



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850



April 10, 2019

Ingrid E. Allen
U.S. Department of Transportation
Federal Highway Administration
Pennsylvania Division
228 Walnut Street, Room 508
Harrisburg, Pa 17101-1720

RE: U.S. Fish and Wildlife Service Project #2018-0076

Dear Ms. Allen:

The enclosed programmatic Biological Opinion supersedes our November 2, 2018, to incorporate minor editorial changes and clarifications (as listed in Appendix A) to *Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania* and its effects on the federally listed threatened bog turtle (*Clemmys muhlenbergii*) in accordance with section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA). This request for formal consultation was received from the Federal Highway Administration (FHWA) on March 14, 2018.

This programmatic biological opinion is based on information provided in the March 14, 2018, programmatic biological assessment (PBA), telephone conversations, field investigations, and other sources of information. The consultation history is located after the Literature Cited. A complete administrative record of this consultation is on file in this office.

If you have any questions regarding this Opinion or our shared responsibilities under the ESA, please contact Bob Anderson by telephone at 814-234-4090 or by email at Robert_m_anderson@fws.gov.

Sincerely,

For Sonja Jahrsdoerfer
Project Leader

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1.0 PROGRAMMATIC BIOLOGICAL OPINION

The two main purposes of this Programmatic Biological Opinion (PBO) are to streamline the ESA section 7 consultation process and to promote better conservation outcomes for the bog turtle.

1.1 Programmatic Consultation Process

This PBO 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 in the design, construction, and maintenance of the nation's highway system. 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.

PennDOT receives funding from the FHWA in support of design, construction, and maintenance activities within the State through the Federal Aid Highway Program. PennDOT has been delegated by the FHWA as a non-Federal representative for the purposes of conducting section 7 ESA interagency consultation. This consultation 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 federally threatened bog turtle. Since the listing of the species in 1997, the action agencies have consulted on a project-by-project basis to ensure compliance with the ESA. The majority of these transportation activities have resulted in no effect to the species, or reduced levels of effect with the implementation of avoidance and minimization measures (AMMs). This PBO will create a streamlined and transparent process to expedite the project review timeline through increased predictability, consistency, and standardization, in addition to providing conservation for the bog turtle.

The transportation activities included within this PBO range in scope and complexity from routine maintenance activities to the construction of new roadways on new alignments within the extant range of the bog turtle. Comprehensive descriptions of the transportation activities, 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 for this consultation are addressed in this document.

This PBO applies to those actions that the Service has determined to meet the effect determinations, project conditions, and conservation measures described in this document are intended to cover the majority of transportation actions. However, some actions upon the review of the Service may exceed the scope of this consultation and require individual or additional section 7 consultation.

This programmatic consultation approach can be broadly summarized as: 1) screening projects with the Pennsylvania Natural Diversity Inventory (PNDI) environmental review tool and conducting bog turtle habitat assessments; 2) modifying projects as possible to avoid and

minimize potential adverse effects; and/or 3) providing measures to offset adverse effects for unavoidable adverse effects.

PennDOT is leading the development of a user's guide that will instruct all parties on the specifics for project submittals, reviews, incidental take tracking, monitoring, and annual reporting. The applicants and action agencies will submit project details to the Service using a standardized Project Submittal Form (PSF) that will capture relevant site-specific information, AMMs, potential take, and restoration benefits; supporting the Service's consistency review (**Appendix C of the PBA contains an example of the interim Project Submittal Form**). When the required information is provided and the project qualifies for programmatic coverage, informal consultations will be completed within 14 days and formal consultations will be completed within 30 days, recognizing that staffing shortages may prevent the Service's ability to meet these deadlines in some limited circumstances. Early coordination is the key to ensuring these timeframes are attained.

1.2 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 PBO 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 no effect or in a may affect determination for the bog turtle. It provides advance Service concurrence with not likely to adversely affect (NLAA) determinations with the implementation of AMMs. For "likely to adversely affect" (LAA) determinations, it provides the opinion of the Service that projects which are consistent with the program are not likely to jeopardize the continued existence of the bog turtle. We describe no effect, NLAA, and LAA categories of projects, and the corresponding project-level processes for using this document to comply with ESA section 7 below.

1.2.1 No Effect

The following activities have been determined by FHWA/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 agency or its designated non-Federal representative, the Service agrees that the following activities would have no effect to the bog turtle.

- Transportation maintenance actions that have been determined to result in No Effect on the bog turtle as identified in appendix A, or
- Wetlands are absent from the project area (including a 300-foot buffer around the limit of disturbance/limit of indirect effect), or
- A Phase I Habitat Assessment of the project area (including a 300-foot buffer around the limit of disturbance/limit of indirect effect) has determined the absence of habitat

conditions that would support the species, or

- Transportation actions within the main channels (within the ordinary high water mark) of watercourses greater than 30 feet in width with persistent cobble/boulder substrate, or
- The transportation action has been determined by the FHWA or PennDOT to completely avoid all potential effects on the species.

1.2.2 Not Likely to Adversely Affect

Appendix A of this PBO summarizes the characteristics of transportation projects that are NLAA the bog turtle. 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 PSF 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 PBO. Upon receipt of the PSF, the Service may check for program consistency and request additional information that is necessary to verify such consistency. The Service has 14 calendar days to notify PennDOT if they determine a particular project does not meet the criteria for a NLAA. If reviewed before the 14 day period ends, the Service reviewer will send an email verification to expedite the project. If PennDOT is not so notified, they may proceed under the programmatic consultation. This verification period is not intended as another level of review. The presumption is that the vast majority of submitted projects fall correctly within the programmatic consultation. Rather, it is an opportunity for the Service to apply local knowledge to these projects, and they may identify a small subset of projects as potentially having unanticipated impacts.

1.2.3 Likely to Adversely Affect

The “Effects of the Action” section of this PBO summarizes the characteristics of transportation projects that are LAA for bog turtle; however, a response from the Service is required. The Service will respond within 30 calendar days to consultation requests completed by PennDOT, submitted prior to project commencement, and accompanied by a complete PNDI and PSF. However, if a project requires formal consultation for other listed species, the Service will verify project consistency with this PBO within a project-specific BO that addresses all adversely affected species, to which 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 PSF) for projects that are LAA 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 the program as a whole.

1.3 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 regarding project effects to adjust how the program is working to ensure the anticipated take avoidance and conservation response from bog turtle 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 PBO 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 the Service agree it is appropriate.

2.0 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 "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."

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* submitted to initiate this PBO.

2.1 Introduction

The FHWA provides stewardship over the construction, maintenance, and preservation of the nation's highways, bridges, and tunnels. The FHWA provides financial and technical assistance to state and local governments. Nationally, Pennsylvania ranks as the fifth largest state-maintained road system and third largest bridge system. PennDOT is directly responsible for nearly 40,000 miles of highway and approximately 25,000 bridges. 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.

On an annual basis, the number of existing road miles 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. During 2017, PennDOT received nearly \$1.6 billion dollars from the FHWA in support of 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.

2.2 General Programmatic Activity Categories

This section provides a summary of the seven different general programmatic activity categories all transportation activities fall within this PBO. The categories are based on the outcome of the activity and the potential effect it may have on the bog turtle (Table 1).

2.2.1 Programmatic Category 1A

This category encompasses actions where *temporary effects to potential hibernacula microhabitat* (i.e., spring-fed rivulets under soft mud, in muskrat burrows, under sedge clumps, at the base of tree stumps, and in meadow vole burrows (Service 2001) are anticipated to occur. Temporary impacts could include the placement of temporary crossing matting, erosion and sedimentation control features, flow diversion measures, and species exclusionary barriers. These transportation actions will be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Hibernacula are critical to the species being able to brumate (i.e., a hibernation-like state that cold-blooded animals utilize during very cold weather) through their winter dormancy period. Activities occurring within this microhabitat during the species inactive season, November 1 to March 31, could result in a high potential for adverse effects due to their inability to escape from disturbance activities and potential exposure to freezing conditions on the ground surface. Therefore, AMMs associated with this programmatic category focus on conducting these transportation actions only during the active season for the species, April 1 to October 31. This seasonal time period will afford a higher likelihood for the species to escape disturbance activities during non-freezing surface conditions. Since these actions will occur during the active season, additional AMMs will be necessary to remove any turtles that may be present within the limits of disturbance of the action as well as physically isolate the disturbance activities from other potentially migrating turtles. Compensatory mitigation measures could be implemented in lieu of some AMMs with the concurrence of the Service.

