TETRA TECH

May 26, 2016

John Taucher
PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110

Subject: **PGC ID Number: 201312180001**
Request for Effects Determination Concurrence Update
Sunoco Pipeline, L.P. - Pennsylvania Pipeline Project

Dear Mr. Taucher:

Tetra Tech, Inc. (Tetra Tech) has been retained by Sunoco Pipeline, L.P. (SPLP) to conduct environmental field surveys and permitting services for the Pennsylvania Pipeline Project (PPP) or Project. On behalf of SPLP, Tetra Tech is providing an update to the Project's Allegheny Woodrat Conservation Plan in response to additional correspondence with Pennsylvania Game Commission (PGC) and discussions with the Department of Conservation and Natural Resources (DCNR). This request is an update to the previously submitted requests seeking Project concurrence of no impact determinations submitted on July 17, 2015 and January 15, 2016 for the Northern harrier, silver-haired bat, small-footed bat, potential bat hibernacula, and the Allegheny woodrat.

Allegheny woodrats and their habitats and eastern small-footed bats and their habitats are documented as occurring at several sites in and in the vicinity of the Project areas. Project related coordination with PGC yielded information on known Allegheny woodrat and eastern small-footed bat habitat sites so that early planning for avoidance and minimization could be considered. Early in the project planning, SPLP went to great lengths to avoid and minimize direct and indirect impacts to Allegheny woodrats and their habitats and eastern small-footed bats and their habitats as presented within the conservation plans submitted on January 15, 2016.

After review of those plans, PGC outlined its initial determination in regards to impacts to the Allegheny woodrat and eastern small-footed bat in correspondence with Preston Smith of Tetra Tech. PGC provided concurrence with most of the survey findings and avoidance measures in both conservation plans submitted on January 16, 2016. SPLP received additional comments from the PGC and DCNR as part of the land acquisition process after the submission of the Allegheny Woodrat Conservation Plan on January 15, 2016. SPLP has revised this Plan (Attachment) to address these concerns. The revised Plan includes the following conservation measures and commitments to satisfy PGC and DCNR requirements on lands they administer.

SPLP has committed to minimize mowing and the use of pesticides, as well as eliminate the use of blasting in all woodrat habitat areas. SPLP has implemented a route change by moving the proposed route to the northern side of the existing ROW to minimize impacts that could potentially occur to the woodrat population at the Jacks Mountain 3 habitat area, located on State Game Lands 71 (Figure 2-2 of the Attachment). SPLP has also agreed to implement the following conservation measures outlined in the document titled, "Sunoco – Pennsylvania Pipeline SGL 71

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Woodrat Mitigation Plan" provided within Appendix A of the revised Allegheny Woodrat Conservation Plan. SPLP will perform 300 plantings comprised of species that can benefit the Allegheny woodrat and ensure a 70% survival rate for 3 months after planting. Additionally, SPLP will construct travel corridors in the form of rock structures to allow woodrats to safely cross the existing and proposed ROW in this area.

Based on discussions with DCNR, SPLP will implement conservation measures at the Bowers Mountain 2 habitat area located within the Tuscarora State Forest (Figure 2-4 of the Attachment). These conservation measures will follow the DCNR's Woodrat Habitat Plan Parameters which are provided in Appendix D of the revised Allegheny Woodrat Conservation Plan. These measures include maintaining currently existing habitat by minimizing mowing and the use of herbicides and enhancing currently existing woodrat habitat by creating rock piles for cover and planting a fenced-in food plot with mast producing species. SPLP will also ensure that the new pipeline is installed parallel and directly adjacent to the existing pipeline and that any additional disturbance will occur on the Southern side of the existing ROW in this area. Finally, SPLP will conduct a study at the Bowers Mountain 2 habitat area to monitor the nightly movements of woodrats using radio telemetry methods in order to better understand the impacts of this project.

Habitat surveys for small-footed bats identified 1.7 acres of habitat within the proposed LOD. SPLP originally proposed to prevent small-footed bats from accessing summer roosting habitat within the Project LOD to avoid any chance of incidental take that could occur during construction activities. To accomplish this, SPLP proposed to seal off these areas using a geotextile material such as silt fencing, mesh screening, or other appropriate materials. With PGC concurrence, SPLP has prevented potential impacts to eastern-small footed bats by sealing off entrances, cracks, and crevices to potential summer roosting habitat areas within the Project LOD prior to emergence from hibernation (April 1). Twenty seven habitat areas totaling approximately 1.7 acres within the Project LOD were sealed off using geotextile materials to prevent eastern small-footed bats from entering potential summer roosting habitat within the LOD. Additionally, several cracks and crevices at two of the habitat areas that also contained overwintering habitat were left uncovered to allow for the emergence of any potential hibernating bats. One-way doors were also installed at these habitat areas as an additional means for potential hibernating bats to emerge.

As an additional mitigation measure following the completion of construction, SPLP proposed to construct new roosting structures as close to the areas of impacted areas as possible. SPLP proposed to construct twenty new roosting structures along temporary Right of Ways (ROWs), access roads, or temporary workspaces, or in areas adjacent to these spaces based on an evaluation of the landscape. These structures will be monitored for use for a period of three years or until bats are seen emerging from the structures.

Based on the information provide herein, the previously provided survey reports, previously provided eastern small-footed bat conservation plan, the attached revised Allegheny woodrat conservation plan, what is known about the presence and/or potential presence of the Allegheny woodrat and the eastern small-footed bat in the vicinity of the project areas, and SPLP's commitments to the protection and conservation of these species, it is Tetra Tech's conclusion that the PPP is not likely to impact the Allegheny woodrat and eastern small-footed bat. Additionally, on July 17, 2015 PGC was provided with an initial request seeking Project concurrence with a no impacts determination that addressed the Northern harrier, silver-haired

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bat, and potential bat hibernacula within the Project area. On behalf of SPLP, Tetra Tech would like to request the PGC's concurrence with these no impact determinations for the Northern harrier, silver-haired bat, potential bat hibernacula, eastern small-footed bat, and the Allegheny woodrat to satisfy State permit requirements.

Thank you for your assistance in this matter and we look forward to your review and concurrence. If you have any questions regarding this request, please feel free to contact me at 412.921.8167 or preston.smith@tetratech.com.

Sincerely,

Preston R. Smith
Manager, Wetlands and Ecological Services Department

Attachment:

Allegheny Woodrat Conservation Plan

CC: Christopher Embry, Sunoco Logistics
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ATTACHMENT

Allegheny Woodrat Conservation Plan

Allegheny Woodrat (*Neotoma magister*) Conservation Plan

Pennsylvania Pipeline Project

Prepared for:

Sunoco Logistics, L.P.
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Sinking Spring, PA 19608

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Submitted to:

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May 2016

TABLE OF CONTENTS

LIST OF FIGURES

Figures

LIST OF APPENDICES

Appendix

LIST OF ACRONYMS and ABBREVIATIONS

ACRONYM	MEANING
AC	Activity Center
ATWS	Additional Temporary Workspaces
ft	Foot or Feet
G3	Global Vulnerable
HDD	Horizontal Directional Drill
LOD	Limit of Disturbance
LE	Federal Listed Endangered
m	Meter
NGL	Natural Gas Liquid
PA	Pennsylvania
PAC	Potential Activity Center
PGC	Pennsylvania Game Commission
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
Project	Pennsylvania Pipeline Project
PPP	Pennsylvania Pipeline Project
PT	Pennsylvania Threatened
ROW	Right-of-Way
S2	State Imperiled
SPLP	Sunoco Pipeline, L.P.
Tetra Tech	Tetra Tech Inc.
Wildlife Specialists	Wildlife Specialists, Inc.

