cross section using a paver finisher or tow paver in excess of 500' continuous length.	**NO EFFECT**	
711-7131-03	**Leveling Course > 2" – Binder Finish Paver Mechanized**	The application of a plant mixed leveling course, used to re-establish the roadway cross section, using a paver finisher over an existing paved road.		**NO EFFECT**
711-7132-01	**Milling – Bituminous Surfaces**	Pavement milling such as removing material, loading material and clean up on paved surfaces.	**NO EFFECT**	
711-7132-02	**Spot Milling Only**	Spot pavement milling such as blow up removal, loading material and clean up on paved surfaces.	**NO EFFECT**	
711-7133-04	**Recycling – Bituminous Surfaces- Full Depth (FDR) Mechanized**	Pavement recycling such as removing material, adding asphalt, placing mat and compaction on paved surfaces.	**NO EFFECT**	
711-7135-01	**Surface Treatment – Plant Mix – Paver 1½**	The application of a uniform 1½" bituminous paving operation, application of a tack coat, cutting pavement notches, placing of hot mix with bituminous paver finisher and compaction on paved roads in excess of 500 feet continuous length.	**NO EFFECT**	
711-7135-02	**Surface Treatment – Plant Mix - 1" Paving**	The application of a id-3 bituminous paving operation such as sweeping, application of tack coast, cutting pavement notches, placing of hot mix with a bituminous paver finisher and compaction on paved roads in excess of 500 feet continuous length.	**NO EFFECT**	
711-7135-03	**Surface Treatment – Plant Mix Single Lane**	Single lane application of a uniform plant mixed bituminous paving course over an existing paved road.		**NO EFFECT**

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7136-01	**Pavement Widening Mechanized**	The widening of paved roadways such as scarifying, shaping and/or removing existing material, the addition of bituminous concrete base course (BCBC) shaping and compacting. The widening shall consist of a minimum of 2 feet. If both sides of the roadway are to be widened, it shall consist of a minimum of 2 feet on each side.	**MAY AFFECT**[9]	
711-7137-01	**Pavement Widening Recycled Material – Mechanical**	The widening of paved roadways such as scarifying, shaping, and/or removing existing material, the addition of recycled material, shaping and compacting. The existing paved roadway width shall be 18 feet or less and the widening shall consist of a minimum of 2 feet. If both sides of the roadway are to be widened, it shall consist of a minimum of 2 feet on each side.	**MAY AFFECT**[9]	
711-7138-01	**Recycled Asphalt Pavement, Paver Finisher – Placement Only <3”**	Application of fresh mixed recycled asphalt material over an existing bituminous roadway to reestablish a uniform cross section.		**NO EFFECT**
711-7138-02	**Recycled Asphalt Pavement Paver Finisher – Placement Only >3”**	Application of fresh mixed recycled asphalt material over an existing bituminous roadway with a finish paver using RAP applied at a compacted depth of 3-5 inches.		**NO EFFECT**
711-7138-03	**Recycled Asphalt Pavement – Widening Recycled Materials**	Involves widening of the paved roadways and placing freshly mixed RAP material, shaping, and compacting. Existing roadway 18 feet or less and widening shall be a minimum of 2 feet.		**MAY AFFECT**[9]
711-7138-04	**Recycled Asphalt Pavement – Base Repair Mechanized**	Removal of distressed pavement base material and replacement using freshly mixed RAP material.		**NO EFFECT**
711-7138-05	**Recycling Bituminous Mobile Mixer Paver**	Application of recycled bituminous material on an existing bituminous roadway using a mobile mixer paver.		**NO EFFECT**
711-7138-08	**Recycled Asphalt Pavement Central Mix Plant (Pug Mill) Production Only**	Production of RAP material from stockpiled reclaimed (milled) asphalt material and virgin aggregate mixed with liquid bituminous material. (This assembly is combined with 711-7238-01)		**NO EFFECT**
711-7138-11	**Recycled Asphalt Pavement Cold-in Place Recycling**	On-grade construction and material process of a cold recycled bituminous base course with a self-propelled milling machine processing a down-cutting drum, screening, and pugmill mixer.		**NO EFFECT**
711-7139-01	**FB Paving Paver Finisher – Placement Only Leveling >2”**	Application of fresh mixed FB asphalt over an existing bituminous roadway using a finish paver to re-establish a uniform cross-section.		**NO EFFECT**
711-7139-02	**FB Paving Paver Finisher – Placement Only Uniform Overlay >2”**	Application of fresh mixed FB asphalt to a uniform depth over a prepared bituminous roadway using a finished paver to re-establish a uniform cross-section.		**NO EFFECT**
711-7139-05	**FB Paving Mobile Mixer Paver**	Mixing of virgin aggregate and liquid bituminous material to established standards for FB mixes, along with the application of the fresh mixed FB asphalt onto an existing bituminous roadway using a mobile mixer.		**NO EFFECT**