2.2.2 Programmatic Category 1B

This category encompasses actions where *permanent effects to potential hibernacula microhabitat* are anticipated to occur. Permanent impacts will result from the loss of this microhabitat through the placement of permanent fill materials or removal through excavation. These transportation actions will be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Hibernacula are critical to the species being able to bromate through their winter dormancy period. Activities occurring within this microhabitat during the species inactive season, November 1 to March 31, could result in a high potential for adverse effects due to their inability to escape from disturbance activities and potential exposure to freezing conditions on the ground surface. Therefore, AMMs associated with this programmatic category focus on conducting

these transportation actions only during the active season for the species, April 1 to October 31. This seasonal time period will afford a higher likelihood for the species to escape disturbance activities during non-freezing surface conditions. Since these actions will occur during the active season, additional AMMs will be necessary to salvage and relocate any turtles that may be present within the limits of disturbance of the action as well as physically isolate the disturbance activities from other potentially migrating turtles. Compensatory mitigation measures could be implemented in lieu of some AMMs with the concurrence of the Service. Due to the permanent loss of species supporting habitat, compensatory mitigation will be required to offset these impacts.

2.2.3 Programmatic Category 2A

This category encompasses actions where *temporary effects to potential foraging microhabitat* are anticipated to occur. Temporary impacts could include the placement of temporary crossing matting, erosion and sedimentation control features, flow diversion measures, and species exclusionary barriers. These transportation actions will be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Foraging microhabitat is defined within this consultation as to lack both the persistent groundwater discharge and depth of mucky soil substrate characteristics that comprise hibernaculum microhabitat. The species will be expected to potentially utilize foraging microhabitat only during its active season, April 1 to October 31, for breeding, feeding, sheltering, and migration purposes. Therefore, AMMs associated with this programmatic category focus on conducting these transportation actions during the inactive season for the species, November 1 to March 31. This seasonal time period will afford a higher likelihood for the species to escape disturbance activities since they will be expected to be in an inactive condition in hibernaculum microhabitat. Compensatory mitigation measures could be implemented in lieu of some AMMs, such as the seasonal restriction, with the concurrence of the Service.

2.2.4 Programmatic Category 2B

Category 2B encompasses actions where *permanent effects to potential foraging microhabitat* are anticipated to occur. Permanent impacts will result from the loss of this microhabitat through the placement of permanent fill materials or removal through excavation. These transportation actions will be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland.

Foraging microhabitat is defined within this consultation as to lack both the persistent groundwater discharge and depth of mucky soil substrate characteristics that comprise hibernaculum microhabitat. The species will be expected to potentially utilize foraging microhabitat only during the species active season, April 1 to October 31, for breeding, feeding, sheltering, and migration purposes. Therefore, AMMs associated with this programmatic category focus on conducting these transportation actions during the inactive season for the species, November 1 to March 31. This seasonal time period will afford a higher likelihood for the species to escape disturbance activities since they will be expected to be in an inactive condition in hibernaculum microhabitat. Compensatory mitigation measures could be

implemented in lieu of some AMMs, such as the seasonal restriction, with the concurrence of the Service. Due to the permanent loss of species supporting habitat, compensatory mitigation will be required to offset these impacts.

2.2.5 Programmatic Category 3A

Category 3A encompasses *actions which will occur during the seasonal period of April 1 to October 31 and include dedicated species exclusionary measures*. These actions are typically associated with activities occurring within stream corridors, or upland habitats in the vicinity of occupied/assumed supporting wetland habitat for the species. These transportation actions will be conducted in a manner that avoids any permanent effect on the hydrologic sources supporting the wetland. Since these actions will be committed to occur during the species active season, AMMs will be necessary to remove any turtles that may be present within the limits of disturbance of the action as well as physically isolate the disturbance activities from other potentially migrating turtles. Take reduction and offsetting measures could be implemented in lieu of some AMMs with the concurrence of the Service.

2.2.6 Programmatic Category 3B

Category 3B encompasses *actions which will occur during the seasonal period of November 1 to March 31 within stream corridors or upland habitats in the vicinity of occupied/assumed supporting wetland habitat for the species*. These transportation actions will be conducted in a manner that avoids permanent effect on the hydrologic sources supporting the wetland. Commitment to this seasonal time period will afford a higher likelihood for the species to escape disturbance activities since they will be expected to be in an inactive condition in hibernaculum microhabitat and not utilizing stream corridor or upland habitat.

2.2.7 Programmatic Category 4

Category 4 encompasses *actions which result in permanent effects to the hydrologic source(s) of occupied/assumed supporting wetland habitat*. Activities which permanently alter supporting hydrologic sources during the species inactive season, November 1 to March 31, could result in a high potential for adverse effects due to their inability to escape from disturbance activities, and potential exposure to freezing conditions on the ground surface. Therefore, AMMs associated with this programmatic category focus on conducting these transportation actions only during the active season for the species, April 1 to October 31. This seasonal time period will afford a higher likelihood for the species to escape disturbance activities during non-freezing surface conditions and acclimate to the translocation habitat. Since these actions will occur during the active season, additional AMMs will be necessary to salvage and relocate any turtles that may be present within the entire affected wetland habitat as well as physically isolate the disturbance activities from other potentially migrating turtles. Due to the permanent loss of species supporting habitat, compensatory mitigation will be required to offset these impacts.

Table 1. Programmatic transportation action categories that may affect, and are likely to adversely affect bog turtles, resulting in death, injury, or harm¹.

Habitat type	Action Category	Anticipated effect
Winter (Hibernation) habitats	1A	Temporary effects to potential hibernacula microhabitat are anticipated to occur without any hydrologic modification.
	1B	Permanent effects to potential hibernacula microhabitat are anticipated to occur without any hydrologic modification.
Foraging and nesting habitats	2A	Temporary effects to potential foraging microhabitat are anticipated to occur without any hydrologic modification.
	2B	Permanent effects to potential foraging microhabitat are anticipated to occur without any hydrologic modification.
Travel Corridor habitats	3A	Proposed action will occur during the seasonal period of April 1 – October 31 with take avoidance focused on excluding bog turtles from the limit of disturbance. No permanent hydrologic modification anticipated.
	3B	Proposed action will occur from November 1 – March 31 and entirely in stream corridors, or upland habitats in proximity to occupied/assumed bog turtle habitat. No permanent hydrologic habitat modification anticipated.
	4	Permanent hydrologic effects to species supporting habitat are unavoidable.

¹“Harm” in the definition of take means an act which kills or injures wildlife. Such act may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR part 17.3).

2.3 Specific Activities

Descriptions of specific transportation activities are summarized in Table 2. A detailed description of the specific activities can be found in the PBA provided by FHWA/PennDOT as part of this consultation.

Table 2. Transportation Activities

Activity	Description	Potential Programmatic Category Type
New Road Construction	Can include but is not limited to stormwater facilities, construction, paving, bridges, and culverts	1A, 1B, 2A, 2B, 3A, 3B, 4
Roadway Widening/Shoulder Improvements	Can include but are not limited to stormwater facilities, construction, paving, bridges, and culverts	1A, 1B, 2A, 2B
Culvert Installation	Can include but not limited to dewatering, scour protection, armoring, headwalls, and vegetation disturbance	1A, 1B, 2A, 2B, 3A, 3B, 4
Bridge Replacement and Construction	Usually includes spanning a body of water, wetlands, or roadway	1A, 1B, 2A, 2B, 3A, 3B
Bridge Maintenance and Rehabilitation	Any work conducted on a current bridge including but not limited to scour repair, deck replacement, and general maintenance	1A, 2A, 3A, 3B
Drainage System Repair	Maintenance of roadside ditches, channels, cross culverts and pipes, catch basins, and retention/detention basins	1A, 1B, 2A, 2B, 3A, 3B, 4
Pavement Preservation	Patching, repairing, and replacing roadway surfaces	1A, 1B, 2A, 2B, 3A, 3B, 4
Slide Abatement	Stabilization of landslides, rockfalls, debris flow, and slope erosion and settlement	1A, 2A, 3A, 3B
Streambank Stabilization and Flood Damage Repair	Direct protection of embankments at bridges, culverts, and roadway sections from erosive flowing water	1A, 2A, 3A, 3B
Sinkhole Repair	Depressions or holes in the ground caused by surface layer collapse	1A, 1B, 2A, 3A, 3B
Transportation Alternatives Set-aside Program	Set-aside funds for small projects including pedestrian and bike facilities, recreational trails, school projects, and community improvements	1A, 2A, 3A, 3B
Take reduction and offsetting measures	Mitigation associated with unavoidable permanent impacts to aquatic resources	1A, 2A, 3A, 3B
Other Related Activities	Activities that support transportation improvements such as geotechnical investigations, use of herbicides, and public utility relocations	1A, 2A, 3A, 3B
General Maintenance	General roadway repair, rehabilitation, and maintenance activities implemented to prolong use, ensure motorist safety, and protect the environment	1A, 2A, 3A, 3B

Conservation Measures

The following conservation measures (called standard measures and AMMs) are proposed as part of the action to help avoid, minimize, and mitigate effects of the proposed action on bog turtle.