1.0 INTRODUCTION

On behalf of Sunoco Pipeline L.P. (SPLP), Tetra Tech, Inc. (Tetra Tech) has prepared this Allegheny woodrat (*Neotoma magister*) Conservation Plan for the Pennsylvania Pipeline Project (PPP or Project). This plan will be used to provide and implement the measures that are necessary to avoid, minimize, and mitigate for potential impacts to the Allegheny woodrat which is protected as a threatened species under the Game and Wildlife Code (PGC 2010). This plan was developed based on correspondence with the Pennsylvania Game Commission (PGC) and information regarding the biology and habitat preferences of the Allegheny woodrat. In addition, special provisions for woodrat habitat occurring on the Tuscarora State Forest and State Game Land 71 are also provided. This plan describes the project, survey results, impacted habitat within the project area, and discusses the avoidance, minimization, and mitigation measures that will be used to conserve the Allegheny Woodrat.

1.1 PROJECT DESCRIPTION

SPLP proposes to construct and operate the Pennsylvania Pipeline Project to expand existing pipeline systems and provide natural gas liquid (NGL) transportation of up to 350,000 barrels per day. The Project involves the phased installation of approximately 561 miles of two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Twin Oaks facility in, Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. Initially, a 20-inch diameter pipeline would be installed within the ROW from Houston, PA to the Twin Oaks facility (306 miles) and a second, up to 20-inch diameter pipeline, is proposed be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Twin Oaks facility, paralleling the initial line for approximately 255 miles. This plan has been written for the 255 mile portion of the proposed line between Delmont and the Twin Oaks Facility. The Project location is shown on Figure 1.

The Project will provide transportation service for up to 700,000 barrels of NGL per day from the Utica and Marcellus Shale formations for both domestic and international markets. The Project will transport propane, butane, and ethane across Pennsylvania. SPLP's upstream customers currently extract natural gas in the form of methane from the aforementioned geologic formations for distribution to the community. The natural gas extracted for this Project will provide fuel that is used for power generation, heating, and cooking. NGLs are separated from the natural gas stream before it is shipped on the natural gas piping network. Upstream shippers are currently limited by the shortage of NGL transport systems. In addition, the Project will provide along its route across Pennsylvania various exit points for the supply of desperately needed propane, at affordable prices to local distributors. This is especially helpful during peak demand periods when there would otherwise be a shortage of supplies. Finally, upon completion, the Pennsylvania Pipeline Project will promote sustained economic development and jobs-creation throughout Pennsylvania.

1.2 LAND REQUIREMENTS

The proposed Project would result in temporary access during the construction period of proposed facilities. Construction of the pipeline would require a 75-foot wide Right-of-Way (ROW) that would contain a 50-foot wide post-construction ROW that is permanently maintained and a 25-foot wide temporary workspace that would be used to facilitate the installation of the pipelines. Following installation, the 25-feet temporary workspace unit would be restored and allowed to return to its pre-construction state unless it is within an existing, permanently maintained ROW. Additional temporary work space (ATWS) would also be needed at some areas to facilitate construction. Sizes of these workspaces would depend on site-specific requirements. All Workspaces would be clearly defined within project mapping and within agency and municipality applications. Following construction, ATWS's would be restored and allowed to return their pre-construction state unless they are within an existing, permanently maintained ROW.

Construction of the Project's aboveground facilities and the use of non-public access roads would have land requirements. New pump stations would generally require 3-4 acres of land and modifications to existing pump stations would require 2-3 acres of additional land. Support sites, such as pipe/contractor yards, are to be sited on previously disturbed areas and generally range from 5-15 acres in size. Temporary use would primarily be limited to existing non-public roads, driveways, and farm lanes that may require improvements. Permanent access roads to stations or valve settings may also be required. All proposed temporary and permanent access roads would be clearly defined within project mapping and within agency and municipality applications. Following construction, temporary work spaces would be restored and allowed to return their pre-construction state unless they are within an existing, permanently maintained ROW.

2.0 ALLEGHENY WOODRAT BIOLOGY AND HABITAT PREFERENCES

The Allegheny woodrat is a solitary, nocturnal mammal measuring about 255-millimeters (mm) in length (Newcombe 1930, Poole 1940, Manjerovic 2004, Castelberry et al. 2006). It is mostly an herbivorous species but will occasionally incorporate fruit into its diet (Castleberry et al. 2002a, 2002b). The woodrat has brown-gray fur on its back and white hair on the underside which extends to the end of its tail that is also fur-covered (Poole 1940, Castleberry et al. 2006).

The Allegheny woodrat is globally ranked as G3 (Global Vulnerable), state ranked as S2 (State Imperiled), and its Pennsylvania status is Pennsylvania Threatened (PT) (Pennsylvania Natural Heritage Program [PNHP] 2015). Allegheny woodrats are found throughout the Appalachian Mountains ranging south to Alabama, west to Tennessee, east to North Carolina, and north to New Jersey (Godwin 1932, Poole 1940, Castleberry et al. 2006, Wright 2008). The current distribution in Pennsylvania is not fully understood as the Allegheny woodrat is found in metapopulations throughout the state may vary between years (Butchkoski 2003, Castelberry et al. 2006, Butchkoski 2012). The Allegheny woodrat can normally be found in rocky habitats on very steep slopes that have cliffs, large rocks, caves, and rocky outcrops (Newcombe 1930, Poole 1940, PGC 2010). Vegetation surroundings may be coniferous, deciduous, or a mixture and mast-producing trees are an important source of food (PGC 2010).

3.0 HABITAT SURVEYS AND RESULTS

In a March 14, 2014 response to a Large Project Pennsylvania Natural Diversity Inventory (PNDI) request for the PPP (Appendix A), the PGC identified 16 areas of project intersection where suitable rocky habitat occurs in mountainous areas of Indiana, Cambria, Blair, Huntingdon, Perry, and Cumberland Counties. After that correspondence, the Altoona Bypass in Cambria and Blair counties represented a large reroute of the Project and potential habitat surveys were conducted along this entire rerouted section. Based on this correspondence with the PGC, Tetra Tech contracted Wildlife Specialists, Inc. (Wildlife Specialists) to complete detailed Allegheny woodrat habitat surveys within the survey areas identified by the PGC and along the entire Altoona Bypass. The purpose of the field surveys was to refine the general surveys areas into woodrat habitat polygons and identify specific sites within those areas with woodrat sign or with specific characteristics. A report of the 2014 and 2015 surveys for the Project was previously provided to the PGC for review. Wildlife Specialists' biologists conducted the field surveys between June 23 and July 24, 2014 and April 15-28, 2015 and in accordance with PGC's *Neotoma magister (=NEMA) Habitat Site Survey Code Manual* (Revision date 02/20/2009).

Field surveys were performed in the 16 survey areas identified by the PGC and along the entire Altoona Bypass reroute within a 200-meter (m) buffer centered on the proposed pipeline centerline and wherever the Project limits of disturbance (LOD) extended beyond that buffer. The LOD included all proposed workspaces involving new land disturbances, including the permanent ROW, temporary workspaces, access roads, pump stations, and staging areas. Surveyed area characteristics varied from rocky, mature deciduous forest with high canopy closure to open talus slopes. During this effort woodrat habitat was mapped within the general survey areas and Activity Centers (AC) and Potential Activity Centers (PAC) point locations were identified and characterized within the woodrat habitat polygons. ACs were defined as site locations with recent (past 5 years) woodrat latrine sites, food caches, and/or nests, and Potential Activity Centers (PACs) defined as site locations with typical AC characteristics, however no recent field sign was identified. All Allegheny woodrat habitat polygons and ACs and PACs site locations were mapped and any observed evidence of woodrat occurrence was recorded. More specific information on the identification of ACs and PACs can be found in the in the *Neotoma magister (=NEMA) Habitat Site Survey Code Manual.*

Field surveys identified that each of the 16 survey areas identified by the PGC contained at least one suitable woodrat habitat polygon and at least one PAC. In addition, two suitable habitat polygons and two PACs were located along the Altoona Bypass reroute. However, ACs with evidence of woodrat occupation within the past 5 years including an old-midden cache, old caches, fresh caches, latrines, and nests were limited to four woodrat habitat areas containing a total of eight ACs. These four woodrat habitat areas included Jacks Mountain 2, Jacks Mountain 3, Blacklog Mountain, and Bowers Mountain 2. (Figures 2-1 to 2-4). The Jacks Mountain 3 site is located on the Pennsylvania State Game Commission (PGC) managed State Game Land (SGL) 71 and the Bowers Mountain 2 site is located on the Department of Conservation and Natural Resources (DCNR) managed Tuscarora State Forest. Jacks Mountain 2 and Blacklog Mountain are located on private property. Specific evidence of woodrat presence observed during the survey effort and site characterizations can be found in Wildlife Specialists' Allegheny Woodrat and Eastern Small-footed Bat Habitat Survey Report.