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711-7139-08	**FB Paving Central Mix Plant (Pug Mill) Production Only**	Production of FB asphalt material for stockpiled virgin aggregate mixed with liquid bituminous material for application to an existing bituminous roadway using a finished paver. (This assembly is combined with 711-7239-01)		**NO EFFECT**
711-7141-01	**Concrete Patching – Full Depth**	The full depth patching/replacement with concrete on rigid pavements.	**NO EFFECT**	
711-7141-02	**Concrete Patching – Spalls**	The partial depth patching (spall repair) with concrete on rigid pavements.	**NO EFFECT**	
711-7147-01	**Joint Sealing Concrete Roads**	Joint sealing operations on rigid pavements only.	**NO EFFECT**	
711-7147-02	**Joint Sealing Concrete Rds. – Pavement/Shoulders Separation**	Sealing the separated area located immediately adjacent to a concrete highway and bituminous shoulder.	**NO EFFECT**	
711-7148-01	**Stockpile Aggregate**	Account code only – no on ground activity.	**NO EFFECT**	
711-7151-01	**Minor Risk Management/ Safety**	Completion of minor risk management/safety improvement projects. This includes designated, site-specific activities such as brushing, bank cutting/shaping, radius improvement, guiderail, etc. coordinated through the District traffic unit or the district risk engineer/specialist.	**MAY AFFECT**[9]	
SHOULDERS – UNPAVED AND SIDE APPROACHES				
711-7212-01	**Grading - Mechanical**	Grading operations, such as grading, shaping, and compacting of unpaved shoulder and side approaches. This is one of our most important preventative maintenance functions. Properly sloped and maintained shoulders aid in the quick removal of surface water from the roadway into the drainage system. Incidental material may be added or removed. If the ditch line adjacent to the effective shoulder area is cut, this should be charged to 711-7312-01 ditch cleaning.	**MAY AFFECT**[9]	
711-7213-01	**Stabilization – Add Material Mechanical**	The application, shaping and compaction of stabilizing material over long portions of the shoulder. This type of operation is typically performed after a roadway has been resurfaced and the shoulder elevation needs to be adjusted to meet the new pavement grade.	**NO EFFECT**	
711-7214-01	**Dust Palliative Bituminous or Calcium Chloride**	The application of a bituminous, calcium chloride material, or other dust palliatives on the surface of a properly graded, stabilized or earth shoulder to increase stability.	**NO EFFECT**	
711-7215-01	**Cutting – Belt Loader**	The cutting of unpaved shoulders utilizing a belt loader including grading, shaping, adding material, compacting, and hauling away excess material from earth shoulders and cutting and hauling of turf from areas adjacent to paved shoulders.	**MAY AFFECT**[9]	
711-7215-02	**Cutting – Front End Loader**	The cutting of unpaved shoulders utilizing a front-end loader including grading, shaping, adding material, compacting, and hauling away excess material from earth shoulders and cutting and hauling of turf from areas adjacent to paved shoulders.	**MAY AFFECT**[9]	
711-7216-01	**Upgrading – Paving Mechanized**	The upgrading of unpaved shoulders to paved shoulders, such as scarifying, shaping and/or removing existing material, the addition of new material, shaping and compacting. This action is intended to reduce or eliminate shoulder erosion caused by high water velocities on unpaved surfaces. The grading of shoulders shall be confined to areas where shoulder erosion problems exist.	**MAY AFFECT**[9]	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7217-01	**Stabilization – Add Material Manual**	The application, shaping and compaction of stabilizing material over short sections of unpaved shoulders, due to washouts or pavement edge drop-offs at the inside of curves, intersections or other locations.	**NO EFFECT**	
711-7221-01	**Patching – Manual**	This activity includes all actions related to manual patching operations on unpaved shoulders.	**NO EFFECT**	
711-7221-02	**Patching Plant Mix Paver or Widener Mechanized**	Mechanized repair of deteriorated paved shoulder area.		**NO EFFECT**
711-7222-01	**Patching – Mechanical – Plant Mix**	This activity includes all actions related to mechanized patching operations on unpaved shoulders and side approaches.	**NO EFFECT**	
711-7224-01	**Surface treatment – Mechanical – Liquid Bituminous**	This activity includes all actions related to liquid bituminous surface treatment operations on unpaved shoulders and side approaches.	**NO EFFECT**	
711-7224-09	**Surface Treatment – Liquid Bituminous**	Account code only – no on ground activity.	**NO EFFECT**	
711-7225-01	**Driveway Adjustment**	This activity includes all actions related to driveway repairs required by paving and/ or shoulder operations, such as, installing pipe, reworking the grade, etc.	**NO EFFECT**	
711-7226-01	**Base/Subbase Repair – Light Duty**	This activity includes all actions related to base/subbase repair operations such as removal of surface and base/subbase material, placing of U-drains and bleeders, adding new material and compactions on light duty shoulders.	**NO EFFECT**	
711-7226-02	**Base/Subbase Repair – Heavy Duty**	This activity includes all actions related to base/subbase repair operations, such as removal of surface and base/subbase material, placing drainage, new material, and compaction on heavy duty shoulders.	**NO EFFECT**	
711-7227-01	**Skin Patching – Manual – Liquid Bituminous**	This activity includes all actions related to liquid bituminous skin patching operations on unpaved shoulders.	**NO EFFECT**	
711-7227-02	**Skin Patching – Mechanical – Liquid Bituminous**	This activity includes all actions related to mechanized liquid bituminous skin patching on unpaved shoulders.	**NO EFFECT**	
711-7227-03	**Skin Patching – Mech. – Liq. Bit. – Distr. and Spray Wand**	This activity includes all actions related to liquid bituminous skin patching operations on unpaved shoulder.	**NO EFFECT**	
711-7227-09	**Skin Patching – Pre-Hauling**	Account code only – no on ground activity.	**NO EFFECT**	
711-7228-01	**Crack Sealing – Bituminous Surface Manual**	Sealing of cracks in bituminous shoulders with pre-packed material		**NO EFFECT**
711-7228-02	**Crack Sealing – Concrete Surface Manual**	Sealing of cracks in concrete shoulder with pre-packed material.		**NO EFFECT**
711-7232-01	**Milling**	This activity includes all actions related to unpaved shoulder milling such as removing material, loading material and cleanup on unpaved surfaces.	**NO EFFECT**	
711-7233-01	**Recycling**	This activity includes all actions related to pavement recycling such as removing material, adding asphalt, placing mat and compaction on unpaved surfaces.	**NO EFFECT**	
SHOULDERS – PAVED AND SIDE APPROACH				
711-7213-01	**Stabilization – Add Material Mechanical**	The application, shaping and compaction of stabilizing material over short sections of unpaved shoulders, due to washouts or pavement edge drop-offs at the inside of curves, intersections or other locations.	**NO EFFECT**	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7213-09	**Stabilization – Pre-Hauling**	Account code only – no on ground activity.	**NO EFFECT**	
711-7214-01	**Dust Palliative Bituminous or Calcium Chloride**	The application of a bituminous, calcium chloride material, or other dust palliatives on the surface of a properly graded, stabilized or earth shoulder to increase stability.	**NO EFFECT**	
711-7217-01	**Stabilization – Add Material – Manual**	The application, shaping and compaction of stabilizing material over short sections of unpaved shoulders, due to washouts or pavement edge drop-offs at the inside of curves, intersections or other locations.	**NO EFFECT**	
711-7221-01	**Patching – Manual**	This activity includes all actions related to manual patching operations on paved shoulders.	**NO EFFECT**	
711-7222-01	**Patching – Mechanical – Plant Mix**	This activity includes all actions related to mechanized patching operations on paved shoulders and side approaches.	**NO EFFECT**	
711-7222-02	**Surface Treatment – Pant Mix**	This activity includes all actions related to mechanized shoulder paving on paved shoulders and side approaches.	**NO EFFECT**	
711-7224-01	**Surface treatment – Mechanical – Liquid Bituminous**	This activity includes all actions related to liquid bituminous surface treatment operations on paved shoulders and side approaches.	**NO EFFECT**	
711-7224-09	**Surface Treatment – Liquid Bituminous – Pre-Hauling**	Account code only – no on ground activity.	**NO EFFECT**	
711-7225-01	**Driveway Adjustment**	This activity includes all actions related to driveway repairs required by paving and/ or shoulder operations, such as, installing pipe, reworking the grade, etc.	**NO EFFECT**	
711-7226-01	**Base/Subbase Repair – Light Duty**	This activity includes all actions related to base/subbase repair operations such as removal of surface and base/subbase material, placing of U-drains and bleeders, adding new material and compactions on light duty shoulders.	**NO EFFECT**	
711-7226-02	**Base/Subbase Repair – Heavy Duty**	This activity includes all actions related to base/subbase repair operations, such as removal of surface and base/subbase material, placing drainage, new material, and compaction on heavy duty shoulders.	**NO EFFECT**	
711-7227-01	**Skin Patching – Manual – Liquid Bituminous**	This activity includes all actions related to liquid bituminous skin patching operations on paved shoulders.	**NO EFFECT**	
711-7227-02	**Skin Patching – Mechanical – Liquid Bituminous**	This activity includes all actions related to mechanized liquid bituminous skin patching on paved shoulders.	**NO EFFECT**	
711-7227-03	**Skin Patching – Mech. – Liq. Bit. – Distr. and Spray Wand**	This activity includes all actions related to liquid bituminous skin patching operations on paved shoulder.	**NO EFFECT**	
711-7227-09	**Skin Patching – Pre-Hauling**	Account code only – no on ground activity.	**NO EFFECT**	
711-7232-01	**Milling**	This activity includes all actions related to unpaved shoulder milling such as removing material, loading material and cleanup on paved surfaces.	**NO EFFECT**	
711-7233-01	**Recycling**	This activity includes all actions related to pavement recycling such as removing material, adding asphalt, placing mat and compaction on paved surfaces.	**NO EFFECT**	
DRAINAGE CLEANING, REPAIR OR REPLACEMENT				
711-7311-01	**Cleaning – Inlet/Endwall/ Basin – Manual/Mechanical**	Cleaning inlets and endwalls such as removal and disposal of material. Normally, if the activity is just cleaning inlets and endwalls all cleaning operations performed in the ditch channel within 15 feet of the pipe opening and one shovel length into the pipe will be charged to this code.	**MAY AFFECT**[9]	