2.3.1 Standard Measures

The FHWA and PennDOT routinely implement standard measures as part of the environmental compliance process [e.g., National Environmental Policy Act (NEPA) and USACE and Pennsylvania Department of Environmental Protection (PADEP) wetland/watercourse permitting], and many of these measures reduce potential effects on the bog turtle. These standard measures include:

- Identifying in PennDOT maintenance manuals all maintenance activities (aka assemblies) that may affect the bog turtle with the following statement that serves to alert maintenance managers to coordinate these activities with their district environmental staff:

“If the assembly is proposed within the counties of Adams, Berks, Bucks, Carbon (only Aquashicola Creek Watershed), Chester, Cumberland, Dauphin (only Spring Creek and Conewago Creek Watersheds), Delaware, Franklin (only Antietam Creek Watershed), Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill (only Swatara Creek Watershed), and/or York; then this activity must avoid adverse impacts to the bog turtle. The bog turtle is a federally threatened, and State endangered species protected by applicable laws. Potential habitat for the species is typically characterized by wetlands with thick mucky soils and groundwater springs. If wetlands or watercourses are present within 300 feet of the disturbance area for the assemblies identified below, then AMMs including time of year restrictions may be necessary. All operators, employees, and contractors working on assemblies in areas where the species may be present must be provided briefing materials prior to the initiation of the activity. If a bog turtle is encountered, then all work activities within 300 feet of the capture will cease immediately. Coordinate with the District Project Manager and District Environmental staff. Refer to Threatened and Endangered Species Desk Reference (PennDOT 2013) for standard operating procedures for the avoidance of adverse effects to the bog turtle”;
- 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 bog turtle habitat assessments;
- Implementing QA/QC practices on a subset of wetland and Phase I 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.

It should be noted that, through the implementation of the above mentioned screening and avoidance/minimization process, locations of concern requiring additional species surveys or conservation measures are identified and these additional measures are applied. As an example, for ditch excavation activities when potential habitat is identified and cannot be avoided, AMM 18 will be deployed (see Table 2 below).

The approach using the above standard measures can be broadly summarized as: 1) performing PNDI and habitat screening procedures; 2) modifying projects as possible to avoid and minimize impacts; 3) conducting actions during the appropriate seasonal time period to avoid adverse effects, or 4) implementing appropriate measures for the exclusion of the species from disturbance areas during their active seasonal time period, or 5) providing for compensation of anticipated limited adverse effects.

2.3.2 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 3). 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 application of AMMs, but will be offset through the implementation of a compensatory AMM.

The AMMs will be applied to transportation actions encompassed by this programmatic consultation unless one of the following conclusions has been reached for the transportation action:

- Wetlands are absent from the project area (including a 300-foot buffer around the limit of disturbance/limit of indirect effect), or
- A Phase I Habitat Assessment (habitat assessment) of the project area (including a 300-foot buffer around the limit of disturbance/limit of indirect effect) has determined the absence of species-supporting habitat conditions, or
- A Phase II/Phase III Presence-Inferred Absence Survey (species 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, or
- The transportation action has been determined by the FHWA or PennDOT to completely avoid all potential effects on the species.

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 3). The application of AMMs acknowledges the presence of potential species-supporting habitat and confirmed or assumed species presence 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 particular actions.

Table 3. Take 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 species individuals 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 species individuals. Any voids in the rock scour protection will be choked with smaller rock and mineral material in order 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.
4	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	In order to avoid the introduction and spread of invasive species into supporting habitats, minimize the duration of exposed soils, utilize erosion control blankets on disturbed areas immediately after project completion to minimize sedimentation, 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.

AMM	DESCRIPTION
9	<p>Specific coordination and construction operating procedures approved by the Service/PFBC shall be implemented in the event that a bog turtle is encountered during preconstruction exclusion surveys, on-site monitoring, or within the vicinity of the limit of disturbance (LOD) during the course of the action (i.e., construction). These specific procedures include the following:</p> <ul style="list-style-type: none"> • 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 - 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. <p>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.</p> <p>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.</p> <p>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</p> <p>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.</p> <p>In order 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.</p>
Required for specific programmatic categories	
10	In order 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	In order 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	In order 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

AMM	DESCRIPTION
	temporary streamflow diversion measures; the placement of rock scour protection materials; and the internal confines of an existing bridge or culvert crossing structure. 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	In order 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	In order 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 spoil materials from excavation areas to ensure that species individuals are recovered and relocated.
16	In order to avoid the killing, harm, or harassment of individual bog turtles during the species active period, a Service/ PFBC recognized-qualified bog turtle surveyor will provide continuous monitoring during the active construction.
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	In order to <u>offset the adverse effects for the permanent loss of supporting habitat and/or incidental take</u> , compensatory mitigation credits will be calculated in accordance with Service credit metrics and purchased from a Service-approved conservation bank with receipt of credit purchase being provided to the Service prior to the start of any work. If a conservation bank has not yet been developed, PennDOT/FHWA may adopt an alternate equivalent mechanism, with Service concurrence.

Table 4. Programmatic category actions and application of avoidance and minimization measures (AMMs) Summary

Programmatic Category	Description	AMM													For Offsets
		1-9	10	11	12	13	14	15	16	17	18	19			
1A	Actions where temporary effects to potential hibernacula are anticipated to occur without any hydrologic modification.	X	X		X	X	X	X	X	X			X		
1B	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	X	X	
2A	Actions where temporary effect to potential foraging habitat are anticipated to occur without any hydrologic modification.	X		X									X		
2B	Actions where permanent effects to potential foraging habitat are anticipated to occur without any hydrologic modification.	X		X									X	X	
3A	Actions which will occur during the seasonal period of April 1 to October 31 with exclusionary measures and without any permanent hydrologic impacts.	X			X	X	X	X	X	X			X		
3B	Actions which will occur during the seasonal period of November 1 to March 31 associated exclusively with stream corridors or upland habitats in the vicinity of occupied/assumed supporting wetland habitat without any permanent hydrologic impacts.	X		X											
4	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		X	

3.0 ACTION AREA

The action area is defined at (50 CFR 402.02) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area for this project is a 17 county area located in southeastern Pennsylvania (Figure 1).

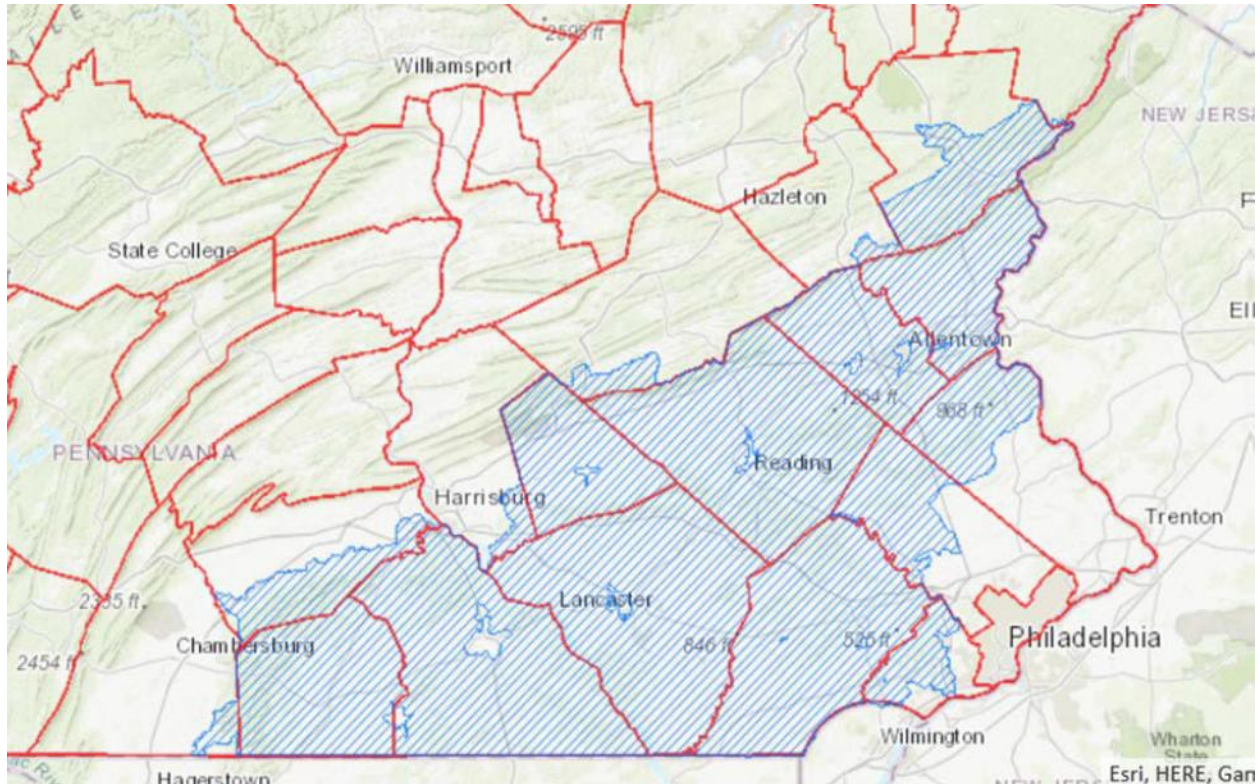


Figure 1. Action Area in southeastern Pennsylvania shaded in blue, which corresponds to the range of the bog turtle in Pennsylvania. County and state lines in red. Labelled locations indicate major towns and cities.