4.0 MITIGATION MEASURES

Woodrat habitat polygons intersecting with project areas and containing at least one AC were considered to be Occupied Woodrat Habitat for the purposes of mitigation planning. While other woodrat habitat polygons were found to have at least one PAC, field sign is not recent enough to consider the site as occupied. With this understanding and PGC's guidance, SPLP focused its mitigation planning at those sites with recent activity and includes the Jacks Mountain 2, Jacks Mountain 3, Blacklog Mountain, and Bowers Mountain 2 habitat areas (Figures 2-1 to 2-4). SPLP utilized the PGC's document titled, "Allegheny Woodrat (*Neotoma magister*) The Environmental Review Process for Pennsylvania", which is included as Appendix B, as well as direct consultations with the PGC and DCNR to assist with development of this Conservation Plan. The following sections outline SPLP's pre-construction and post-construction avoidance, minimization, and mitigation measures to minimize impacts to this species.

4.1 PRE-CONSTRUCTION

From the onset of the Project, SPLP has instructed project designers to consider environmental impacts in regard to all aspects of the proposed Project and to avoid and minimize wherever possible while allowing safe installation. Pipeline engineers were provided a large list of restrictions, recommendations, and requirements to consider during the design phase. Major considerations, where co-location with existing utility corridors, limiting the construction corridor to the minimum amount practicable, use of Horizontal Directional Drilling (HDD) technology, and avoidance and minimization at sensitive habitats.

SPLP has co-located the project alignment with an existing SPLP ROW for approximately 80% of the route so that this existing ROW could be utilized as workspace. With the use of portions of the existing ROW for construction, this is a major means for avoiding new impacts to sensitive resources (i.e., forested wetlands, forest areas, streams) and for minimizing environmental impacts for the entire Project. SPLP has also co-located with foreign utility lines whenever possible when routing pulls away from the existing SPLP ROW. In addition, SPLP has implemented a number of route variations through environmental feedback, both minor and major, to further reduce the impacts associated with the Project. Many of these route variations are driven by environmental factors such as avoidance of forested wetlands or areas occupied by sensitive species such as the Allegheny woodrat. One of the route variations made was to conserve and protect the woodrat population at the Jacks Mountain 3 Habitat Area, located on State Game Lands 71 (Figure 2-2). This route change consisted of moving the proposed route to the northern side of the existing ROW to minimize impacts that could potentially occur to this woodrat population.

In general, the construction ROW is limited to 75-ft in most areas. This is comprised of a 50-ft-wide permanent easement and 25-ft of temporary workspace required to facilitate construction. In some areas, additional temporary workspace is required to facilitate construction. The industry standard for installation of this size of pipe is 100-ft. Restricting construction to 75-ft significantly reduces impacts to the landscape including a large reduction in impacts to forested areas. Instead of continuing through the wetlands/streams with the 75-ft-wide construction ROW, SPLP has narrowed the construction ROW to 50-ft for all wetland/stream crossings thus minimizing temporary impacts to these resources during construction. This narrow construction corridor, along with co-location efforts has greatly minimized fragmentation of habitat impacts.

As stated in the Allegheny Woodrat (*Neotoma magister*) The Environmental Review Process for Pennsylvania document, the criteria used to determine if it is appropriate to create woodrat habitat are: the area is in a forest interior setting with acorn producing species present, the area is within 3 miles of an active woodrat population that is connected to the creation site by a travel corridor, the area has a steep slope with supporting talus slopes and rock outcrops immediately adjacent to the site, or no forest fragmentation (highways, developments, etc.) is within 1.25 miles. Pre-construction field surveys were performed at 16 survey areas identified by the PGC and along the entire Altoona Bypass reroute. Only four of the survey areas were found to have Occupied Woodrat Habitat identified by the criteria above and the presence of ACs; Jacks Mountain 2, Jacks Mountain 3, Blacklog Mountain, and Bowers Mountain 2 (Figures 2-1 to 2-4). These areas have 1.7, 0.7, 0.1, and 2.4 acres of identified Occupied Woodrat Habitat, respectively, within the proposed LOD that would be impacted by Project construction. Construction related

mitigation procedures for these areas are described in section 4.2 and post-construction related mitigation procedures are described in section 4.3.

At the special request of the DCNR, prior to construction, SPLP will hire a qualified woodrat biologist to live trap for 4 nights with 40 traps (e.g., 160 trap nights) on the southern side of the existing pipeline at the Bowers Mountain 2 habitat area, located within the Tuscarora State Forest (Figure 2-4). Traps will be placed up to 50 feet from the existing pipeline within suitable habitat and be conducted in accordance with the PGC's Allegheny Woodrat (*Neotoma magister*) Survey protocol (Appendix C). Up to 10 captured woodrats will be fitted with a radio telemetry transmitters that allow tracking of movements and survival. To better understand any potential impacts of habitat alteration, each woodrat will be tracked nightly using radio telemetry methods for a minimum period of 3 weeks to begin the night immediately following the attachment of the transmitter. The tracking period will be planned to include a period of a minimum of 10 days prior to and 11 days after initial land disturbance. A report summarizing the nightly movements of each woodrat will be provided to the PGC and DCNR upon completion of the study.

4.2 CONSTRUCTION

During construction, the work areas will be cleared of vegetation and rocks within the four occupied habitats to the minimum extent practicable that allows safe installation of the pipelines. Figures 2-1 to 2-4 depict the LODs intersecting with occupied habitats and represents the maximum level of disturbance. After installation and during grading back, windrowed rocks would be restored to pre-existing conditions to the maximum extent within these areas while allowing for safe operation of the pipeline. In particular, a clear travel lane for vehicle access will remain that is parallel and adjacent to the installed pipelines to allow repair and inspection.

As stated in Section 4.1, at the Bowers Mountain 2 habitat area, any radio-tagged woodrats would be tracked through construction for a minimum of 11 days after the initial land disturbance. No herbicide use and no blasting will take place in the vicinity of woodrat habitat on DCNR property during the construction process. SPLP will also hire a trained woodrat biologist to be present during the construction phase to ensure that all mitigation measures required by the PGC and DCNR will be implemented at the Bowers Mountain 2 location (Figure 2-4).

4.3 POST-CONSTRUCTION

SPLP will enhance, restore, and create woodrat habitat at four occupied habitats intersected by project workspaces. SPLP will create new potential woodrat habitat in the form of rock structures at the four occupied habitat project intersects following the criteria stated in the PGC's Allegheny Woodrat (*Neotoma magister*) The Environmental Review Process for Pennsylvania document. Six rock structures are proposed to be built within the four areas. A single structure is planned for the Jacks Mountain 2 habitat area (Figure 2-1), two structures for the Jacks Mountain 3 habitat area on SGL 71 (Figure 2-2), a single structure for Blacklog Mountain (Figure 2-3), and two structures for Bowers Mountain 2 habitat area on the Tuscarora State Forest (Figure 2-4). Except at the Bowers Mountain 2 habitat area, all structures will be constructed within temporary workspace adjacent to the permanent easement/license agreement. At the Bowers Mountain 2 habitat area the structures will traverse the existing 8-inch pipeline ROW and this proposed easement, however gaps will need to be placed at the intersection of the structure with existing pipelines and along a travel lane (Figure 2-4).