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711-7311-02	**Cleaning – Inlet Clogged**	Cleaning inlets and endwalls such as removal and disposal of material. Normally, if the activity is just cleaning inlets and endwalls all cleaning operations performed in the ditch channel within 15 feet of the pipe opening and one shovel length into the pipe will be charged to this code.	**MAY AFFECT**[9]	
711-7312-01	**Cleaning – Ditch/Drain Chan. Mech.**	Mechanized cleaning and reshaping of ditches and drainage channels, such as removal and disposal of material. Ditches and drainage channels should provide an obstruction free flow of surface water away from and parallel to the roadway.	**MAY AFFECT**[9]	
711-7312-02	**Cleaning – Ditch/Drain Chan. Manual**	Cleaning flow lines (swales), such as removal and disposal of material. The cleaning of flow lines on unpaved roads is also charged to this activity.	**MAY AFFECT**[9]	
711-7312-03	**Cleaning – Swales – Mech.**	Cleaning flow lines (swales), such as removal and disposal of material. The cleaning of flow lines on unpaved roads is also charged to this activity.	**MAY AFFECT**[9]	
711-7314-01	**Cleaning Pipes and Culverts**	The mechanical cleaning of pipes and culverts and the removal and disposal of material. The flushing of pipes and culverts is accomplished by using a high velocity sewer cleaner, sewer odor or cable unit. Inlet and outlet ditches must be cleaned before the pipe cleaner arrives at the work site and charged to "ditch cleaning".	**MAY AFFECT**[9]	
711-7315-01	**Install Rock Lining**	The installation of rock lining in drainage ditches.	**MAY AFFECT**[9]	
711-7321-01	**Replace Inlet and Endwall – Manual**	The repair or replacement of inlets and endwalls such as removing old material, excavating area, construction of forms, pouring of concrete or appropriate material.	**MAY AFFECT**[9]	
711-7321-02	**Repair/Adjust Inlets and or Endwalls – Manual**	The repair and or adjustments to inlets and/or endwalls. Includes actions required to make repairs/adjustments to inlets and/or endwalls.		**MAY AFFECT**[9]
711-7324-01	**Replace Pipes and Culverts under 36 inches – Mech.**	The replacement/installation of pipes and culverts less than 36 inches in diameter, such as cutting/sawing pavement, excavation of trench, installing pipe, backfilling, and compaction.	**MAY AFFECT**[9]	
711-7324-02	**Replace Pipes and Culverts over 36 inches– Mech.**	The replacement/installation of pipes and culverts 36" and greater in diameter, such as cutting/sawing pavement, excavation of trench, installing pipe, backfilling, compacting, and installation of flared end sections or construction of field stone end walls.	**MAY AFFECT**[9]	
711-7324-03	**Replace/Install Parallel Pipe**	The replacement/installation of parallel pipes such as saw cutting shoulder, excavation of trench, installation of pipe, backfilling and compacting.	**MAY AFFECT**[9]	
711-7324-04	**Drainage – Replacement/Installation Pipes Extension Only**	This assembly is all actions related to the extension of existing pipe installation.		**MAY AFFECT**[9]
711-7324-05	**Drainage – Pipe Trenches Trench Restoration Manual**	This assembly is the placing of bituminous surface/base course after a pipe replacement.		**NO EFFECT**
711-7325-01	**Repair/Replace Structure under 8-foot Length**	The repair or replacement of a masonry, concrete, or wood structure (arch culvert, box culvert, slab or wood deck structure, masonry structure, etc.) under 8 feet in length which cannot be charged to activity 711-7324 pip or metal culver replacements.	**MAY AFFECT**[9]	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7326-01	**Repair Pipe and Culvert**	The repair of pipes and culverts such as installing a pipe liner, patching a pipe, replacing a small end section, etc.	**MAY AFFECT**[9]	
711-7328-01	**Install Subsurface Drain (U-Drain)**	The installation of subsurface drains (u-drain).	**MAY AFFECT**[9]	
ROADWAY SECTION RESTORATION				
711-7332-01	**Repair/Install Gabions/Ret. Walls**	The Installation or repair of gabions and retaining walls including the removal of material, shoring and building supports, etc.	**MAY AFFECT**[9]	
711-7333-01	**Repair Sink Holes/Slides**	All actions related to roadway restoration including the removal and disposal of debris from slides, repair of cuts and fills, dressing slopes and washouts, bench cleaning, repair of sink holes, etc.	**MAY AFFECT**[9]	
711-7331-01	**Side Dozing – Mechanical**	The removal of accumulated material from beneath guiderail such as: side dozing of vegetation and soil buildup and manually shoveling embankment if stroke of side dozer is insufficient; or manually filling of small washouts along the job course.	**NO EFFECT**	
711-7334-01	**Graffiti Removal**	The covering (painting) or removal of graffiti form any department facilities.	**NO EFFECT**	
STORM PATROL				
711-7351-01	**Rain or Wind Patrol**	Patrolling of roadways and minor debris removal during the storm event including the evaluation of drainage and erosion control facilities for potential hazards to the motoring public. Includes cleaning minor surface debris from drains and roadway, removing fallen trees and branches from the traveled way and any other actions required as a result of the storm. Does not include any drain cleaning which requires the removal and disposal of material other than minor surface debris.	**NO EFFECT**	
ROADWAY SECTION RESTORATION				
711-7332-01	**Repair/Install Gabions/Ret. Walls**	The Installation or repair of gabions and retaining walls including the removal of material, shoring and building supports, etc.	**MAY AFFECT**[9]	
711-7333-01	**Repair Sink Holes/Slides**	All actions related to roadway restoration including the removal and disposal of debris from slides, repair of cuts and fills, dressing slopes and washouts, bench cleaning, repair of sink holes, etc.	**MAY AFFECT**[9]	
711-7331-01	**Side Dozing – Mechanical**	The removal of accumulated material from beneath guiderail such as: side dozing of vegetation and soil buildup and manually shoveling embankment if stroke of side dozer is insufficient; or manually filling of small washouts along the job course.	**NO EFFECT**	
711-7334-01	**Graffiti Removal**	The covering (painting) or removal of graffiti form any department facilities.	**NO EFFECT**	
STORM PATROL				
711-7351-01	**Rain or Wind Patrol**	Patrolling of roadways and minor debris removal during the storm event including the evaluation of drainage and erosion control facilities for potential hazards to the motoring public. Includes cleaning minor surface debris from drains and roadway, removing fallen trees and branches from the traveled way and any other actions required as a result of the storm. Does not include any drain cleaning which requires the removal and disposal of material other than minor surface debris.	**NO EFFECT**	
BRIDGE MAINTENANCE AND REPAIR				
711-7425-01	**Repair/Replace – Bridge over Eight-Foot Length**	Work area includes the entire structure including footings, abutments, wingwalls, superstructure, and deck. Also, any incidental roadway approach work.	**MAY AFFECT**[9]	

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711-7432-02	**Painting - Full**	Generally, run through full permitting process.	**MAY AFFECT**[9]	
711-7446-01	**Repair/Replace – Superstructure Member**	This activity may involve temporary piers, jacks or other supports beneath the bridge.	**MAY AFFECT**[9]	
711-7447-01	**Repair/Replace – Truss Member**	This activity may involve temporary supports beneath the bridge.	**MAY AFFECT**[9]	
711-7448-01	**Repair/Replace Backwalls**	These activities may involve extensive ground disturbance.	**MAY AFFECT**[9]	
711-7448-02	**Replace/Repair Substructure**		**MAY AFFECT**[9]	
711-7448-03	**Maintenance – Underpinning**		**MAY AFFECT**[9]	
711-7448-04	**Other Substructure**			**MAY AFFECT**[9]
711-7449-01 and 711-7449-02	**Concrete Deck Overlay – Epoxy/PPC Overlay**	Activities on concrete bridge deck.		**NO EFFECT**
711-7450-01	**Maintenance – Repointing**	Masonry repair is often done by hand but may involve removal of riprap or other protective material, cofferdams, or excavation to access bridge substructure.	**MAY AFFECT**[9]	
711-7451-01	**Repair/Replace Slopewalls**	May require excavation and instream/in wetland activity.	**MAY AFFECT**[9]	
711-7452-01 and 711-7452-02	**Repair/Replace – Culverts**		**MAY AFFECT**[9]	
711-7453-01 and 711-7453-02	**Erosion Protection – Stream Bed/Rock/Deflector Scour Hole Backfill**		**MAY AFFECT**[9]	
711-7453-03	**Erosion Protection – Channel Cleaning**		**MAY AFFECT**[9]	
711-7454-01	**Const./Install – Temporary Supports**		**MAY AFFECT**[9]	
711-7455-01	**Repair/Replace Slabs/Box Culvert**		**MAY AFFECT**[9]	
711-7431-01	**Cleaning/Flush Deck**	Work area includes entire deck between the backs of the abutment backwalls. Remove all salt, anti-skid, dirt, debris and other deleterious material by manually first and then by flushing. Seasonal restriction recommended over trout streams from April 10 to June 10.	**NO EFFECT**	
711-7431-02	**Cleaning/Flush – Bearing and Super Structure**		**NO EFFECT**	
711-7431-03	**Cleaning/Flush Open Grid**		**NO EFFECT**	
711-7432-01	**Painting – Spot**	Superstructure painting, usually less than 35% of structure. Scaffolding or work platform may be used, and any hand or power tools for cleaning.	**NO EFFECT**	
711-7432-03 through 711-7432-06	**Painting Superstructure – Spot Inorganic Zinc/ Aluminum Mastic**	Spot painting of the superstructure and substructure.		**NO EFFECT**
711-7433-01	**Seal – Joints (Liquid Only)**	Joints can be located anywhere within the entire length of the bridge between the backs of the backwalls. Poured joint material.	**NO EFFECT**	
711-7433-02	**Repair Joints**	Repair or replace existing joints.	**NO EFFECT**	
711-7433-03	**Repair/Replace Joints – Strip Seals**	Repair or replace existing joint strip seals		**NO EFFECT**