4.0 STATUS OF THE SPECIES AND CRITICAL HABITAT

The bog turtle is the smallest member of the genus *Clemmys* (= *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. These areas are primarily used by bog turtles for nesting, basking, and foraging activities, and contain native sedges, grasses, forbs, scattered shrubs, saturated mud/muck-like soils, and contain shallow to deep rivulets/watery trails created by naturally flowing water or by wildlife. However, they utilize more densely vegetated areas for hibernation.

4.1 Status of the Species

Per the ESA section 7 regulations (50 CFR § 402.14(g)(2)), it is the Service's responsibility to "evaluate the current status of the listed species or critical habitat."

The Service listed the northern population of the bog turtle as a threatened species under the ESA on November 4, 1997 (Service 1997); a recovery plan was finalized on May 15, 2001 (Service 2001).

To assess the current status of the species it is helpful to understand the species' conservation needs, which are generally described in terms of reproduction, numbers, and distribution. The Service frequently characterizes reproduction, numbers, and distribution for a given species via the conservation principles of resiliency (ability of species/populations to withstand stochastic events which is measured in metrics such as numbers, growth rates), redundancy (ability of a species to withstand catastrophic events which is measured in metrics such as number of populations and their distribution), and representation (variation/ability of a species to adapt to changing conditions which may include behavioral, morphological, genetics, or other variation), collectively known as the three Rs.

To address reproduction, numbers, and distribution and the three Rs, the Service has developed a recovery program that focuses on addressing the primary threats and maintaining healthy populations across multiple recovery units. The Recovery Plan outlines the following four criteria as targets for delisting:

- Long range protection is secured for at least 185 populations 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.

The Service developed five recovery units to ensure long-term survival of the species across a range of habitats and genetic variation and these projects are all located in the Delaware West or Susquehanna/Potomac Recovery Units (Figure 2).

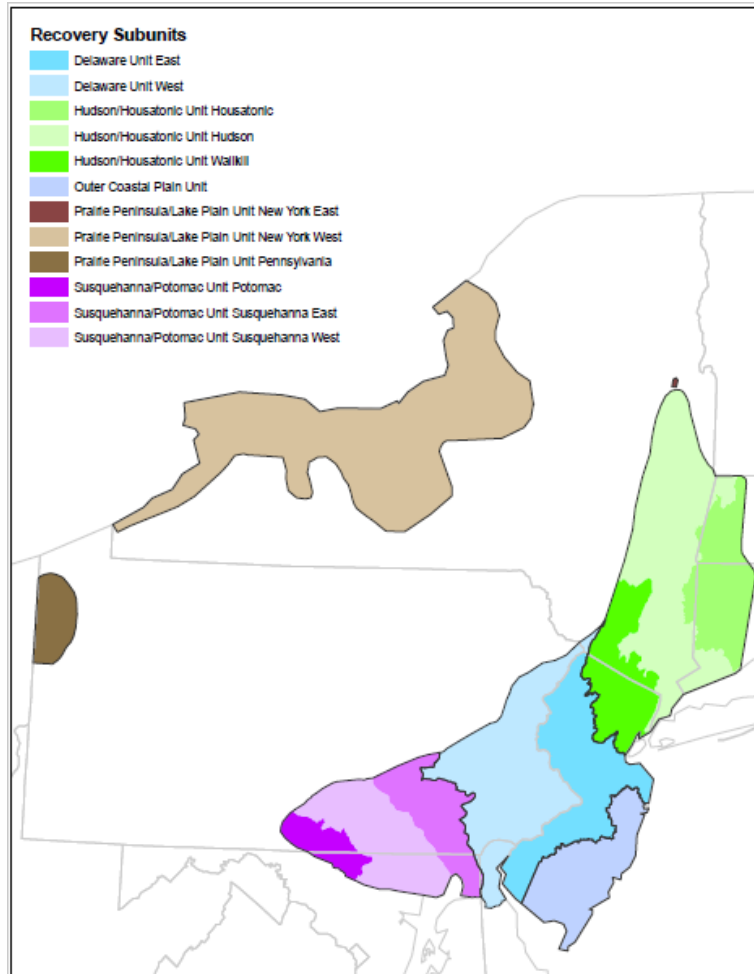


Figure 2. Recovery unit (areas outlined in black) and subunit (see map legend for corresponding colors) map for the northern population of the bog turtle.

The range-wide status of the species is considered stable to increasing based on increased survey efforts that have detected new bog turtle sites and habitat management that has resulted in the creation or expansion of suitable core habitat at many known sites. At the time of listing, the bog turtle was thought to be extant in 191 wetlands in 7 states in the northern range of the species – Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, and Pennsylvania. Prior to listing, there were range reductions with populations lost from western Pennsylvania and northern New York. These range reductions resulted in a decline in the redundancy of populations across the northern range, also potentially reducing representation and genetic variation. However, currently there are 461 known extant sites in these states.

Pennsylvania is the only state in the northern range where new populations are continually being discovered, while other states infrequently find new sites. Extant populations in many locations are highly fragmented due to encroachment of residential and commercial development, eliminating connecting corridors to other extant wetlands, as well as habitat alterations due to vegetation succession, hydrology changes, and introduction of invasive species. These populations may generally be considered as having lower resiliency. However, there have been

no discernable range reductions since the time of listing. Instead, as mentioned above, there has been a range expansion since the Federal listing with more than 250 new sites located throughout the northern range. Within the last few years, some new sites have been found in new watersheds. Pennsylvania has seven new sites in new WBDHU12-level watersheds².

Tables 5 and 6 provide information for bog turtle populations for each state and Recovery Unit in the northern range, summarizing our understanding of reproduction, numbers, and distribution to date. In the future we will assess overall viability of each population using the Species Status Assessment approach.

Table 5. Bog turtle extant wetland population summary by state (from Regional Bog Turtle Population Viability Ranking Methodology, 2017).

State	No. of Extant Populations	No. of Extant Pops. by Recruitment Condition*	No. of Extant Pops. By Viability Condition†	No. of Extant Pops. w/ Habitat Management‡
Connecticut	4	Good: 3 Fair: 0 Poor: 1	Good: 1 Fair: 2 Poor: 1	0
Delaware	8	Good: 5 Fair: 0 Poor: 3	Good: 2 Fair: 1 Poor: 5	2
Maryland	90	Good: 52 Fair: 31 Poor: 7	Good: 17 Fair: 66 Poor: 7	25
Massachusetts	2	Good: 2 Fair: 0 Poor: 0	Good: 2 Fair: 0 Poor: 0	2
New Jersey	98	Good: 48 Fair: 48 Poor: 2	Good: 27 Fair: 23 Poor: 48	20
New York	66	Good: 30 Fair: 24 Poor: 12	Good: 20 Fair: 12 Poor: 34	16
Pennsylvania	193	Good: 73 Fair: 76 Poor: 44	Good: 25 Fair: 96 Poor: 72	69
Total	461	Good: 213 Fair: 179 Poor: 69	Good: 94 Fair: 200 Poor: 167	134

*Per the ranking methodology, “good” means that a population is known to have recruitment. “Fair” means that reproduction is unknown for a population. “Poor” indicates that the population is not reproducing and is not viable without intervention.

²See the following link for Watershed Boundary Data for Hydrologic Units (WBDHU): https://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Watershed_Boundary_Dataset/Watershed_Boundary_Dataset.htm.

† Per the ranking methodology, “good” means that a population is thought to be viable based on current knowledge of the population and assuming that ≥ 16 individuals can maintain a population. “Fair” indicates that a population may be viable. “Poor” means that a population is not likely to be viable without intervention.

‡Habitat management is a tool used to help achieve viability at a site by enhancing or restoring suitable habitat (e.g., removing invasive species and/or woody vegetation) for bog turtles.

Table 6. Bog turtle extant wetland population summary by recovery unit (from Regional Bog Turtle Population Viability Ranking Methodology, 2017).

Recovery Unit	No. of Extant Populations	No. of Extant Pops. by Recruitment Condition*	No. of Extant Pops. By Viability Condition†	No. of Extant Pops. w/ Habitat Management‡
Delaware	213	Good: 86 Fair: 89 Poor: 38	Good: 32 Fair: 85 Poor: 96	61
Hudson-Housatonic	105	Good: 54 Fair: 38 Poor: 13	Good: 36 Fair: 18 Poor: 51	23
Outer Coastal Plain	1	Good: 0 Fair: 1 Poor: 0	Good: 0 Fair: 0 Poor: 1	0
Prairie Peninsula-Lake Plain	5	Good: 2 Fair: 1 Poor: 2	Good: 2 Fair: 2 Poor: 1	4
Susquehanna-Potomac	137	Good: 71 Fair: 50 Poor: 16	Good: 24 Fair: 95 Poor: 18	46
Total	461	Good: 213 Fair: 179 Poor: 69	Good: 94 Fair: 200 Poor: 167	134

*Per the ranking methodology, “good” means that a population is known to have recruitment. “Fair” means that reproduction is unknown for a population. “Poor” indicates that the population is not reproducing and is not viable without intervention.