The structures to be created will be at least 5-ft in height, and contain boulders at least 3-ft in diameter that will be arranged to maximize the amount of openings present. The structures will be approximately 25 feet long and 10 feet wide for those proposed at Jacks Mountain 2, Blacklog Mountain, and Bowers Mountain 2. The two structures acting as travel corridors at Jacks Mountain 3 will be approximately 15 feet wide and have lengths of approximately 86 feet and 75 feet due to the angles of the existing ROW and new ROW. If possible, underground openings will be utilized to create the deepest caverns possible. Using flat rocks, as many flat ledges as possible will be created to be used for latrines and food caches. Smaller boulders will also be placed around the edges of the core habitat. The construction of these structures will be overseen by a trained biologist who has performed woodrat surveys and is familiar with their habitat characteristics and needs.

The Jacks Mountain 3 habitat area and associated ACs occur on PGC-administrated SGL 71. In addition, to the two rock structures, PGC has requested additional measures at this location as outlined in the PGC authored mitigation plan provided on May 9, 2016 titled "Sunoco – Pennsylvania Pipeline SGL 71 Woodrat Mitigation Plan" (Plan). This Plan is included as Appendix D. As a condition of this Plan, SPLP will plant 300 Pennsylvania seedlings comprised of seven species American chestnut (*Castanea dentata*), common (black) elderberry (*Sambucus nigra* [syn. *canadensis*]), blackberry (*Rubus allegheniensis*), smooth gooseberry (*Ribes hirtellum*), American black currant (*Ribes americanum*), devil's walking stick (*Aralia spinosa*), and American hazelnut (*Corylus americana*). Of those seedlings, 100 must be American chestnut (*C. dentata*) and at least 100 must be common (black) elderberry (*S. canadensis*). PGC identified a 62.4 acre area where the plantings are to occur (Figure 2-2). A smaller 16.4 acre subset of the area must have 50-percent of the 300 total plantings. PGC also stipulates that seedlings will be protected with plastic tree tubes and a semi-permanent tag will be attached to each seedling. A survival rate of at least 70% of all plantings is necessary to meet the mitigation requirement. If a survival rate of 70% is not achieved at 3 months after the initial planting, additional plantings will be performed the following March and April. Seedlings will be transported, stored, and planted according to the specifications listed in the Plan document. All seedling planting locations will be recorded and provided to PGC. SPLP will notify PGC at least three days prior to beginning any work and will have a representative present at all times during the project to ensure project personnel comply with all SGL rules and regulations.

Similar to the Jacks Mountain 3 site on SGL 71, DCNR has requested additional mitigation measures to offset impacts to woodrat habitat. At the Bower's Mountain 2 habitat area within the Tuscarora State Forest, SPLP will enhance existing occupied habitat areas by cutting undesirable tree species such as birch (*Betula* sp.) and maple (*Acer* sp.) and planting mast producing species such as hawthorn (*Crataegus* sp.), black oak (*Quercus velutina*), scrub oak, and American mountain ash (*Sorbus americana*). These cuttings and plantings will be limited to the portions of the identified occupied habitat polygons identified in Figure 2-4 that occur outside of the LOD and represents a total of 28.4 acres. Approximately 139 seedlings will be planted in accordance with the PGC protocols listed above for SGL 71. In the temporary workspaces that intersect with the occupied woodrat habitat, SPLP will include plantings of mast producing species such as sassafras (*Sassafras albidum*), grape (*Vitis* sp.), black gum (*Nyssa tupelo*), sumac (*Rhus* sp.) and pitch pine (*Pinus rigida*) during restoration. These areas total approximately 1 acre and no more than 80 seedlings will be planted in these areas.

SPLP will also create a ¼ acre food plot on the southern side of the existing ROW adjacent to existing woodrat habitat by removing undesirable species that are mentioned above and planting a diverse community of mast producing species which will include grey dogwood (*Cornus racemose*), arrow-wood viburnum (*Viburnum dentatum*), nannyberry (*Viburnum lentago*), maple-leaf viburnum (*Viburnum acerifolium*), black-haw (*Viburnum prunifolium*), hawthorn, beaked hazelnut (*Corylus cornuta*), scrub oak (*Quercus ilicifolia*), black oak, flowering dogwood (*Cornus florida*), silky dogwood (*Cornus amomum*), chokeberry (*Aronia* sp.), American mountain ash, and hybrid chestnuts (*Castanea* sp.). If plantings do not maintain a 75% survival rate through the second growing season following construction, additional planting will be performed. The food plot will be gated with a new steel gate and fenced off to prevent deer from grazing in it. The area to be fenced and the number of gates will be determined by the district forester. The new steel gates will serve as access for the food plot and for the future access of the ROW. Finally, following construction in this area, vegetation will be allowed to grow adjacent to the ROW and the ROW will be seeded with a DCNR warm-season mix. A report thoroughly documenting these mitigation efforts will be prepared and submitted to the PGC within three months following construction of the habitat structures.

5.0 CONCLUSION

This Allegheny Woodrat Conservation Plan for the Pennsylvania Pipeline Project provides SPLP's commitment to mitigation measures to prevent permanent impacts to the woodrat within the Project area. SPLP has conducted extensive background and field survey to identify Allegheny woodrat occurrence and habitats within and adjacent to all Project work areas. These surveys provided the foundation for the development of this plan.

SPLP has implemented several measures as a standard practice to reduce impacts to sensitive resources including those to Allegheny woodrat habitat. These include co-locating the project alignment with an existing SPLP ROW for approximately 80% of the route and limiting the construction ROW to 75-ft in most areas. This narrow construction corridor, along with co-location efforts has greatly minimized the fragmentation of habitats. SPLP has committed to minimizing mowing and the use of herbicides, as well as eliminating the use of blasting in all woodrat habitat areas. SPLP has also committed to mitigating for unavoidable impacts to Allegheny woodrat habitat by creating six new habitat structures along the PPP (Figures 2-1 to 2-4).

SPLP has committed to several conservation measures at the Jacks Mountain 3 habitat area, located on State Game Lands 71 (Figure 2-2). SPLP has implemented a route change by moving the proposed route to the northern side of the existing ROW to minimize impacts that could potentially occur to the woodrat population in this area. Additionally, following the procedures outlined in the Sunoco – Pennsylvania Pipeline SGL 71 Woodrat Mitigation Plan document, SPLP has committed to planting 300 seedlings comprised of species that are beneficial to woodrats and constructing two travel corridors in the form of rock structures to provide woodrats with safe travel across the ROW in this area.

SPLP will also implement the DCNR's Woodrat Habitat Plan Parameters provided in Appendix E at the Bowers Mountain 2 habitat area located within the Tuscarora State Forest (Figure 2-4). These measures include maintaining currently existing habitat by minimizing mowing and the use of herbicides and enhancing currently existing woodrat habitat by creating rock piles for cover and planting a fenced-in food plot with mast producing species. SPLP will ensure that the new pipeline is installed parallel and directly adjacent to the existing pipeline and that any additional disturbance will occur on the Southern side of the existing ROW in this area. Finally, SPLP will conduct a study at the Bowers Mountain 2 habitat area to monitor the nightly movements of woodrats using radio telemetry methods in order to better understand the impacts of this project.

Based on SPLPs commitments to the protection and conservation of the Allegheny woodrat and what is known about the presence and/or potential presence of the species in the vicinity of the Project area, we conclude that the PPP is not likely to impact the Allegheny woodrat.

6.0 REFERENCES

Allegheny Woodrat (*Neotoma magister*). 2008. The Environmental Review Process for Pennsylvania

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FIGURES

Mariner East System

Sunoco Logistics

Mariner East Pipeline - Pennsylvania Pipeline Project

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project (Project) that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation of up to 350,000 barrels per day. The Project involves the phased installation of approximately 306 miles of two parallel pipelines from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. Initially, a 20-inch diameter propane/butane pipeline would be installed within a 50-foot-wide right-of-way (ROW) and a second, up to 20-inch diameter, ethane pipeline would be constructed in the same ROW within 5 years.