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7434-01	**Repair/Replace Guiderail/ Median Barrier/Parapet**	Conducted on the existing bridge structure. May include limited demolition.	**NO EFFECT**	
711-7435-01	**Lubricate Bearings**	Repair or replacement of various bridge superstructure components. Conducted from the existing bridge.	**NO EFFECT**	
711-7435-02	**Repair/Replace Bearings**		**NO EFFECT**	
711-7435-03	**Repair/Replace – Pedestal/ Seat**		**NO EFFECT**	
711-7442-01	**Repair/Replace – Approach Slab**		**NO EFFECT**	
711-7443-01	**Repair/Replace Deck**		**NO EFFECT**	
711-7443-02	**Repair/Replace Sidewalk/ Curb**		**NO EFFECT**	
711-7444-01	**Repair/Replace Deck Drainage**		**NO EFFECT**	
711-7457-01 and 711-7457-02	**Brushing, Tree Removal, Manual and Mechanized**	Vegetation maintenance in close proximity to bridge structure		**MAY AFFECT**[9]
711-7459-01	**Other Bridge Activities**	Restricted to maintenance activities that are non-structural.	**NO EFFECT**	
TUNNEL MAINTENANCE AND REPAIR				
711-7421-01	**Washing**	Mechanical washing of the highway tunnel interior.	**NO EFFECT**	
711-7422-01	**Traffic Services – Traffic Incident Management**	Tunnel traffic incident management activities assuming staging and other support activities are not conducted in or near wetlands.	**NO EFFECT**	
711-7422-02	**Repair Tunnel Roadway Wearing Surface**	All actions related to Bituminous Asphalt or Concrete patching including preparing (milling/cutting) and cleaning the hole, tacking, manually placing hot or cold bituminous patching, including concrete material and compaction on bituminous paved tunnel roads.		**NO EFFECT**
711-7422-03	**Repair/Replace Tunnel Barrier**	All actions related to the repair and replacement of tunnel barriers.		**NO EFFECT**
711-7422-04	**Tunnel Lane Signal**	All actions related to the repair, replacement, servicing, and maintenance of all tunnel lane signals and tunnel lane signal systems including, but not limited to, replacement of lamps, testing, troubleshooting and repairs, cleaning, etc.		**NO EFFECT**
711-7422-05	**Tunnel Signs**	All actions related to the repair or replacement of tunnel signs.		**NO EFFECT**
711-7422-06	**Over Height Truck Warning System**	All actions related to the repair or replacement of tunnel Over Height Truck Warning Systems and appurtenances.		**NO EFFECT**
711-7423-01	**Lighting Systems – General Maintenance and Inspection**	All actions related to performing non-complex, minor repairs or inspections of tunnel lighting systems and lighting infrastructure.	**NO EFFECT**	
711-7423-02	**Repair Tunnel Lighting Systems**	All actions related to performing moderately complex, and complex repairs to or replacement of tunnel lighting systems.		**NO EFFECT**
711-7424-01	**Electrical Systems – General Maintenance/Inspection (SWO)**	All actions related to performing non-complex, minor repairs or inspections of tunnel electrical infrastructure and systems.	**NO EFFECT**	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7424-02	**Electrical Systems – Switch Gear**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel electrical switch gears.		**NO EFFECT**
711-7424-03	**Electrical Systems – Motor Control Center**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel motor control centers.		**NO EFFECT**
711-7424-04	**Electrical Systems – Repair or Replace Transformer**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel transformers.		**NO EFFECT**
711-7424-05	**Electrical Systems – Repair or Replace Transfer Switch**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel electrical transfer switches.		**NO EFFECT**
711-7424-06	**Electrical Systems – Panel Board**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel electrical panelboards.		**NO EFFECT**
711-7424-07	**Electrical Systems – Universal Power Supply**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel universal power supply systems (UPS).		**NO EFFECT**
711-7426-01	**Structural – General Maintenance/Inspection**	All actions related to performing non-complex, minor repairs or inspections of tunnel structural members and systems.		**NO EFFECT**
711-7426-02	**Structural – Tunnel Liner**	All actions related to repairing or replacing tunnel liner systems.		**NO EFFECT**
711-7426-03	**Structural – Tunnel Roof/ Ceiling Girders**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel roof material, systems or ceiling girders.		**NO EFFECT**
711-7426-04	**Structural – Tunnel Cross Passageway**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel cross passageways.		**NO EFFECT**
711-7426-05	**Structural – Tunnel Interior Walls**	All actions related to performing moderately complex and complex repairs to or replacement of interior tunnel walls.		**NO EFFECT**
711-7426-06	**Structural – Tunnel Portals**	All actions related to performing moderately complex and complex repairs to or replacement or tunnel portals.		**NO EFFECT**
711-7426-07	**Structural – Invert Concrete Slab on Grade**	All actions related to performing moderately complex and complex repairs to or replacement of concrete tunnel invert slabs.		**NO EFFECT**
711-7426-08	**Structural – Tunnel Invert Girders**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel invert girders.		**NO EFFECT**
711-7426-09	**Structural – Tunnel Joints**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel liner joint systems.		**NO EFFECT**
711-7426-10	**Structural – Tunnel Structure Members**	All actions related to performing minor, miscellaneous tunnel structural or general maintenance repairs.		**NO EFFECT**
711-7427-01	**Mechanical Systems – General Maintenance/ Inspection**	All actions related to performing non-complex, minor repairs or inspections of tunnel mechanical infrastructure systems.		**NO EFFECT**
711-7427-02	**Mechanical Systems – Ventilation Systems and Fans**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel ventilation systems and fans.		**NO EFFECT**
711-7427-03	**Mechanical Systems – Drainage and Pumping Systems**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel potable and ground water drainage systems including mechanical pumps.		**NO EFFECT**

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
711-7427-04	**Mechanical Systems – Emergency Generator Systems**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel emergency generator systems.		**NO EFFECT**
711-7428-01	**Fire/Life Safety Systems – General Maintenance/ Inspection**	All actions related to performing non-complex, minor repairs or inspections of tunnel fire, life safety, and security infrastructure and systems.		**NO EFFECT**
711-7428-02	**Fire/Life Safety Systems – Carbon Monoxide Monitoring System**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel carbon monoxide monitoring systems including mechanical exhaust duct work and electrical wiring.		**NO EFFECT**
711-7428-03	**Fire/Life Safety Systems – Tunnel Fire Protection System**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel fire protection systems.		**NO EFFECT**
711-7428-04	**Fire/Life Safety Systems – Emergency Communication System**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel emergency communication systems.		**NO EFFECT**
711-7428-05	**Fire/Life Safety Systems – Operations and Security Systems**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel operations and security systems.		**NO EFFECT**
711-7428-06	**Fire/Life Safety Systems – Fire Protective Coatings**	All actions related to performing moderately complex and complex repairs to or replacement of tunnel protective fire coating systems and appurtenances.		**NO EFFECT**
711-7428-07	**Fire/Life Safety Systems – Concrete Protective Coating Systems**	All actions related to performing moderately complex and complex repairs and removal of existing protective coatings or replacement of tunnel protective concrete coating systems.		**NO EFFECT**
711-7429-01	**Other – Tunnel Activities**	Miscellaneous and incidental tunnel maintenance activities such as minor non-complex incidental repairs to tunnel systems assuming staging and other support activities are not conducted in or near wetlands.	**NO EFFECT**	
SPECIAL CHARGES				
711-7491-01	**Hauling Non-Disabled Equip. – Lowboy Operation Only**	The hauling of non-disabled equipment using a lowboy.	**NO EFFECT**	
711-9003-01	**Under-Utilized Rented Equipment**	Accounting coding for tracking hours not used on rental equipment.		**NO EFFECT**
711-9812-01	**In-Service Training**	Accounting coding for tracking on-the-job training for non-core equipment training/ certification.		**NO EFFECT**
SNOW SEASON PREPARATION, SNOW REMOVAL, AND ICE CONTROL				
712-7521-01	**Plowing, Applying Material/ Chemicals - Mechanized**	The removal of snow and ice from roadways, ramps, intersections and gore areas including plowing, snow blowing, cutting ice, and applying material/chemicals.	**NO EFFECT**	**MAY AFFECT**[9]
712-7522-01	**Snow and Ice Control - Other**	Snow season work that is not included in activity 712-7521-01 such as installing snow fence; mixing winter materials; transferring/receiving material; cleanup of storage facilities; towing, dry runs, stand by, removing, installing or verifying the spreader; shoveling snow at the stock site; tire chains; other snow preparatory work; etc.	**NO EFFECT**	**MAY AFFECT**[9]

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
712-7523-01	**Anti-Icing Operations**	This assembly includes all actions related to applying anti-icing chemicals to pavement surface prior to the storm to prevent bond forming. This assembly should not be used to charge for pre-wetting of solid material.		**MAY AFFECT**[9]
712-7524-01	**Salt Brine Manufacture/ Distribution**	This assembly includes all actions related to the manufacturing and distribution of salt brine.		**NO EFFECT**
PAVEMENT MARKING				
713-7611-01	**Traffic Line Painting – Mechanized Yellow**	This assembly includes all actions related to the painting or repainting of yellow traffic lines using line striping machines.		**NO EFFECT**
713-7612-01	**Traffic Line Painting – Mechanized**	The painting or repainting of traffic lines using line striping machines.	**NO EFFECT**	
713-7613-01	**Pavement Marking – Hand Operated Machine**	Marking the pavement using hand operated machines and/or hand-held rollers, such as painting gore areas, certain types of ramps, and other areas not readily accessible to the department's large paint trucks.	**NO EFFECT**	
713-7614-01	**Raised Pavement Markers**	The repair/replacement of reflectorized pavement markers such as removing and replacing damaged reflectors. (Could be raised, flush, or recessed.)	**NO EFFECT**	
713-7615-01	**Pavement marking paint line eradication**	The removal of traffic markings.	**NO EFFECT**	
713-7616-01	**Pavement marking thermoplastics installation**	All actions to installation of thermos-plastic markings.	**NO EFFECT**	
713-7617-01	**Repair Paint Machines – Crew Only**	The repair of paint machines by the paint crew only.	**NO EFFECT**	
713-7618-01	**Pavement Marking Small Paint – Waterborne Site**	This assembly includes all actions related to the Small Paint Program – WATERBORNE		**NO EFFECT**
713-7618-02	**Pavement Marking Small Paint – Durable**	This assembly includes all actions related to the Small Paint Program – DURABLE.		**NO EFFECT**
713-7619-01	**Other Pavement Marking activities**	Any miscellaneous pavement marking activity which cannot be properly charged to the previous marking codes. Examples include transferring materials between counties, traffic line layouts, winterization of the large paint machines, etc.	**NO EFFECT**	
SIGN ACTIVITIES				
713-7621-01	**Construction Detour and Other Temporary Signs**	Includes all actions related to the erection, maintenance and removal of construction, detour and other temporary signs, such as erecting supports, mounting signs and when necessary removing damaged materials. Also includes the costs of flasher lights attached to barricades and signs and the placement and repair of all barricades.	**NO EFFECT**	
713-7622-01	**Delineations, Hazard**		**NO EFFECT**	
713-7623-01	**Sign Reviews**		**NO EFFECT**	
713-7624-01	**Regulatory, Warning and Guide Signs Under 16 Sq. Feet**		**NO EFFECT**	
713-7624-02	**Regulatory, Warning and Guide Signs Over 16 Sq. Feet**		**NO EFFECT**	
713-7625-01	**SR and Segment Markers**		**NO EFFECT**	
713-7629-01	**Other – Sign Activities**		**NO EFFECT**	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
GUIDERAIL, MEDIAN BARRIER, AND IMPACT INTENUATION DEVICE ACTIVITIES				
713-7631-01	**Repair/Removal – Low-tension Cable Barrier (Old Style – Non-Tensioned)**	All actions related to the repair or removal of damaged or worn guide-rail cable, posts, cable fittings, etc.	**NO EFFECT**[10]	
713-7631-02	**Guide-Rail Repair/Replace – W-Beam; Mechanized**	This assembly is all actions related to the repair and/or replacement of damaged or worn W-Beam panels, posts, fittings, etc. This includes extension or installation of any W-Beam guide rail for less than 500 continuous feet.	**NO EFFECT**[10]	
713-7631-03	**Guiderail Repair/Replace Manual**	This assembly is all manual actions related to the repair/replacement of all types of guiderail. Refer to Assemblies 713-7631-01 and 02.	**NO EFFECT**[10]	
713-7631-04	**Guider Rail Upgrade Remove Cable/Replace with W-Beam; Mechanized**	This assembly is all actions related to removing cable guide-rail and replacing it with W-Beam Guide-rail.		**NO EFFECT**[10]
713-7631-05	**Guiderail Resetting W-Beam Guide Rail; Mechanized**	This assembly is all actions related to removing and resetting existing guide-rail and posts. Resetting guide-rail consists of relocation existing posts and reattaching existing panels. Do not reuse timber posts. This includes resetting W-Beam guide-rail for less than 500 continuous feet.		**NO EFFECT**[10]
713-7632-01	**Guiderail Removal**	This assembly is all actions related to the permanent removal of unnecessary guiderail when guide-rail is not being replaced.	**NO EFFECT**[10]	
713-7632-02	**Guiderail Removal – Dept. Force/Contract install**	This assembly is all actions related to the removal of guide-rail by Department Forces where the guide-rail is to be installed by contract.	**NO EFFECT**[10]	
713-7633-01	**High-Tension Cable Median Barrier**	This assembly is all actions related to repair of damaged High-Tension Cable Median Barrier including but not limited to cable adjustment, loading and transporting of new High-Tension Cable Median Barrier for storage, mechanized straightening of rails with post straightener, all repair/replacement of end treatments associated with bridges, repair/replacement of impact attenuation devices, etc.		**NO EFFECT**[10]
713-7639-01	**Median Barrier/Guiderail Impact Attenuation Devices; Other**	This assembly is all actions related to miscellaneous median barrier, guiderail and impact attenuation devices including but not limited to painting, cable adjustment, loading and transporting of new guiderail for storage, mechanized straightening of rails with post straightener, all repair/replacement of end treatments associated with bridges, repair/replacement of impact attenuation devices, etc.	**NO EFFECT**[10]	
LIGHTING				
713-7671-01	**Traffic Services – Lighting Highway, Bridge and Sign Lighting Systems**	All actions relative to the servicing and maintenance of permanent highway, bridge sign, and navigation systems by department employees and outside contractors.	**NO EFFECT**	
INCIDENTAL SERVICES				
713-7681-01	**Sweeping; Manual/ Mechanized**	This assembly is all actions relative to sweeping and proper disposal of materials.	**NO EFFECT**	