† Per the ranking methodology, “good” means that a population is thought to be viable based on current knowledge of the population and assuming that ≥ 16 individuals can maintain a population. “Fair” indicates that a population may be viable. “Poor” means that a population is not likely to be viable without intervention.

‡Habitat management is a tool used to help achieve viability at a site by enhancing or restoring suitable habitat (e.g., removing invasive species and/or woody vegetation) for bog turtles.

As mentioned above, the greatest threat to the bog turtle is the loss, degradation, and fragmentation of habitat. In addition, vehicle mortality, disease outbreaks, predation, and collection may be impacting various populations. For a more detailed account of the species description, life history, population dynamics, threats, and conservation needs, refer to:

<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=C048>.

4.2 Status of the Critical Habitat

No critical habitat for the species has been designated.

5.0 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.

5.1 Status of the Species within the Action Area

Currently, there are 193 extant bog turtle populations in the action area (from Regional Bog Turtle Population Viability Ranking Methodology, 2017) . In Pennsylvania, these populations are distributed across the Susquehanna/Potomac and the Delaware Recovery Units and make up 42 percent of the species extant populations. The protection and management of bog turtle populations in the action area is imperative to recovery of this species.

The bog turtles within the action area are likely suffering from the same threats identified earlier in this biological opinion, but based on the information provided above, their status appears to be stable because of 1) improved regulatory mechanisms; 2) habitat protection (i.e., conservation easements); and 3) habitat management that has resulted in the creation or expansion of optimal habitat.

6.0 EFFECTS OF THE ACTION

Direct effects are the direct or immediate effects of the project on the species, its habitat, or designated/proposed critical habitat. Indirect effects are defined as those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. Direct and indirect effects of the proposed action along with the effects of interrelated/interdependent activities are all considered together as the “effects of the action.”

To ensure all components of the proposed action are considered in the effects analysis, a comprehensive species/response table was created (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 through stressors³ and/or direct interactions⁴. In addition, the table describes the relationships between the sub-activities, stressors, direct interactions, AMMs, and the

³ A stressor is any physical, chemical, or biological alteration of the environment (i.e., increase, decrease, introduction, or removal) that can lead to an adverse individual response. Stressors act indirectly on a species through impacts to the resources it needs to fulfill its life cycle.

⁴ A direct Interaction is the method or means by which an activity, structure, or stressor acts directly upon individuals of a species (in contrast to stressors which act indirectly on individuals by affecting resources used to fulfill aspects of their lifecycle).

resulting effects on individual bog turtles. The following project actions are NLAA bog turtles because the AAMs will ameliorate potential adverse effects as described in Appendix B.

- Programmatic Category 2A actions.
- Programmatic Category 3B actions.
- Transportation actions for which the species has been determined to be absent from the action area through the performance of Phase II/Phase III species surveys approved by the Service.
- Transportation maintenance actions identified as “may affect” in Appendix A that fit into Programmatic Categories 2A, and 3B and follow the AMMs identified in table 3.

Although the majority of actions encompassed in PBO are NLAA bog turtles, the following actions are LAA bog turtles.

- Programmatic Category 1A actions.
- Programmatic Category 1B actions.
- Programmatic Category 2B actions.
- Programmatic Category 3A actions.
- Programmatic Category 4 actions.
- Transportation maintenance actions identified as “may affect” in Appendix A that fit into Programmatic Categories 1A, 1B, 2B, 3A and 4 and follow the AMMs identified in table 3.

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

6.1 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/harassment of individuals during transportation activities from crushing, entrapping, smothering and/or injury.
- Harm of individuals due to the temporary or permanent loss/degradation of suitable foraging, basking, escape habitat and hibernaculum habitat.
- Harm/harassment of individuals during transportation activities due to construction-related noise; percussion; vibration; heavy equipment operation; trenching; grading; isolation created by operation of heavy construction equipment; installation, utilization, and removal of erosion and sedimentation pollution control measures; installation, utilization, and removal of temporary access measures including crossing matting and causeway structures; installation, utilization, and removal of temporary species exclusion measures; and utilization of temporary stream diversion and/or bypass dewatering measures.

6.2 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/harassment

of individuals following transportation activities due to increased risk for injury/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/nonpoint source runoff, and introduction/spread of invasive and exotic species.

6.3 Interrelated and Interdependent Actions and Activities

Transportation activities can also introduce the potential for interrelated and interdependent project effects. These potential secondary effects are generally more difficult to predict, and are usually less quantifiable than other direct and indirect effects. Secondary impacts of transportation infrastructure improvement activities are typically recognized as necessary public utility relocations, pre-construction geo-technical investigations, off-site staging/storage areas, offsite waste and borrow areas, utilization of temporary detour routes, increased transportation infrastructure usage/maintenance, and land development activities that otherwise would not occur but for the proposed action.

7.0 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” 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); 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.

Many activities that impact streams and wetlands that are the primary habitat of bog turtles require Federal permits from the Corps under the Clean Water Act. 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.

Patterns and types of land use and development are not expected to dramatically change relative to trends seen over recent decades. Activities that have affected bog turtles and their habitat in recent years are expected to continue relatively unchanged, although various efforts at bog turtle conservation have and will continue to benefit the species (e.g., wetland conservation easements and State and Federal habitat management programs).

Projects as a part of this action are not expected to increase development in the vicinities of this project for residential or commercial use.

8.0 ANALYTICAL FRAMEWORK FOR JEOPARDY DETERMINATION

8.1 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.

8.2 Jeopardy Analysis Framework

“Jeopardize the continued existence of” means to engage in an action that reasonably will 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). The following analysis relies on four components: (1) Status of the Species, (2) Environmental Baseline, (3) Effects of the Action, and (4) Cumulative Effects. The jeopardy analysis in this Opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. It is within this context that we evaluate the significance of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

8.3 Analysis for Jeopardy

8.3.1 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, foraging, and hibernating . However, the conservation measures proposed will avoid, minimize or offset most of the potential adverse effects to the bog turtles and the permanent protection and management of occupied bog turtle habitat is expected to provide a conservation benefit. Because this is a programmatic consultation, the extent of the affected individuals cannot be calculated. Therefore, the amount of anticipated take is capped annually (Table 7) to facilitate this analysis.

Table 7. Maximum annual take using habitat loss as a surrogate¹.

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

¹ Numbers are based on historic disturbances in wetlands that support bog turtle or wetlands containing potential bog turtle habitat. Historically, the impacts are small, and refers to take in a year’s time.

Although there will be adverse effects to individual bog turtles in both their annual survival and reproductive rates, this will be minimized with the planned conservation measures described above.

8.3.2 Effects to Populations

As we have concluded that individual bog turtles are likely to be killed and/or experience some reductions in their annual or lifetime reproductive success, we need to assess the aggregated consequences of the anticipated losses/reductions in fitness (i.e., reproductive success and long-term viability) of the exposed individuals on the population to which these individuals belong.

The majority of the habitat impacts caused by the proposed action will be temporary and the surrounding turtles should colonize the impacted area as it recovers. 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. Therefore, the effects of the action are not expected to measurably decrease the fitness of this population.

8.3.3 Effects to Species

As we have concluded that populations of bog turtles are unlikely to experience reductions in their fitness, there will be no harmful effects (i.e., there will be no reduction in reproduction, numbers, and distribution) on the species as a whole.

8.4 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 as a whole. 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 effect and the 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.

9.0 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 as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering (50 CFR § 17.3). Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the FHWA (or PennDOT acting on their behalf) so that they become binding conditions, as appropriate, for the exemption in Section 7(o)(2) to apply. The FHWA/PennDOT has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA/PennDOT (1) fails to assume and implement the terms and conditions or (2) fails to require the FHWA/PennDOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any permit, construction plan, or grant document, the protective coverage of Section 7(o)(2) may lapse. To monitor the impact of incidental take, the FHWA/PennDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

9.1 Amount or Extent of Take Anticipated

The Service anticipates incidental take of bog turtles will be difficult to detect for the following reason(s): 1) adult individuals of this species are small; 2) juveniles/hatchlings of this species are even smaller; and 3) bog turtles are likely to be below the surface of the ground. However, the following level of take can be anticipated by loss of suitable habitat as described in Table 8.

Table 8. Annual Incidental take estimate

Species	Amount of Take Anticipated	Life Stage when Take is Anticipated	Type of Take	Take is Anticipated as a Result of
Bog turtle	All turtles in the 1 acre of non-mucky wetland habitat that will be temporarily impacted	Adults & Juveniles	Harmed or Harassed	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 or Harassed	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, or Harassed	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, or Harassed	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

9.2 Reasonable and Prudent Measures

The Service believes that all reasonable and prudent measures necessary and appropriate to minimize impacts of incidental take of bog turtle have been incorporated into the proposed action as described above.