Buffalo District USACE

PADEP Northwest Regional Office

PADEP Northcentral Regional Office

PADEP Southwest Regional Office

Pittsburgh District USACE

PADEP Southcentral Regional Office

Baltimore District USACE

PADEP Southeast Regional Office

Philadelphia District USACE

Norfolk District USACE

Legend

- Proposed Centerline
- USACE Districts
- State Boundary
- County Boundary

PADEP Regions

- Northcentral
- Northeast
- Northwest
- Southcentral
- Southeast
- Southwest

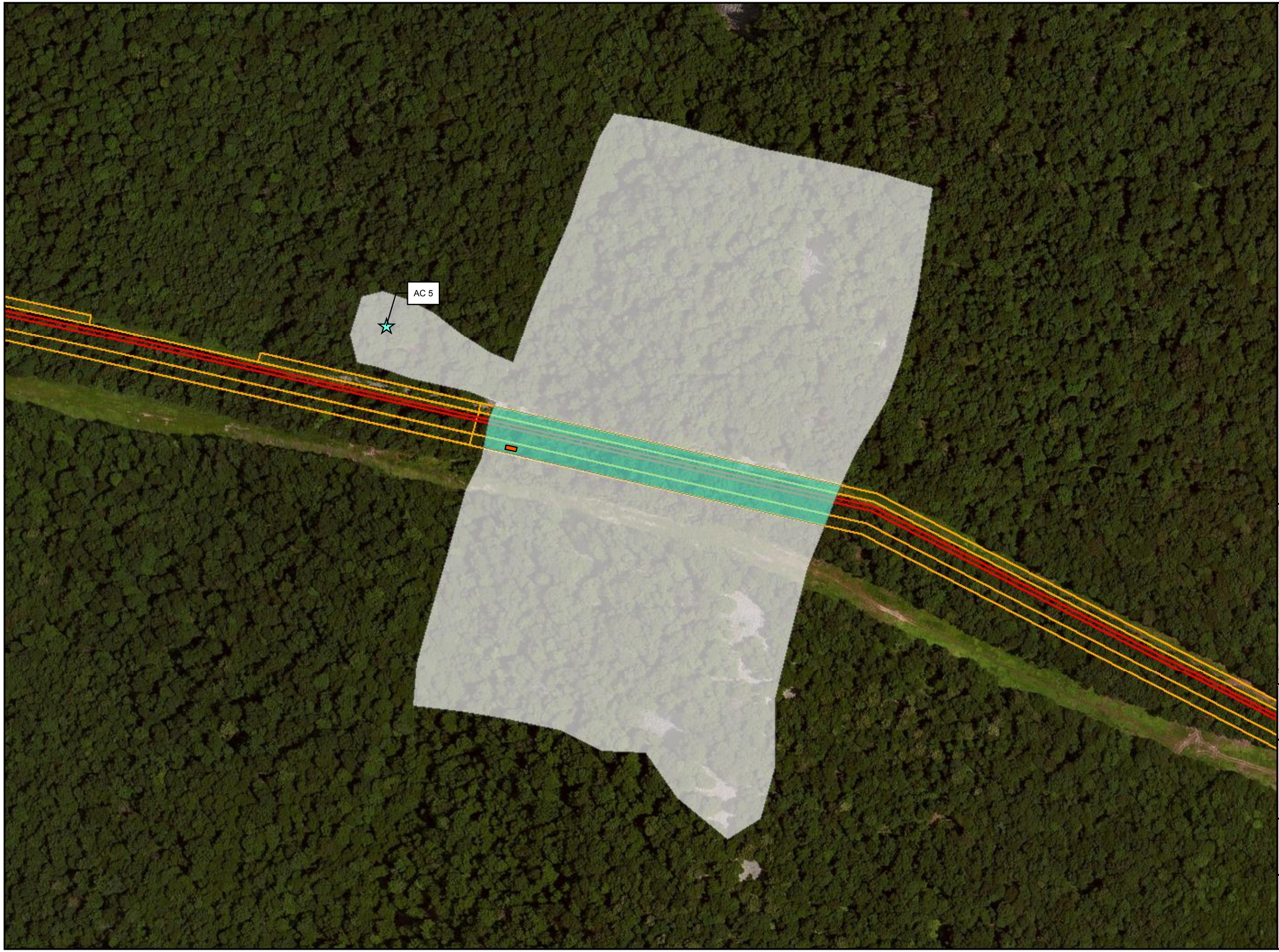
Miles

0 10 20 30 40 50

N W E S

Source: World Street Map from ESRI Online. USACE Districts from USACE. State and County Boundaries from ESRI.

P:\GIS\Projects\Sunoco\MXD\Phase\PPP_Overview12112014



Legend

- 2015 Activity Center
- Proposed Habitat Structure
- Impacted Woodrat Occupied Habitat
- Non-Impacted Woodrat Occupied Habitat
- Access Road
- Alignment Centerline
- Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

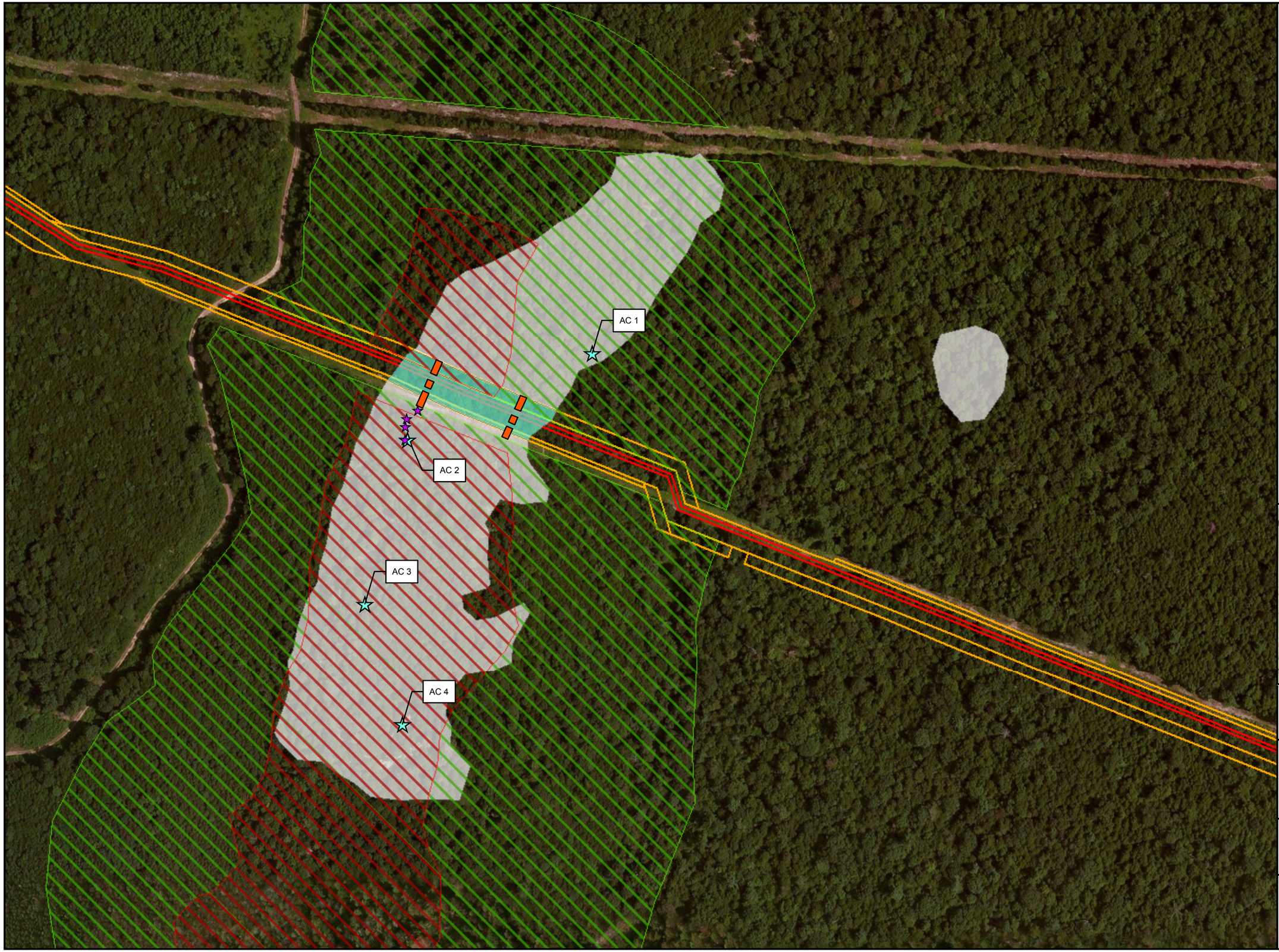
FIGURE 2-1
JACKS MOUNTAIN 2 HABITAT AREA

PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENN\PIPELINE_WO\ODRAT.MXD 05/17/16 GIS



Legend

- 2016 Activity Center
- 2015 Activity Center
- Proposed Habitat Structure
- Post-Construction Seedling Plantings - 150 qty
- Post-Construction Seedling Plantings - 150 qty
- Impacted Woodrat Occupied Habitat
- Non-Impacted Woodrat Occupied Habitat
- Access Road
- Alignment Centerline
- Limit of Disturbance

Sheet Identifier

N

Feet
0 100 200

Meters
0 30.48 60.96

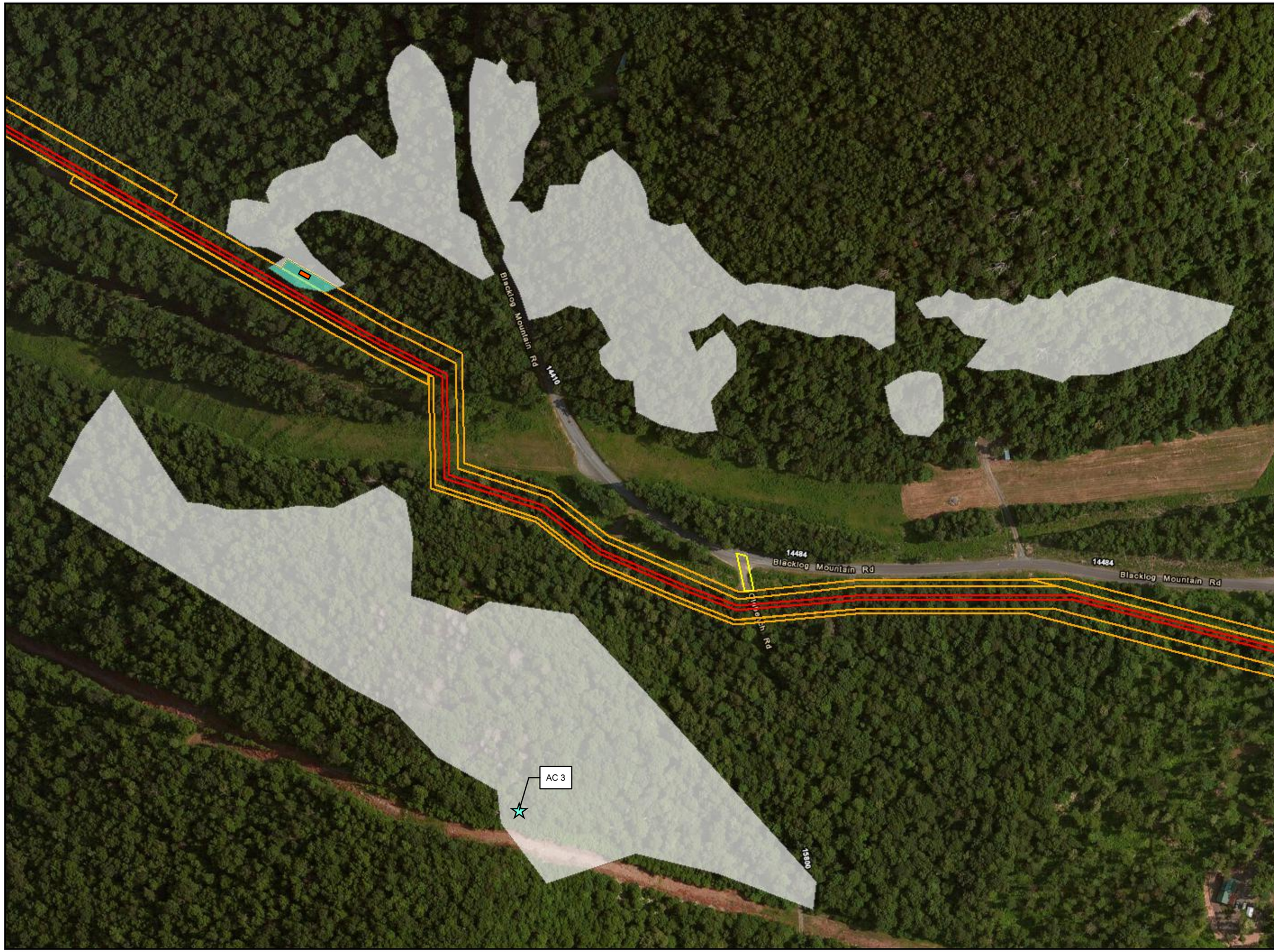
FIGURE 2-2
JACKS MOUNTAIN 3 HABITAT AREA

PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_WOODRAT.MXD 05/18/16 GIS



Legend

- 2015 Activity Center
- Proposed Habitat Structure
- Impacted Woodrat Occupied Habitat
- Non-Impacted Woodrat Occupied Habitat
- Access Road
- Alignment Centerline
- Limit of Disturbance