[10] If conducted in existing developed area (paved or gravel shoulder, median, etc.)

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713-7682-01	**Deer Removal**	This assembly is all actions relative to the removal of deer carcasses. All other animal removal will be charged to assembly 713-7689-01 "Traffic – Incidental Services – Other".		**NO EFFECT**
713-7683-01	**Traffic Services-Homeland Security**	This assembly is all actions relative to any miscellaneous incidental services related to preparing, responding and demolishing to Federal or State authorities in response to Homeland Security events. This includes the setup, maintenance and demobilization of traffic control devices, manning traffic control points, security inspections of PennDOT facilities, and other activities performed at the request of officials. Homeland Security Events include Presidential visits, Gubernatorial events, International Dignitary events, or special security events.		**NO EFFECT**
713-7689-01	**Other – Incidental Service Activities**	This assembly is all actions relative to any miscellaneous incidental service activities such as dead animal removals, right-of-way fence maintenance, and other incidental highway services.	**NO EFFECT**	
VEGETATION MANAGEMENT				
714-7711-01	**Mowing**	Manual roadside mowing activities such as mowing with power driven type mower(s), string trimmers or other hand tools. This activity is normally performed at intersections where small traffic islands exist, or at other similar areas where larger power mowers cannot operate efficiently. This activity should not be necessary under guiderail, around delineations and signs as the non-selective herbicide program under cost function 7712-01 is designed to accomplish this vegetation control.	**NO EFFECT** **REVISED 2017** **MAY AFFECT**[9]	
714-7711-02	**Mowing – Tractor Type; Mechanized**	Mechanized roadside mowing activities including mow-line establishment, mowing, supervision or inspection, removing litter and mowing obstructions. This activity is performed in the medians, interchanges and along the roadway to control the height of grown of grass and for the purpose of preventing the growth and spread of prohibited weeds and other undesirable plant growth.	**NO EFFECT** **REVISED 2017** **MAY AFFECT**[9]	
714-7711-03	**Plant Growth Reg. (PGRs) Herbicide Application**	The application of plant growth regulators for the purpose of inhabiting seed head formation, reducing mechanical cutting frequencies, and for the control of broadleaf weeds. This activity is recommended primarily for turf areas requiring frequent cutting and traffic islands or other plots that require manual mowing. The applications must be made by a certified pesticide applicator, a trained application technician or any other person provided by a certified pesticide applicator is present at the work site and within communication distance.	**NO EFFECT** **REVISED 2017** **MAY AFFECT**[9]	
714-7712-01	**Herbicide Application – Non-Selective**	The application of non-selective herbicides. This includes the application under guiderails and around delineators, sign posts, and similar areas where bare soil is desirable and erosion will be no problem. There are two types of non-selective herbicides: residual (through the roots) and foliar (through the leaves). The application must be made by a certified pesticide applicator, a trained application technician, or any other person provided a certified pesticide applicator is at the work site and within communication distance.		**MAY AFFECT**[9]

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
714-7713-01	**Herb Application – Broadcast Foliage**	All actions related to the application of selective herbicides for the control of undesirable weeds and woody plant growth in lawn and roadside areas. Herbicides for this activity are selective in their effects on various plants when used in accordance with label directions. Various herbicides are used in the performance of this assembly. Weed and brush control applications produce the best results when applied to the foliage of plants. The application must be made by a certified pesticide applicator, a trained application technician, or any other person provided a certified pesticide applicator is at the work site and within communication distance.	**MAY AFFECT**[9]	
714-7714-01	**Herbicide Application Broadcast Chemical Trimming (Fosamine)**	This assembly is the application of selective herbicides for the control of undesirable woody growth or any part thereof. This includes utilizing Fosamine (Krenite) for foliage applications made with power sprayers. The application must be made by a certified pesticide applicator, a trained application technician, or any other person provided a certified pesticide applicator is at the work site and within communication distance.	**MAY AFFECT**[9]	
714-7715-01	**Brushing, Selective Thinning, Tree Removal, and Tree Trimming**	This assembly is the removal and/or trimming of brush, trees, and woody vegetation including all actions related to tree trimming, brushing, selective thinning, and tree removal using the appropriate power and hand tools and the removal of stumps where required. Unless grubbing or stump removal are planned, apply a basal bark herbicide mixture to the cut surface of all live stumps, including the root collar and exposed roots.		**NO EFFECT**
714-7715-02	**Brushing, Tree Trimming, and Tree Removal; Mechanized**	This assembly is the mechanical removal and/or trimming of brush, trees, and woody vegetation including all methods and procedures described under 714-7715-01 with the use of hydraulic tools, boom arm mowers, or trimmer lift equipment.		**NO EFFECT**
714-7715-03	**Herbicide Basal Bark and Cut Stump**	This is the application of Basal Bark and cut stump treatments. This includes all herbicide applications related to the elimination of unwanted woody plants, stump re-sprouts, and root sprouting through basal bark and cut stump treatment methods. Although the basal bark method may be applied at any time of the year, for highway purposes it is also most applicable to the dormant season. The application must be made by a certified pesticide applicator, a trained application technician, or any other person provided a certified pesticide applicator is at the work site and within communication distance.	**NO EFFECT**	
714-7716-01	**Revitalization – Seeding and Soil Supplement; Mechanized**	This assembly is the revitalization of roadside locations, including the furnishing and placing of seed, soil supplements and mulch to roadside locations stabilizing roadway embankments and compliance with current erosion and sedimentation control mandates.	**NO EFFECT**	