9.3 Terms and Conditions

In order 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 and monitor take, as described in the PBA.

9.3.1 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 include the following:

- describes the proposed action (e.g., type of action, location, involved Federal agencies);
 - verifies that the project is within the scope of the programmatic consultation;
 - provides a quantification of temporary and permanent impacts (e.g., square feet or acres of wetland, linear feet of watercourse channel); and
 - verifies that the action meets the requirement of implementing all applicable AMMs that will 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.

10.0 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize 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 discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Identify locations with chronic transportation maintenance issues throughout the action area associated with inadequate or improper roadway drainage/crossing features. Develop permanent corrective actions to remedy these issues and facilitate bog turtle movement.
- 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.
- During the design and implementation of culvert and bridge improvement projects, utilize stream restoration measures that restore and facilitate the use of potential travel corridors near occupied habitat.
- 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.

11.0 REINITIATION NOTICE

This concludes formal 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.

12.0 LITERATURE CITED

- PennDOT, October 2013. Revised Threatened and Endangered Species Desk Reference. Publication No. 546. Harrisburg, Pennsylvania.
- United States Fish and Wildlife Service. 1997. Final Rule to List the Northern Population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance. Federal Register 62 CFR 59605-59623. November 4, 1997
- United States Fish and Wildlife Service. 2001. Bog turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan (62 FR 59611). Hadley, Massachusetts.
- Williams, B.K., and E.D. Brown. 2012. Adaptive Management: The U.S. Department of the Interior Applications Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC. 136pp.

13.0 CONSULTATION HISTORY

- 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/characteristics either directly or indirectly were determined to potentially affect the species.
- June 6, 2017 PennDOT conducts a conference call with the Service to discuss the preliminary concept of a formal programmatic consultation process for transportation actions relating to the bog turtle.
- October 13, 2017 PennDOT provides Draft Programmatic Biological Assessment to FHWA, PennDOT Districts, PFBC, and the Service for review and comment.
- November 2, 2017 The Service provides review comments to PennDOT on Draft Programmatic Biological Assessment.
- January 11, 2018 PennDOT conducts a conference call with PennDOT Districts 5-0, 6-0 and 8-0, FHWA, SFWS, and PFBC to review comments, responses and revisions to the Draft BA.
- March 14, 2018 FHWA requests Formal Consultation on the *Programmatic Biological Assessment for the Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania*.
- April 2, 2018 PennDOT conducts a conference call updating the Service and summarizing the Biological Assessment.
- April 11, 2018 PennDOT conducts conference call to clarify specific questions from the Service.
- April 16, 2018 The Service issues a letter to FHWA acknowledging receipt of the request for formal section 7 consultation and stated sufficient information was provided.
- April 16, 2018 The Service submits additional questions to PennDOT.
- April 17, 2018 A BA amendment is submitted to the Service in response to the questions.
- Nov. 21, 2018 Programmatic Biological Opinion signed and delivered to PennDOT and FHWA

14.0 ACRONYMS

FHWA	Federal Highway Administration
BA	Biological Assessment and Programmatic Biological Assessment
AAH	Adopt-A-Highway Program
A-JACKS	A commercially made concrete product used for scour protection at bridge piers and on channel banks having large interstitial spaces allowing for vegetation to better take root in a more natural state to protect against erosion.
AMM	Avoidance and Minimization Measure
BO	Biological Opinion
BST	bituminous surface treatment
EPA	United States Environmental Protection Agency
EPDS	PennDOT Environmental Policy and Project Development Section
ESA	Endangered Species Act
FAST	Fixing America's Surface Transportation Act of 2015
FEMA	Federal Emergency Management Agency
GPC	Great Pennsylvania Clean-up Program
HDD	horizontal directional drilling
HMA	hot mix asphalt
IPaC	Information for Planning and Consultation System
LAA	Likely to Adversely Affect
LOD	Limit of Disturbance
NEPA	National Environmental Policy Act
NLAA	Not Likely to Adversely Affect
NLEB	Northern Long-eared Bat
NPDES	National Pollution Discharge Elimination System
OHWM	Ordinary High Water Mark
PADEP	Pennsylvania Department of Environmental Protection
PBA	Programmatic Biological Assessment
PBO	Programmatic Biological Opinion
PCCP	Portland Cement Concrete Paving
PennDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PNDI	Pennsylvania Natural Diversity Inventory
PSF	Project Submittal Form
PSI	Pounds per square inch
QA/QC	Quality Assurance/Quality Control
RU	Recovery Unit
SPCC	Spill Prevention Control and Countermeasure Plan
SU	Subunit
USACE	U.S. Army Corps of Engineers
Service	U.S. Fish and Wildlife Service

15.0 DEFINITIONS

Foraging Habitat–Wetlands that lack both persistent groundwater discharge and depth of mucky soils substrate. Areas that are utilized to feed, breed, shelter.

Hibernacula Microhabitat/Core Habitat–Wetlands that have persistent groundwater flow through the hibernating season. Essential for survival of bog turtles through the winter months.

Temporary Impact–An impact that is not permanent – Temporary crossing matting for equipment, erosion and sedimentation controls, flow diversions, and exclusionary barriers.

Potential Habitat–Wetlands that have the characteristics associated with bog turtles (persistent groundwater flow and mucky soils) but has not been surveyed to the species nor is connected to a known site.

Compensatory Mitigation–Purchase of a land parcel or easement to off-set impacts to bog turtles.

Time of Year Restriction–A restriction of time that work can be completed. There are two restrictions; Active season (April 1 to October 31) and Inactive season (November 1 to March 31).

Exclusionary Barriers–Barriers to keep bog turtles from entering the construction area, typically super-silt fence.

Appendix A

Maintenance Assemblies Effect Determinations for the Bog Turtle

CODE ⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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 AFFECT⁶
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 AFFECT²
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
711-7136-01	Pavement Widening BCBC 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 AFFECT²
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 AFFECT²
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 AFFECT²
711-7113-01	Dust Palliative - Bit./ Calcium Chloride/Other Product	Spot application of dust palliatives on unpaved 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	Patching – Manual (Emergency)	Manual patching using emergency repair patching procedures such as filling and compacting.	NO EFFECT
711-7121-03	Patching – Manual – Pipe Trenches	The manual placing of a bituminous course over a pipe.	NO EFFECT

⁵ Same description of activity regardless of the first three numbers indicated – program code may also be 612, 618, 621, 663, 712, 713, or 714

⁶ If conducted in or near wetlands occupied or assumed to be occupied by bog turtles

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
711-7121-04	Patching – Layered – Including Patch Machine	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
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
711-7123-01	Surface Treatment – Mixer Paver	The placing of a uniform, full width 1" (90-110 lbs. per square yard) fb application with a mixer paver; such as sweeping, applying mix to road surface and compaction on paved roads.	NO EFFECT
711-7123-09	Surface Treatment – Mixer Paver – Pre-Hauling	Stockpiling (hauling) aggregate prior to mix paver operations.	NO EFFECT
711-7124-01	Surface Treatment – Liquid Bituminous 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 – Liquid Bituminous – Pre-Hauling	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
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
711-7127-01	Skin Patch – Liquid Bituminous – Manual	Liquid bituminous skin patching operations, such as sweeping, manual application of liquid bituminous material using a heating kettle, manually spreading cover aggregate and rolling on paved roads.	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
711-7127-03	Skin Patch – Liq. Bit. Manual – Dist. and Spray Wand	Liquid bituminous skin patching operations, such as sweeping, application of liquid bituminous material using a distributor with spray wand, manually spreading cover aggregate and rolling 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
711-7131-01	Leveling – 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
711-7131-02	Leveling – Mixer Paver – Mechanical	Applying a leveling course to re-establish the roadway cross section using a mixer paver to place a layer of liquid bituminous and aggregate blended mix (fb-1 or fb-2) 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
711-7131-09	Leveling – Mixer Paver – Pre-Hauling	Stockpiling (hauling) costs for a mixer paver leveling course prior to actually performing the work.	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
711-7133-01	Recycling – Bituminous Surfaces	Pavement recycling such as removing material, adding asphalt, placing mat and compaction on paved surfaces.	NO EFFECT
711-7134-01	Slurry Seal and Ralumac	The contract application of slurry seal or ralumac material.	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 ID3	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
711-7141-01	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 Lane	Joint sealing operations on rigid pavements only.	NO EFFECT

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
711-7147-02	Joint Sealing Concrete Rds. – Pavement/ Shoulders Separation Lane	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
711-7212-01	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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
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
711-7222-01	Patching – Mechanical – Plant Mix	This activity includes all actions related to mechanized patching operations on unpaved shoulders and side approaches.	NO EFFECT
711-7222-02	Surface Treatment – Pant Mix	This activity includes all actions related to mechanized shoulder paving 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 – 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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
711-7232-01	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
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
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
711-7315-01	Install Rock Lining	The installation of rock lining in drainage ditches.	MAY AFFECT²
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 AFFECT²
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 AFFECT²