Sheet Identifier

N

Feet
0 100 200

Meters
0 30.48 60.96

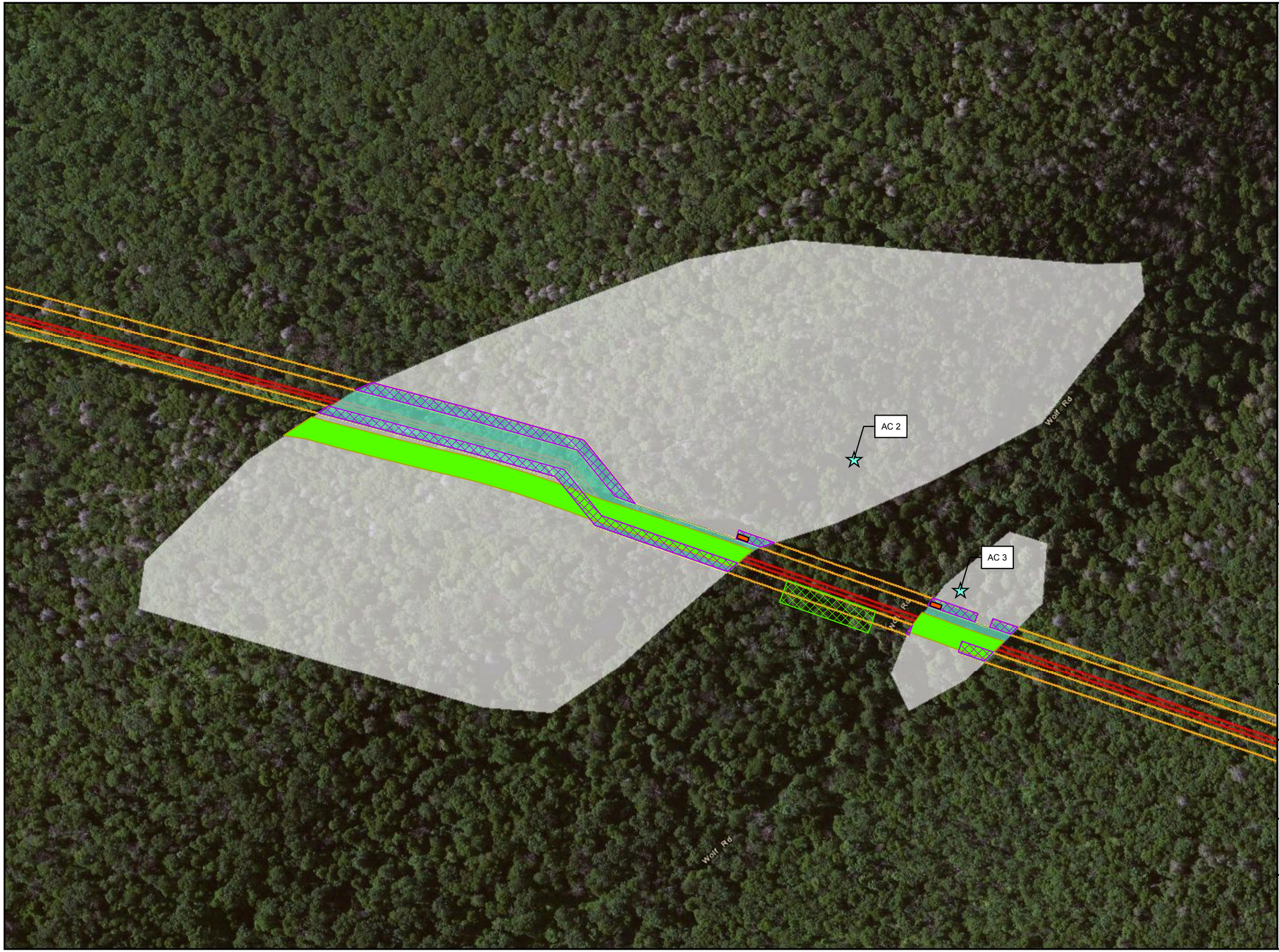
FIGURE 2-3
BLACKLOG MOUNTAIN HABITAT AREA

PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_WOODRAT.MXD 05/17/16 GIS



Legend

- 2015 Activity Center
- Proposed Habitat Structure
- Woodrat – Food Plot Planting Area
- Woodrat – Vegetation Restoration Area
- Woodrat - Live Trapping Zone
- Impacted Woodrat Occupied Habitat
- Non-Impacted Woodrat Occupied Habitat (Woodrat Habitat Enhancement Area)
- Access Road
- Alignment Centerline
- Limit of Disturbance

Sheet Identifier

N

Feet
0 100 200

Meters
0 30.48 60.96

FIGURE 2-4
BOWERS MOUNTAIN 2 HABITAT AREA

PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

Notes:
1) Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).

PGH PGIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_WOODRAT.MXD 05/17/16 GIS

APPENDIX A

Agency Coordination

From: Taucher, John
To: Smith, Preston
Subject: RE: Pennsylvania Pipeline Project
Date: Tuesday, October 27, 2015 8:40:46 AM
Attachments: 2014 Eastern Small-footed Bat Roost Structures and Examples_081214.pdf

---

Preston,

Attached, please find a guidance for the alternate roost structures for small-footed bats and some example photographs. Please note that the size of each structure is flexible, it should fit into the area and be constructed properly with adequate sun exposure. Generally these should be constructed as close to the actual impacts as possible, however they can be aggregated in some instances. Based on the shapefiles that delineated the small-footed habitat, it appears 1.7 acres of suitable habitat will be impacted. A mitigation rate of 3:1 will be implemented which yields 5 acres. Four structures are to be constructed per acre of impact which leaves a total of 20 structures for the project.

In addition, monitoring will be required for replacement structures in the form of emergence counts. Three years of monitoring or until small-footed bat use is documented, whichever comes first (i.e. if bats are found using it the first year, no further monitoring is required).

Regarding the woodrat, constructing habitat similar to the small-footed bat roost structures (just with larger crevices) and/or supplemental plantings would be sufficient for mitigation.

John

From: Smith, Preston [mailto:Preston.Smith@tetratech.com]
Sent: Monday, October 26, 2015 2:53 PM
To: Taucher, John <jotaucher@pa.gov>
Subject: RE: Pennsylvania Pipeline Project

Hi John,

Thanks for sending this. Do you have any examples of approved mitigation plans for small-footed bats or Allegheny woodrats that I could use as a guide?

I also got your letter for the mussels, fish, and redbelly turtle.

Thanks again,

Preston

Preston Smith | Manager, Wetlands and Ecological Services Department
Direct: 412.921.8167 | Main: 412.921.7090 | Cell: 724.516.6842 | Fax: 412.921.4040
preston.smith@tetratech.com

Tetra Tech, Inc. | Appalachian Basin Oil and Gas Services
661 Andersen Drive Foster Plaza No. 7 | Pittsburgh, PA 15220 | www.tetratech.com

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From: Taucher, John [mailto:jotaucher@pa.gov]
Sent: Monday, October 26, 2015 1:45 PM
To: Smith, Preston <Preston.Smith@tetratech.com>
Subject: Pennsylvania Pipeline Project

Preston,

I am working on updating the PGC's PNDI response letter regarding the Pennsylvania Pipeline Project based on the small-footed bat and woodrat information you provided. Regarding the eastern small-footed bats, suitable bat roosting habitat was identified and delineated within the proposed project. From here there are two options:

1) Small-footed bat use can be assumed, in which case there will be a seasonal restriction on the suitable habitat and any impacts to the habitat will need to be mitigated for.
2) Verify small-footed bat use at suitable habitat through emergence counts. Seasonal restriction and mitigation will be required for any habitat that small-footed bat use is verified only. All other areas there will be no restrictions or mitigation.

Regarding Allegheny woodrats, mitigation will only be required for impacts to sites where woodrat sign was found. Woodrat sign was found at four locations along the proposed pipeline. One location is located on State Forest property which will require coordination with DCNR.

A mitigation plan for both small-footed bats and woodrats will need to be submitted and approved by the PGC prior to issuing a resolution letter. If you have any questions, please do not hesitate to contact me.

Thanks,

John Taucher
Pennsylvania Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110
717-787-4250 ext. 3632
Fax 717-787-6957

APPENDIX B

Allegheny Woodrat (*Neotoma magister*) The Environmental Review Process for Pennsylvania

ALLEGHENY WOODRAT
(*Neotoma magister*)

THE ENVIRONMENTAL REVIEW PROCESS
for
PENNSYLVANIA

Prepared
By

Pennsylvania Game Commission
Bureau of Wildlife Habitat Management
& Bureau of Wildlife Management

June 2008

CONTENTS

APPENDIX

Allegheny Woodrat

Allegheny woodrats inhabit steep rocky/talus slopes, boulder fields, or caves in a forest interior matrix in the Appalachian mountain areas of Pennsylvania. The woodrat is less a "rat" then a large, native mouse living in areas sparsely populated by humans. The following guidelines have been developed to: ensure the protection of active woodrat colonies across the state of Pennsylvania, provide consistency during the impact assessment process, establish best management practices, and enhance & create habitat for the species.

STATUS

The woodrat has been declining over much of its historic range. The decline is thought to be a result of a combination of habitat variables including: reduced acorn crops in areas severely impacted by gypsy moth, fragmentation of forest habitat, and an increase in raccoon populations that act a vectors of an internal parasite fatal to woodrats. The woodrat is officially listed as a Pennsylvania threatened species. The Pennsylvania Game Commission (PGC) has jurisdiction over state listed birds and mammals and is mandated by Title 34 (Game and Wildlife Code) to protect the species.

IDENTIFYING CHARACTERISTICS

Woodrats are a buffy gray above, with white underparts and paws and long whiskers. The adult averages just over a pound, and 17 inches in length, including an 8 inch tail. Its ears are large and may appear naked. The eastern woodrat is distinguished from the Norway rat by its hairy, bicolored tail: the Norway rat has a hairless tail (Wild Resources Conservation Fund, 1995).

LIFE HISTORY

The nest of the woodrat is usually found near an entrance on a dry cave floor, on narrow ledges along cave passages, or in inaccessible crevices of large rocks. The nest consist of shredded bark in a round/oval shape that is roughly 18 inches wide (Genoways and Benner, 1995). The breeding season runs from February until September, during which time up to three litters containing two or three young each may be produced (Wild Resources Conservation Fund).