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
714-7717-01	**Wildflowers (formerly Wildflower Planting)**	This assembly is the furnishing and placing of seeds of various plants which have growth and flowering characteristics desirable for highway roadsides, the maintenance of wildflower sites, and the propagation and enhancement of naturally occurring "wildflowers." This will provide an acceptable roadside cover while maintaining a reduced mowing schedule and will provide the necessary erosion and sediment control properties.	**NO EFFECT**	
PUBLIC SERVICE FACILITIES				
714-7731-01	**Maintenance of Interstate Roadside Rests with All-Weather Buildings**	The maintenance of roadside rests with all-weather buildings such as mowing; fertilizing; watering; raking; mulching; and herbicide weed control on the grounds as well as repairing, replacing, repainting, cleaning, and periodic equipment servicing of building and equipment. The maintenance of signs, litter containers, and snow and ice control are also included as well as picking up litter, litter disposal, and cleaning rest rooms.	**NO EFFECT**	
714-7732-01	**Maintenance of Roadside Rest, Table Sites, Overlooks, Scenic Feature, and Park-and-Ride Lots**	This assembly includes all actions related to the maintenance of all other roadside rests, roadside table sites, and overlooks not covered under activity 714-7731-01 This includes roadside table sites, overlooks, and park-and-ride lots. Growing; fertilizing; watering; raking; mulching; herbicide weed control on the grounds in addition to repairing, replacing, and cleaning of the temporary facilities placing as well as maintenance of roadside tables, signs, litter containers, junkyard screenings (both vegetative and structural), and snow and ice control are included in this assembly. Also included is litter pickup and disposal and sanitary service purchase contracts.		**NO EFFECT**
714-7735-01	**Roadside Litter Pickup and Debris Removal Routine**	This assembly includes all actions related to Department Force litter pickup and debris removal (within established highway right-of-way limits). This includes litter and debris pickup and removal generated by the motoring public and normal weather and wind conditions. Contract disposal costs are also included in this activity. Pickup of debris, etc., resulting from ice storms or high wind conditions should be charged to Assembly 711-7351. This does not include three special litter pickup and debris removal programs: Great PA Cleanup (714-9813-01, Litter Brigade (714-9848-01) and Adopt-A-Highway (714-9849-01).		**NO EFFECT**
714-7735-02	**Roadside Tire Remnant Removal – Debris Removal**	This assembly includes all actions related to tire remnant removal on interstate and interstate look-alike highways.		**NO EFFECT**
714-9813-01	**Special Roadside Litter Pick Up and Debris Removal Great PA Cleanup**	This assembly is the annual Great PA Clean-up (GPC) campaign. This includes all actions related to the annual Great PA Clean-up campaign scheduled from March 1 to May 31. This is primarily an educational/public participation activity focusing on refuse bag retrieval and disposal.		**NO EFFECT**
714-9848-01	**Special Roadside Litter Pick Up and Debris Removal Litter Brigade**	This assembly is the Adult and Juvenile Litter Brigades. This includes all actions related to refuse bag retrieval and disposal.		**NO EFFECT**

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
714-9849-01	**Special Roadside Litter Pick Up and Debris Removal Adopt-A-Highway**	This assembly is the Adopt-A-Highway (AAH) program. This includes all actions related to the program focusing on refuse bag retrieval and disposal. This includes the collection of the refuse bags from volunteers as well as the Inmate Community Work Program.		**NO EFFECT**
719-9829-01	**Maintenance Administration**	Accounting coding assembly for employee salaries, wages, leave, subsistence, and other expenses of those employees in the County, Maintenance Districts, and Central Offices whose primary duties are related to administration and who, for payroll purposes, are regularly assigned to Program 719.		**NO EFFECT**
719-9851-01	**Hazardous Waste Inventory Control**	This assembly includes all actions related to the removal of hazardous waste material generated by all programs, except Program 813 (fuel and petroleum related), by contract to professional waste disposal contractors. This is for disposal of batteries, light bulbs, spray cans, and similar items.		**NO EFFECT**
621-2541-01	**FHWA Disaster Recovery (Federal Aid Routes) Debris Clearance**	All disaster activities for FHWA reimbursement involving tree, dirt, stone, and other debris removal.		**MAY AFFECT**[9]
621-2542-01	**FHWA Disaster Recovery (Federal Aid Routes) Protective Measures**	All disaster activities for FHWA reimbursement involving installation of road closed and detour routing signs, temporary lane restrictions, temporary traffic signals, cones, barricades, etc.		**NO EFFECT**
621-2543-01	**FHWA Disaster Recovery (Federal Aid Routes) Emergency Road Repairs**	All disaster activities for FHWA reimbursement involving any repair of the roadway surface (i.e., paving, base repair).		**NO EFFECT**
621-2544-01	**FHWA Disaster Recovery (Federal Aid Routes) Emergency Bridge Repairs**	All disaster activities for FHWA reimbursement involving any repair of bridges (i.e., abutments, piers, deck and support structure, underwater and above water inspection, material removal, and related bridge repairs).		**MAY AFFECT**[9]
621-2545-01	**FHWA Disaster Recovery (Federal Aid Routes) Emergency Shoulder Repairs**	All disaster activities for FHWA reimbursement involving reshaping, ditching, reestablishment, and rock lining of swales or ditch lining and related shoulder work.		**MAY AFFECT**[9]
621-2546-01	**FHWA Disaster Recovery (Federal Aid Routes) Emergency Pipe Installation**	All disaster activities for FHWA reimbursement involving any repair, installation, or replacement of drainage system pipes.		**MAY AFFECT**[9]
621-2549-01	**FHWA Disaster Recovery (Federal Aid Routes) Other Costs**	All other disaster activities for FHWA reimbursement which are in response to the disaster damage.		**MAY AFFECT**[9]
663-2541-01	**FEMA Disaster Recovery (Non-Federal Routes) Debris Clearance**	All disaster activities for FEMA reimbursement involving tree, dirt, stone, and other debris removal.		**MAY AFFECT**[9]
663-2542-01	**FEMA Disaster Recovery (Non-Federal Routes) Protective Measures**	All disaster activities for FEMA reimbursement involving installation of road closed and detour routing signs, temporary lane restrictions, temporary traffic signals, cones, barricades, etc.		**NO EFFECT**

CODE	BRIEF DESCRIPTION	DETAILED DESCRIPTION	USFWS 2003 DETERMINATION CONCURRENCE	USFWS 2025 DETERMINATION CONCURRENCE[8]
663-2543-01	**FEMA Disaster Recovery (Non-Federal Routes) Emergency Road Repairs**	All disaster activities for FEMA reimbursement involving any repair of the roadway surface (i.e., paving, base repair).		**NO EFFECT**
663-2544-01	**FEMA Disaster Recovery (Non-Federal Routes) Emergency Bridge Repairs**	All disaster activities for FEMA reimbursement involving any repair of bridges (i.e., abutments, piers, deck and support structure, underwater and above water inspection, material removal, and related bridge repairs).		**MAY AFFECT**[9]
663-2545-01	**FEMA Disaster Recovery (Non-Federal Routes) Emergency Shoulder Repairs**	All disaster activities for FEMA reimbursement involving reshaping, ditching, reestablishment, and rock lining of swales or ditch lining and related shoulder work.		**MAY AFFECT**[9]
663-2546-01	**FEMA Disaster Recovery (Non-Federal Routes) Emergency Pipe Installation**	All disaster activities for FEMA reimbursement involving any repair, installation, or replacement of drainage system pipes.		**MAY AFFECT**[9]
663-2549-01	**FEMA Disaster Recovery (Non-Federal Routes) Other Costs**	All other disaster activities for FEMA reimbursement which are in response to the disaster damage.		**MAY AFFECT**[9]

14.2 Appendix B: Bog Turtle Effects Pathway Analysis

From the leftmost columns to the right, we analyze each activity of the action (grouped by stressor) for its effect to bog turtle resources and predict the species' response at the individual level. We then extrapolate to the population and species level to assess the demographic consequence of the stressor. In many cases, the AMMs of this PBO decrease the effects of the activities down to insignificant or discountable levels to arrive at an NLAA determination. However, some activities are LAA despite the use of AMMs.

Note: All these activities are covered by the Programmatic Biological Opinion with the implementation of applicable AMM measures.

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
Introduction of contaminants causes a decrease in wetland vegetation	Using heavy equipment Using vehicles off-road Cleaning/Flushing Pipes Operating a new road (contaminants from new traffic)	Wetland vegetation	Breeding – Change or loss of vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation, leading to decreased foraging success and increased energy expenditure. Sheltering – Loss of hibernacula for adults and juveniles, leading to decreased winter survival and increased injury and mortality. Change or loss of vegetation, leading to decreased cover from predation and poaching.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 2, 4, 5, 7, 8 These AMMs involve following PA DEP and USACE permit conditions (including an approved Erosion and Sediment Pollution Control Plan), disinfecting equipment, storing vehicular fuels and fluids and having staging areas away from aquatic habitat, delineating habitat avoidance areas, and minimizing the introduction and	These AMMs should avoid and minimize the introduction of contaminants into wetland habitat such that the effect to the species becomes insignificant.	NLAA for all Programmatic Categories (PC)

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
					spread of invasive species.		
Alteration of hydrology to bog turtle wetlands causing a decrease in hydrology and vegetation	De-watering New road[11] Access road[11] Constructing and using a cofferdam Drainage ditch[11] Culvert or bridge[11] Stormwater facility[11] Geotechnical drilling	Hydrology and vegetation of wetland habitat	Breeding – Change or loss of vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation and hydrology, leading to decreased foraging success and increased energy expenditure. Sheltering – Loss of hibernacula for adults and juveniles, leading to decreased winter survival and increased injury and	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 16, 17, 18, 19 These AMMs involve following PA DEP and USACE permit conditions, retaining a qualified bog turtle surveyor for monitoring, conducting a salvage effort for permanent habitat loss, and conducting compensatory mitigation for permanent habitat loss.	The AMMs reduce the effect but whether it reaches the level of insignificant and discountable will be context-dependent	LAA if the stressor occurs to hibernacula habitat (PC 1 and 2) LAA if the stressor permanently affects foraging habitat (PC 5, 6) LAA if the stressor is permanent (PC 9) NLAA for PC 3, 4, 7, and 8

[11] Includes the construction, use, maintenance, and post-construction presence of the permanent structure. Structure in this context is any object or item such as a road, fence, culvert, etc.