CODE ⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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 ²
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 ²
711-7324-04	Drainage – Replacement/Installation Pipes Extension Only	This assembly is all actions related to the extension of existing pipe installation.	MAY AFFECT ²
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 ²
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 ²
711-7328-01	Install Subsurface Drain (U-Drain)	The installation of subsurface drains (u-drain).	MAY AFFECT ²
711-7324-09	Replace Pipes and Culverts – Pre-Hauling	Account code only – no on ground activity.	NO AFFECT
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 ²
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 ²
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
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
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 ²
711-7432-02	Painting - Full	Generally, run through full permitting process.	MAY AFFECT ²
711-7446-01	Repair/Replace – Superstructure Member	This activity may involve temporary piers, jacks or other supports beneath the bridge.	MAY AFFECT ²
711-7447-01	Repair/Replace – Truss Member	This activity may involve temporary supports beneath the bridge.	MAY AFFECT ²
711-7448-01	Repair/Replace Backwalls	These activities may involve extensive ground disturbance.	MAY AFFECT ²
711-7448-02	Replace/Repair Substructure		MAY AFFECT ²

CODE ⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
711-7448-03	Maintenance – Underpinning		MAY AFFECT
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 ²
711-7451-01	Repair/Replace Slopewalls	May require excavation and instream/in wetland activity.	MAY AFFECT ²
711-7452-01	Repair/Replace – Culverts		MAY AFFECT ²
711-7453-01	Erosion Protection – Stream Bed/Rock/ Deflector		MAY AFFECT ²
711-7453-03	Erosion Protection – Culverts		MAY AFFECT ²
711-7454-01	Const./Install – Temporary Supports		MAY AFFECT ²
711-7455-01	Repair/Replace Slabs/ Box Culvert		MAY AFFECT ²
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.
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
711-7433-01	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
711-7434-01	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
711-7459-01	Other Bridge Activities	Restricted to maintenance activities that are non-structural.	NO EFFECT
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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
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
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
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
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.	NO EFFECT
712-7524-01	Salt Brine Manufacture/ Distribution	This assembly includes all actions related to the manufacturing and distribution of salt brine.	NO EFFECT

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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
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
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
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
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

CODE ⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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
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
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
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
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
713-7681-01	Sweeping; Manual/ Mechanized	This assembly is all actions relative to sweeping and proper disposal of materials.	NO EFFECT
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
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 <u>REVISED 2017</u> <u>MAY AFFECT</u> ²

CODE ⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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 <u>REVISED 2017</u> <u>MAY AFFECT</u> ²
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 <u>REVISED 2017</u> <u>MAY AFFECT</u> ²
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 ²
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 ²
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 ²
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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
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

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²

CODE⁵	BRIEF DESCRIPTION	DETAILED DESCRIPTION	EFFECT DETERMINATION
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
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 AFFECT²
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 AFFECT²
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 AFFECT²
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 AFFECT²

Appendix B
Bog Turtle Effects Pathway Analysis

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

Sub- activity or Structure	Direct interaction OR Stressor	Resources affected Life stage Conservation Functions of the Resource	Species' Responses to Exposure to Direct interaction or Indirect interaction (Stressor)	Effect to individuals	Programmatic Categories	Avoidance Minimization Mitigation	Effects remaining	Determination
Use of heavy equipment	(stressor) Introduction of Contaminants causes a decrease in wetland vegetation	Resource: wetland vegetation Life stage: adults, juveniles, eggs Function: breeding, Feeding, sheltering	Decreased foraging success, increased energy expenditure, abandonment/ displacement from wetland, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced survivorship (predation and exposure to the elements), reduced reproductive success, and reduced fitness	1A	AMMs 1-10, 12-17, and 19a	The threats posed by contaminants should be eliminated or reduced to NLAA by implementing the AMMs and standard PennDOT BMPs	NLAA
Use vehicles off-road					1B	AMMs 1-10, 12-17, 19a, and 19b		NLAA
Cleaning/Flushing Pipes					2A	AMMs 1-9, 11, and 19a		NLAA
					2B	AMMs 1-9, 11, 19a, and 19b		NLAA
					3A	AMMs 1-9, 12-17, and 19a		NLAA
New Road (structure)					3B	AMMs 1-9 and 11		NLAA
	4	AMMs, 1-10, 12-18, and 19b	NLAA					
Use of Heavy Equipment	(direct) Crushing bog turtles or nests	Resource: Individuals Life stage: adults juveniles, eggs	Injury, mortality	Reduced fitness to direct mortality	1A	AMMs 1-10, 12-17, and 19a	Although bog turtles will be moved from the area of disturbance per AMM 12, which will minimize take, it is still likely that bog turtles could escape detection during a pre-construction survey based on their cryptic nature, small size, and the frequency of this activity over the life of the PBO.	LAA
Use vehicles off-road					1B	AMMs 1-10, 12-17, 19a, and 19b		LAA
Use of motorized hand tools					2A	AMMs 1-9, 11, and 19a		NLAA
Use of Hand Tools					2B	AMMs 1-9, 11, 19a, and 19b		LAA
					3A	AMMs 1-9, 12-17, and 19a		NLAA
Walking through habitat					3B	AMMs 1-9 and 11		NLAA
	4	AMMs, 1-10, 12-18, and 19b	LAA					

Sub- activity or Structure	Direct interaction OR Stressor	Resources affected Life stage Conservation Functions of the Resource	Species' Responses to Exposure to Direct interaction or Indirect interaction (Stressor)	Effect to individuals	Programmatic Categories	Avoidance Minimization Mitigation	Effects remaining	Determination
Use of Heavy Equipment	(stressor) Soil compaction in the wetlands causing alteration of site hydrology and loss of hibernacula	Resource: Mucky soil Life stage: adults, juveniles, eggs Function: breeding, sheltering	Displacement, decreased nesting success, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced survivorship (predation and exposure to the elements), reduced reproductive success, and reduced fitness	1A	AMMs 1-10, 12-17, and 19a	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
					1B	AMMs 1-10, 12-17, 19a, and 19b		LAA
					2A	AMMs 1-9, 11, and 19a		NLAA
					2B	AMMs 1-9, 11, 19a, and 19b		LAA
Use vehicles off-road					3A	AMMs 1-9, 12-17, and 19a		NLAA
					3B	AMMs 1-9 and 11		NLAA
					4	AMMs, 1-10, 12-18, and 19b		LAA
Vegetation removal	(stressor) Decrease in wetland vegetation	Resource: Vegetation Life stage: adults, juveniles, eggs Function: breeding, feeding, sheltering	Decreased foraging success, increased energy expenditure, abandonment/displacement from wetland, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced survivorship (predation and exposure to the elements), reduced reproductive success, and reduced fitness	1A	AMMs 1-10, 12-17, and 19a	The AMMs will minimize the loss of wetland vegetation, but there will still be temporary and permanent losses.	LAA
					1B	AMMs 1-10, 12-17, 19a, and 19b		LAA
					2A	AMMs 1-9, 11, and 19a		NLAA
Applying herbicides					2B	AMMs 1-9, 11, 19a, and 19b		LAA
					3A	AMMs 1-9, 12-17, and 19a		LAA
Walking through habitat					3B	AMMs 1-9 and 11		NLAA
					4	AMMs, 1-10, 12-18, and 19b		LAA
Addition of imported soils	(indirect) Introduction of non – native invasive species changing vegetation community	Resource: vegetation Life stage: adults and juveniles Function: feeding, sheltering	Increased energy expenditure, decreased reproduction (loss of nesting sites), displacement of bog turtles, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced reproduction, reduced growth rate, reduced survival (injury), direct mortality	All	AMM 8	AMM 8 will minimize the introduction and spread of non-native invasive species.	NLAA
Plantings								
Redistribute soils								
Spreading vegetative debris								
Use of heavy equipment								
Use vehicles off-road								
Walking through habitat								

Sub- activity or Structure	Direct interaction OR Stressor	Resources affected Life stage Conservation Functions of the Resource	Species' Responses to Exposure to Direct interaction or Indirect interaction (Stressor)	Effect to individuals	Programmatic Categories	Avoidance Minimization Mitigation	Effects remaining	Determination
De-water	(Stressor) Alteration of hydrology causing a decrease in hydrology and a decrease in wetland vegetation	Resource: hydrology & wet vegetation Life Stage: Adult, juveniles, eggs Function: Breeding, feeding, sheltering	Displacement, decreased nesting success, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced survivorship (predation and exposure to the elements), reduced reproductive success, and reduced fitness	1A	AMMs 1-10, 12-17, and 19a	Depending on the scale of the work, impacts to site hydrology may still occur.	LAA
New Road (structure)					1B	AMMs 1-10, 12-17, 19a, and 19b		LAA
Access Road (structure)					2A	AMMs 1-9, 11, and 19a		NLAA
Cofferdam (structure)					2B	AMMs 1-9, 11, 19a, and 19b		NLAA
Drainage Ditch (structure)					3A	AMMs 1-9, 12-17, and 19a		LAA
Culvert (structure)					3B	AMMs 1-9 and 11		NLAA
					4	AMMs, 1-10, 12-18, and 19b		LAA
Sidewalk/Bike Path (structure) ¹	Increase in pedestrian traffic increasing the risk of collection (direct) and (stressor) causing an increase in domesticated animals	Resource: Individuals Life stage: Adults, juveniles, eggs	Predation and collection	Direct mortality		n/a	LAA	
Apply fertilizer	(indirect) Increase in non –native invasive species changing vegetation community	Resource: vegetation Life stage: adults and juveniles Function: feeding, sheltering	Increased energy expenditure, decreased reproduction (loss of nesting sites), displacement of bog turtles, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced reproduction, reduced growth rate, reduced survival (injury), direct mortality	All	AMM 8	AMM 8 will minimize the introduction and spread of non-native invasive species.	
Hydroseed								NLAA