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
			mortality. Change or loss of vegetation, leading to decreased cover from predation and poaching.				
Alteration of bog turtle wetland hydrology due to soil compaction in the wetlands	Using heavy equipment Using vehicles off-road	Mucky soil, hydrology, and vegetation of wetland habitat	Breeding – Loss of vegetation associated with muck, possibly including tussock vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation and hydrology, leading to decreased foraging success and increased energy expenditure. Sheltering – Loss of hibernacula leading to decreased winter survival. Loss of mucky substrate leading to inability to escape predation and poaching. Loss of vegetation associated with muck.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 2, 7, 18, 19	Even with the use of low pressure matting, soil compaction is still likely to occur in the wetland and, depending on the scale of the work, impacts to site hydrology may still occur.	LAA if the stressor occurs to hibernacula habitat (PC 1 and 2) LAA if the stressor permanently affects foraging habitat (PC 5, 6) LAA if the stressor is permanent (PC 9) NLAA for PC 3, 4, 7, and 8

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
Increase in erosion leading to an increase in sedimentation of the bog turtle wetland habitat	Removing vegetation in the uplands or in areas around the bog turtle wetland	Wetland vegetation	Breeding – Change or loss of vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation, leading to decreased foraging success and increased energy expenditure. Sheltering – Loss of hibernacula for adults and juveniles, leading to decreased winter survival and increased injury and mortality. Change or loss of vegetation, leading to decreased cover from predation and poaching.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1 and 2 These AMMs involve following PA DEP and USACE permit conditions (including an approved Erosion and Sediment Pollution Control Plan).	These AMMs will minimize this stressor such that effects are insignificant.	NLAA for all PC.
Decrease in wetland vegetation	Removing vegetation Applying herbicide Walking through habitat	Wetland vegetation	Breeding – Change or loss of vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation, leading to decreased foraging success and increased energy expenditure.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 2, 7, and 19 These AMMs involve following PA DEP and USACE permit conditions (including an approved Erosion and Sediment Pollution Control Plan) which often require restoration of	These AMMs will minimize loss of wetland vegetation in most cases. Cases with permanent vegetation loss will mitigate via AMM 19.	LAA for permanent vegetation loss (PC 2, 5, and 6). LAA for temporary hibernacula vegetation loss (PC 1) and foraging habitat loss during the active season (PC 4)

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
			Sheltering – Loss of hibernacula for adults and juveniles, leading to decreased winter survival and increased injury and mortality. Change or loss of vegetation, leading to decreased cover from predation and poaching.		removed vegetation. The AMMs also include delineating habitat to be avoided.		NLAA for PC 3, 7, 8.
Introduction or increase of non-native invasive species	Using imported soils Planting and hydroseeding Redistributing soils Spreading vegetative debris Using erosion and sedimentation control products made from non-native vegetation Using heavy equipment Using vehicles off-road Walking through habitat Applying fertilizer	Wetland vegetation	Breeding – Change or loss of vegetation for nest building, leading to increased energy expenditure to find suitable nesting habitat or abandonment/displacement from the wetland. Feeding – Change or loss of prey species dependent on wetland vegetation, leading to decreased foraging success and increased energy expenditure. Sheltering – Loss of hibernacula for adults and juveniles, leading to decreased winter survival and increased injury and mortality. Change or loss of vegetation, leading to decreased cover from predation and poaching.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	8	This AMM will minimize the introduction and spread of non-native invasive species to insignificant and discountable effects.	NLAA for all PC.

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
Crushing bog turtles or their nests	Using heavy equipment Using vehicles off-road Using motorized or manual hand tools Walking through habitat Placing causeway, fill, wetland matting, rip-rap, erosion control and streamflow diversion measures	Individuals of all life stages (adults, juveniles, and eggs)	Injury, mortality	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 3, 5-7, 9-19 These AMMs involve ensuring personnel awareness of bog turtles when working in known or assumed occupied habitat, installing rock scour protection and other placement of equipment away from delineated habitat, working in a seasonal period that avoids or minimizes impacts, and having a qualified bog turtle surveyor conduct exclusion, salvage, and monitoring efforts.	These AMMs, particularly those related to limiting activities to the inactive season in foraging and stream habitat, will avoid and minimize the likelihood of crushing bog turtles and their nests to be a discountable effect. However, bog turtles are cryptic and difficult to find. Over the lifespan of this PBO, some of the activities that occur in the active season in foraging and stream habitats, and in any time of the year in hibernacula habitat, will likely result in injury and mortality of bog turtles that escape detection during the preconstruction survey and salvage.	LAA for activities with effects that occur in hibernacula habitat where bog turtles may be present year-round (PC 1 and 2). LAA for activities with effects in the active season in stream and foraging habitat (PC 4, 6, and 7) NLAA for activities with effects in inactive season foraging and in-stream habitat PC 3, 5, and 8)

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
Introduction of vehicle traffic causing species/vehicle collisions	Access road[11] New road[11]	Individuals of adults and juveniles	Injury, mortality	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	AMM 19 offsets the adverse effect of incidental take. Mitigation may include constructing and monitoring a turtle crossing to reduce the risk of collision.	There may still be remaining risk of road mortality.	LAA
Entrapment	Using rip-rap Using mesh erosion control material	Individuals of adults and juveniles	Injury, mortality	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	3, 8 AMM 3 involves filling voids in rip-rap, and AMM 8 specifies erosion materials to be used	None	NLAA for all PCs
Smothering	Adding imported soils Redistributing soils	Individuals of all life stages (adults, juveniles, eggs)	Injury and mortality due to suffocation	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 7, 9-19 These AMMs involve ensuring personnel awareness of bog turtles when working in known or assumed occupied habitat, delineating habitat from the work area, working in a seasonal period that avoids or minimizes impacts, and having a qualified	These AMMs, particularly those related to limiting activities to the inactive season in foraging and stream habitat, will avoid and minimize the likelihood of smothering bog turtles and their nests to be a discountable effect. However, bog turtles are cryptic and difficult to find. Over the lifespan of this	LAA for activities with effects that occur in hibernacula habitat where bog turtles may be present year-round (PC 1 and 2). LAA for activities with effects in the active season in stream and foraging habitat (PC 4, 6, and 7) NLAA for activities with

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
					bog turtle surveyor conduct exclusion, salvage, and monitoring efforts.	PBO, some of the activities that occur in the active season in foraging and stream habitats, and in any time of the year in hibernacula habitat, will likely result in injury and mortality of bog turtles that escape detection during the preconstruction survey and salvage.	effects in inactive season foraging and in-stream habitat PC 3, 5, and 8)
Increase in pedestrian traffic leading to an increase in the risk of collection and increase in domesticated animals	Sidewalk or bike path[11]	Individuals of all life stages (adults, juveniles, eggs)	Injury, mortality, predation, harmed, harassed, hunted, removed from population.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	No AMMs specifically address this stressor/activity		LAA
Noise and vibrations causing turtles to abandon feeding and breeding activities	Using heavy equipment Blasting	Individuals of adults and juveniles	Breeding – Nest abandonment Feeding – Decreased foraging activity due to increased sheltering from disturbance. Potentially decreased forage availability if prey are also affected. Sheltering – Potential abandonment of wetland site.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 6, 7, 9-19 These AMMs include sensitivity training to on-site staff, notification of public utilities of consultation needs if relocating utilities, delineation the work area from	These AMMs will avoid and minimize effects, but whether reductions lead to insignificance depends on the habitat type. For the AMMs related to surveying and salvaging, bog	LAA for activities with effects that occur in hibernacula habitat where bog turtles may be present year-round (PC 1 and 2). LAA for activities with effects in the

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
			Increased energy expenditure to disperse to other sites.		bog turtle habitat, work during certain seasons, survey and salvage efforts by a QBTS, and mitigation to offset take.	turtles are cryptic and difficult to find. Over the lifespan of this PBO, some of the activities that occur in the active season in foraging and stream habitats, and in any time of the year in hibernacula habitat, will likely result in injury and mortality of bog turtles that escape detection during the preconstruction survey and salvage.	active season in stream and foraging habitat (PC 4, 6, and 7) NLAA for activities with effects in inactive season foraging and in-stream habitat PC 3, 5, and 8)
Deterring bog turtle movement	Using a caution fence Using construction mats Noise wall[11] Permanent fence[11] Using a silt fence New road[11] Stockpiles[11]	Individuals of adults and juveniles	Breeding – Decreased ability to find mates, which may also decrease genetic exchange within the metapopulation. Feeding – Decreased foraging ability if bog turtles cannot travel to areas with prey.	Reproduction – Reduced Numbers – Reduced Distribution – Reduced	1, 2, 11, 13, 19 These AMMs include following the PA DEP and USACE permit conditions which regulate placement of structures in wetlands and waterways. Working during the inactive season for placement of temporary structures avoids	Temporary structures used in the inactive season and removed prior to the active season would likely reduce this effect to insignificance. Permanent structures or structures used in the active season may still have adverse effects on the bog turtle.	NLAA for activities with temporary effects in the inactive season foraging and stream habitats (PC 3 and 8). LAA for activities with effects in hibernacula, permanent effects, and active season effects (PC 1, 2, 4, 5, 6, 7, 9).