Sub- activity or Structure	Direct interaction OR Stressor	Resources affected Life stage Conservation Functions of the Resource	Species' Responses to Exposure to Direct interaction or Indirect interaction (Stressor)	Effect to individuals	Programmatic Categories	Avoidance Minimization Mitigation	Effects remaining	Determination
Access road (structure) ¹	(stressor) Introduction of vehicle traffic causing (direct) vehicle/species collisions	Resource: Individuals	Injury or mortality	Reduced fitness to direct mortality	All	n/a		LAA
New road (structure) ¹		Life stage: Adult, juvenile						
Caution fence (structure)	(direct) deters movement	Resource: Individuals Life stage: Adult, juvenile	Increased energy expenditure and mortality (predation)	Reduced fitness, reduced survival	1A	AMMs 1-10, 12-17, and 19a	Structures could impede bog turtle movement and results in reduced fitness and survival.	LAA
Construction mats (structure)					1B	AMMs 1-10, 12-17, 19a, and 19b		
Noise wall (structure)					2A	AMMs 1-9, 11, and 19a		
Permanent fence (structure)					2B	AMMs 1-9, 11, 19a, and 19b		
Silt fence (structure)					3A	AMMs 1-9, 12-17, and 19a		
New Road (structure)					3B	AMMs 1-9 and 11		
Stockpiles (structure)					4	AMMs, 1-10, 12-18, and 19b		
Riprap (structure)	(direct) Entrapment	Resource: Individuals Life stage: Adult, juvenile	Injury or mortality	Reduced fitness to direct mortality	All	AMM3	None	NLAA
Addition of Imported soils	(direct) Smothering	Resource: Individuals Life stage: Adult, juvenile, eggs	Suffocation	direct mortality	1A	AMMs 1-10, 12-17, and 19a	Although bog turtles will be moved from the area of disturbance per AMM 12, which will minimize take, it is still likely that bog turtles could escape detection during a pre-construction survey based on their cryptic nature, small size, and the frequency of this activity over the life of the PBO.	LAA
Redistribute soils					1B	AMMs 1-10, 12-17, 19a, and 19b		LAA
					2A	AMMs 1-9, 11, and 19a		NLAA
					2B	AMMs 1-9, 11, 19a, and 19b		LAA
					3A	AMMs 1-9, 12-17, and 19a		NLAA
					3B	AMMs 1-9 and 11		NLAA

Sub- activity or Structure	Direct interaction OR Stressor	Resources affected Life stage Conservation Functions of the Resource	Species' Responses to Exposure to Direct interaction or Indirect interaction (Stressor)	Effect to individuals	Programmatic Categories	Avoidance Minimization Mitigation	Effects remaining	Determination
Remove vegetation	(stressor) Increase in erosion causing an increase in sediment causing a decrease in wetlands	Resource: Vegetation Life stage: adults, juveniles, eggs Function: breeding, feeding, sheltering	Decreased foraging success, increased energy expenditure, abandonment/ displacement from wetland, injury or mortality (loss of hibernacula causing decreased winter survival)	Reduced reproduction, reduced growth rate, reduced survival (injury), direct mortality	All	AMM 2	AMM2 will minimize all potential stressors related to soil and erosion.	NLAA
Use of heavy equipment	(direct) Noise & vibrations causing turtles to potentially abandon feeding/ breeding activities	Resource: Individuals Life stage: adults and juveniles	Decreased foraging success, increased energy expenditure, abandonment/ displacement	Reduced reproduction, reduced growth rate, reduced survival	All	AMM 1 – 19b	These avoidance measures will minimize and reduce effects of the action, but not completely eliminate the threat	LAA

¹ Structure is defined as the item or object remaining, post-construction

Appendix C

Addendum, Edits, and Clarifications for the USFWS Programmatic Biological Opinion

Addendum, Edits, and Clarifications for the USFWS Programmatic Biological Opinion entitled *Effects of Transportation Actions on the Bog Turtle within the Commonwealth of Pennsylvania* (November 21, 2018)

Page	Original Comment	Addition/Edit
2	USFWS should confirm that the PSF included as Appendix C of the PBA meets their requirements	<p>Project Submittal Form in Appendix C is an interim form. Add the TaILS project number to the project Submittal Form in Appendix C of the PBA</p> <p>Added: (Appendix C of the PBA contains an example of the interim Project Submittal Form).</p>
3	However, if a project requires formal consultation for other listed species, the Service will verify project consistency with this PBO within a project-specific BO that addresses all adversely affected species, to which 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).	<p>This will be addressed in the User's Guide, which is in the process of development - Spring 2019. Likely part of PennDOT PUB 546 the T&E Handbook.</p> <p>Note: This process will be detailed in a User's Guide that will be contained in PennDOT PUB 546 (the T&E Handbook).</p>
4	5-year effective lifetime	This PBO timeline is similar to the one used for the PennDOT mussel programmatic. It includes a 5-year review and it is renewable.
7	Take reduction and offsetting measures could be implemented in lieu of some AMMs with the concurrence of the Service.	Language used defaults to the mitigation policy of 1981

9	Descriptions of specific transportation activities are summarized in Table 1 .	Changed to Table 2 .
13	Required for specific programmatic categories Programmatic categories should be identified for each AMM. This can be done in the User's Guide.	Note: (Programmatic categories) will be detailed in a User's Guide that will be contained in PennDOT PUB 546 (the T&E Handbook).
14	#19 If a conservation bank has not yet been developed, PennDOT/FHWA may adopt an alternate equivalent mechanism, with Service concurrence. Describe general process....	Note: The process of adopting an alternate equivalent mechanism will be detailed in a User's Guide that will be contained in PennDOT PUB 546 (the T&E Handbook).
15	Table 4	Period added after Table 4.
24	Therefore, the amount of anticipated take is capped annually (Table 6) to facilitate this analysis	Changed to: Table 7
24	Table 2 . Maximum annual take using habitat loss as a surrogate.	Changed to: Table 7

24	Table 7	Added a footnote: ¹ Numbers are based on historic disturbances in wetlands that support bog turtle or wetlands containing potential bog turtle habitat. Historically, the impacts are small, and refers to take in a year's time.
26/27	However, the following level of take can be anticipated by loss of suitable habitat as described in Table 7.	Changed to: Table 8
26/27	Table 3. Annual Incidental take estimate	Changed to: Table 8
27	#2 ...on all bog turtle wetlands with impacts to hibernating habitat following a Service-approved protocol.	Added: ...on all bog turtle wetlands with impacts (both temporary and permanent) to hibernating habitat following a Service-approved protocol.
27	#3..... FHWA/PennDOT will conduct vegetation monitoring of impacted bog turtle wetlands annually for a minimum of 3 years post-construction.	Added: 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... Note: The appropriate protocol for vegetation monitoring will be detailed in a User's Guide that will be contained in PennDOT PUB 546 (the T&E Handbook).
51	Clarification	Added to the top of the table in Appendix B: Note: All these activities are covered by the Programmatic Biological Assessment with the implementation of applicable AMM measures.

51	1A – AMM 19 vs. AMM 19a and 19b	AMM19 is from the PBO and AMM 19a and 19b is from PBA
51	1B - AMM 12-18 vs. 12-17	If there is an impact to a hibernaculum, salvaging hibernating animals is not practical due to the difficulty in finding them.
53	Sidewalk/bike path No AMMs applied, but it is LAA Clarification	Risk from collectors. Access granted that was not there before. Footnote added: ¹ Structure is defined as the item or object remaining, post-construction
54	Access Road/New Road No AMMS applied, but it is LAA Clarification	Additional road traffic causes mortality. Also provides better opportunity for collector access. Footnote added: ¹ Structure is defined as the item or object remaining, post-construction
55	Heavy Equipment No AMMs applied, but it is LAA	Noise affects. Changed Programmatic Categories to All Changed AMMs to 1-19b Changed Effects Remaining to These avoidance measures will minimize and reduce effects of the action, but not completely eliminate the threat Changed Determination to LAA