Stressor	Activities	Resources Affected	Individual Response	Demographic Consequence	AMMs for this Stressor	Remaining Effects	Determination
					deterring bog turtle movement. Temporary exclusion barriers will be removed and a QBTS will ensure trenches and pitfalls are removed. Mitigation would be used to offset this effect.		

14.3 Appendix C: Large Watercourses within the Pennsylvania Bog Turtle Range

Transportation actions within these main channels greater than 30 feet in width with persistent cobble or boulder substrate are determined to have no effect on the species.

PENNSYLVANIA COUNTY	WATERCOURSE
Cumberland	Conodoguinet Creek
Adams and York	Conewago Creek
York	Codorus Creek
York	Muddy Creek
York	Yellow Breeches Creek
Dauphin, Schuylkill, and Lebanon	Swatara Creek
Lebanon	Quittapahila Creek
Lebanon and Lancaster	Conewago Creek
Lancaster	Conestoga River
Lancaster	Octoraro Creek
Chester	Brandywine Creek
Berks	Tulpehocken Creek
Montgomery	Perkiomen Creek
Bucks	Neshaminy Creek
Northampton	Bushkill Creek
Monroe	Big Bushkill Creek
Monroe, Northampton, Bucks, and Delaware	Delaware River
Lehigh and Northampton	Lehigh River
Dauphin, York, and Lancaster	Susquehanna River
Berks, Chester, Montgomery	Schuylkill River

14.4 Appendix D: Bog Turtle Exclusion Barrier Specifications

BOG TURTLE EXCLUSION BARRIER SPECIFICATIONS

1. AN APPROXIMATELY 30–INCH HIGH EXCLUSION BARRIER FENCE SHALL BE ERECTED NEAR THE LIMITS OF DISTURBANCE OF THE PROPOSED TRANSPORTATION ACTIVITY. THE EXCLUSIONARY FENCE WILL FUNCTION AS A BARRIER TO PREVENT BOG TURTLES FROM MIGRATING OUT OF WETLANDS AND WATERWAYS INTO THE DISTURBANCE AREA. THE BARRIER WILL ALSO PREVENT TRANSPORTATION ACTIVITIES FROM EXTENDING BEYOND THE PRESCRIBED LIMITS OF DISTURBANCE. THE BARRIER WILL BE INSTALLED AS INDICATED AS SOON AS PRACTICABLE FOLLOWING ANY NECESSARY SPECIES EXCLUSIONARY SURVEY EFFORTS, AND PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBANCE ACTIVITIES. THE BARRIER WILL BE INSTALLED ONLY AFTER RECEIVING APPROVAL TO DO SO FROM THE QUALIFIED BOG TURTLE SURVEYOR. SILT SOCK, SAND BAG WALL, SHEETING, JERSEY BARRIER, ETC. MAY BE NECESSARY TO ESTABLISH THE EXCLUSION BARRIER IN LIEU OF THE FENCING AS DETERMINED BY THE QUALIFIED BOG TURTLE SURVEYOR TO ADDRESS SITE SPECIFIC CONDITIONS SUCH AS WATERCOURSE CHANNEL ENVIRONMENTS, TIE–IN AREAS TO EXISTING STRUCTURES, PAVEMENTS, ETC.

2. THE EXCLUSIONARY BARRIER IS TO BE INSTALLED A MINIMUM OF 6–INCHES INTO THE UNDERLYING HABITAT WHERE APPROPRIATE. THE INSTALLATION/REMOVAL OF THE EXCLUSIONARY BARRIER MUST BE COMPLETED BY HAND THROUGH WETLAND HABITATS. THE INSTALLATION/REMOVAL OF THE EXCLUSIONARY BARRIER THROUGH UPLAND HABITATS MAY BE COMPLETED WITH THE ASSISTANCE OF EQUIPMENT. THE EXCLUSIONARY BARRIER SHALL BE INSTALLED AND REMOVED UNDER THE SUPERVISION OF A QUALIFIED BOG TURTLE SURVEYOR. WHILE IN USE, THE EXCLUSIONARY BARRIER SHALL BE INSPECTED DAILY TO ENSURE ITS COMPETENCY AND FUNCTION. THE DAILY INSPECTION MAY BE COMPLETED BY THE ON–SITE ENVIRONMENTAL MONITOR/INSPECTOR OR PROJECT FOREMAN. STRAW BALES, SAND BAGS, OR TEMPORARY FENCING MAY BE USED AS TEMPORARY BARRIERS AT INGRESS/EGRESS LOCATIONS TO PROVIDE ACCESS TO EQUIPMENT/PERSONNEL THROUGH THE EXCLUSIONARY BARRIER. SHOULD THE EXCLUSIONARY BARRIER BECOME COMPROMISED DURING ITS USE, THEN ALL CONSTRUCTION/MAINTENANCE ACTIVITIES WILL CEASE UNTIL AN EXCLUSIONARY SURVEY OF THE ACTION AREA HAS BEEN COMPLETED BY A QUALIFIED BOG TURTLE SURVEYOR AND THE COMPROMISE HAS BEEN REMEDIATED. THE EXCLUSIONARY BARRIER IS TO BE REMOVED IMMEDIATELY FOLLOWING THE COMPLETION OF THE DISTURBANCE ACTIVITIES. THE QUALIFIED BOG TURTLE SURVEYOR WILL ENSURE THAT POTENTIAL PITFALLS ARE NOT CREATED BY TRENCHING ASSOCIATED WITH THE INSTALLATION AND/OR REMOVAL OF THE EXCLUSIONARY BARRIER.

DETAIL NOTES

1. POSTS ARE TO BE SPACED AT 10 FOOT MAXIMUM DISTANCES USING 2.5 INCH DIAMETER GALVANIZED OR ALUMINUM MATERIAL.

2. CHAIN LINK TO POST FASTENERS ARE TO BE SPACED AT 14–INCH MAXIMUM USING NO. 6 GALVANIZED ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL PRE–FORMED CLIPS.

3. CHAIN LINK TO TENSION WIRE FASTENERS SPACED AT 60–INCHES MAXIMUM USING NO. 10 GAGE GALVANIZED STEEL WIRE.

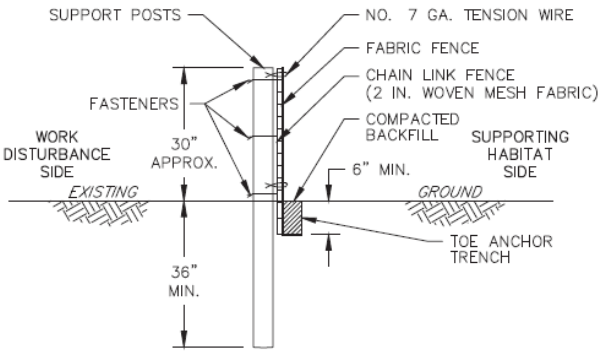
4. NO. 7 GAGE TENSION WIRE INSTALLED HORIZONTALLY AT TOP AND BOTTOM OF CHAIN–LINK FENCE.

5. CHAIN LINK FENCE AND FABRIC FENCE MUST BE INSTALLED ON THE SIDE OF THE POSTS FACING THE SUPPORTING WETLAND HABITAT. NO FENCING SHOULD ON THE SIDE OF THE POSTS FACING THE WORK DISTURBANCE SIDE. THIS IS OPPOSITE OF THE TYPICAL INSTALLATION FOR EROSION AND SEDIMENT POLLUTION CONTROL PURPOSES.

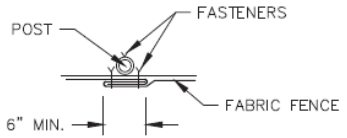
6. FENCING SHOULD BE INSTALLED TO A MINIMUM DEPTH OF 6 INCHES INTO THE UNDERLYING GROUND WHERE POSSIBLE.

7. INSTALLATION SHOULD ENSURE THAT GROUND ELEVATION IS RE–ESTABLISHED WITH COMPACTED BACKFILL ALONG BOTH SIDES OF THE FENCING TO PREVENT THE FORMATION OF A TRENCH OR PITFALL.

8. IN AREAS ALONG THE EXCLUSION BARRIER WHERE DRAINAGE IS NECESSARY TO PREVENT PONDING BEHIND THE FENCE AND POSSIBLE BREACH/COMPROMISE, A SECTION OF 0.5 INCH X 0.5 INCH OR 1 INCH X 1 INCH HARDWARE CLOTH MAY BE AFFIXED TO THE CHAIN LINK FENCE IN LIEU OF THE FABRIC FENCE.



SECTION VIEW



JOINING FENCE SECTIONS

BOG TURTLE EXCLUSION BARRIER

NOT TO SCALE

FILE PATH: Q:\R16x0433.006 Bog Turtle Barrier\Bog Turtle Barrier.dwg