The diet consists of a wide diversity of plant parts including ferns, fungi, fruits, and soft and hard mast (acorns). They also store food in midden-caches that are located in dry ledges or crevices. A telltale sign that woodrats are storing food is the accordian folded herbaceous plants that are within the food cache. The caches can also contain all sorts of items including bottle caps, plastic, and numerous shiny items.

Food Cache

Folded Vegetation

Woodrats use "toilet areas" where large quantities of droppings collect. The toilet areas are typically located below an overhanging rock in close proximity to their denning area. The toilet areas can contain dozens to thousands of droppings.

Toilet Area

The first phase of impact assessment involves an initial office review or Environmental Review (www.naturalheritage.state.pa.us) to determine if any potential exists for woodrat habitat. The office review involves a review of the type of project, existing woodrat data and modeling for potential habitat. If potential habitat exists the PGC may request photographs, a habitat assessment (Appendix A), or a field view to determine the presence of habitat.

The second phase involves surveying potential habitat for woodrat sign (toilet areas, food caches, and nests). The survey needs to be conducted by a qualified biologist with experience surveying and locating woodrat sign. The survey involves a detailed search by the lead biologist and several assistants for all potential habitat in the project area and within 200 meters of the project area. The project area includes all facilities, roads, utility lines, etc. For linear or point projects the distance from the project site to survey will be determined by the PGC based on site specific conditions. The survey data must be recorded on the PGC standardized survey form (Appendix B).

The third phase takes place if woodrat sign is found during phase II or if the habitat is present and could be re-colonized by known woodrat populations in the surrounding area. Phase III follows the pattern of avoiding, minimizing, and as a last resort (if possible) mitigating for impacts to woodrat habitat or their travel corridors. Avoidance and minimizing impacts can involve shifting the project to another location, modification of the project design, or maintaining/enhancing travel corridors.

MONITORING

On some projects the PGC will request monitoring of the woodrat population to determine if the avoidance, minimization, or mitigation efforts are successful at maintaining the post-construction woodrat population. The monitoring information will assist the PGC to further refine and assess the viability of the avoidance, minimization, and mitigation efforts. Monitoring may include a determination of presence of the species or may involve population estimates pre and post-construction.

BEST MANAGEMENT PRACTICES
for
OCCUPIED WOODRAT HABITAT

Primary Allegheny woodrat habitat consists of activity centers, supporting landscape, and dispersal corridors. Following are three management zones based on the woodrats primary habitat components and the Best Management Practices (BMP) for each zone (modified from the PGC Woodrat Management Plan):

ZONE 1

CORE HABITAT consists of the overtop or near subsurface core habitat that supports the species nesting and denning sites. Activity centers are characterized by observable woodrat sign in the form of toilet area (s) and midden-cache(s) (food cache) linked in most cases to a complex of surface rocks and fissures or to a cave/mine entrance zone.

Best Management Practices

No disturbance to the Core Habitat including but not limited to:

1) No hard mast tree harvesting or salvage of downed trees.
2) No temporary or permanent haul roads, cell towers, buildings, pipelines, etc.

Enhancements *

1) Release cuts around hard mast producing trees is favorable.

2) Red Maple is a lower value seed producer; kill or hinge-cut red maple.

3) In areas lacking canopy closure find, fertilize and fence (if necessary) hard mast producing seedlings or saplings.

4) Plantings of grape vines (summer grape *Vitis aestivalis*) or Virginia creeper provides a valuable food source and cover.

5) Evergreens, particularly hemlock, represent food, cover, and water to woodrats. If a suitable location exists a limited number can be planted.

7) Additional plantings of grape, gooseberry, red elderberry, Hercules club, mountain sumac, serviceberry, sassafras, mountain ash, dwarf chestnut oak, and American chestnut hybrids (if available) are beneficial.

8) If the woodrats are using caves or old mine openings they should be examined for the potential of gating.

*Some enhancement techniques may be difficult to accomplish in the Core Habitat due to the dominance of rock and lack of suitable soil.

ZONE 2

SUPPORTING LANDSCAPE is the area that extends 200 meters from the edge of the Core Habitat polygon. The Supporting Landscape typically consists of mature forest that provides food sources to the woodrat.

Apply the same Best Management Practices and enhancements as Zone 1. The enhancements should be easier to apply within Zone 2 than in Zone 1 due to the potential increase in suitable soil that would support the plantings.

ZONE 3

GENERAL LANDSCAPE is the area extending from the edge of the supporting landscape for a 1.25 mile distance. Generally this zone should be maintained in a forested condition with minimal to no permanent fragmentation.

Best Management Practices

1) Limit permanent haul roads, cell towers, buildings, pipelines, etc.
2) Temporary haul roads and timber harvest are acceptable. The timber harvest should focus on maintaining hard mast producing trees.

DISPERSAL CORRIDORS

Occupied, recently occupied, and potential woodrat habitat needs to be connected in order to provide dispersal corridors from one known woodrat location to another. When dispersal corridors are fragmented it increases the chances of existing populations to die off and not be reoccupied.

1) Dispersal corridors should be a minimum of 100 meters wide when connecting core habitat areas within 500 m of each other.

2) Forestry operations can occur within the corridor provided the corridor is maintained in pole size or larger trees.

4) No new permanent fragmentation to the corridor should occur from logging roads, developments, utility lines, etc. that breaks the corridor and would reduce the ability of woodrats to disperse and or would increase their mortality.

5) In some instances, breaks in the travel corridor (Ex. highways) can be improved by providing various forms of wildlife passages.

HABITAT CREATION

Habitat creation for the Allegheny woodrat (*Neotoma magister*) involves the construction of large boulder fields with numerous rock ledges and overhangs that provide deep fissures that provide protection from predators and the weather.

The following criteria should be used to determine if woodrat habitat should be created:

1) The area is in a forest interior setting with acorn producing species present.

2) The area is within 3 miles of an active woodrat population that is connected to the creation site by a travel corridor.

3) The area has a steep slope with supporting talus slopes and rock outcrops immediately adjacent to the site.

4) No major forest fragmentation (highways, developments, etc.) is within 1.25 miles.

The woodrat habitat creation should adhere to the following criteria:

1) Enough material is present to create a minimum of 1 acre of core habitat. The largest and flatest rock material should be stored and stockpiled from the entire work area. Core habitat consists of boulders with a minimum diameter of 3 feet with larger boulders being better. The boulders are placed in a manner to create the highest amount of openings that extend as far as possible under ground level. If possible, underground openings should be created that have the boulders placed on top to create the deepest caverns as possible. Smaller boulders are placed on the outside edges of the core habitat.

Typically woodrats locate there toilet areas and food caches on larger and flatter boulders with over hanging rocks above that shelter them from the weather and/or predators. The best woodrat habitat has numerous flat ledges leading to underground caverns and as many of them as possible should be created.

2) A biologist with experience surveying for woodrats should be hired to oversee the creation of woodrat habitat.

3) A planting plan needs to be developed for the site that includes trees, shrubs, and vines that provide overhead cover and food. Following are examples of beneficial plants that can be included in the planting plan: drape grape, Virginia creeper, gooseberry, red elderberry, serviceberry, mountain sumac, sassafras, mountain ash, dwarf chestnut oak, hemlock and all hard mast producing species such as chestnut oak, red oak, and white oak.

CONCLUSIONS

The PGC follows a process of determining if habitat is present, determining the presence or absence of the species, and working to avoid and minimize potential impacts. In order to accomplish this task the PGC may require additional information and review projects in the field. The information collected will be used by the PGC to determine what actions (if any) need to be taken in regards to a particular project. The determinations of potential impacts and the recommendations on how to avoid and minimize such impacts are specific to each project.

The Pennsylvania Game Commission, Bureau of Wildlife Habitat Management, should be contacted at the following address to coordinate reviews and impact assessments for the Allegheny woodrat.

Pennsylvania Game Commission
Division of Environmental
Planning and Habitat Protection
Bureau of Wildlife Habitat Management
2001 Elmerton Avenue
Harrisburg, PA 17110
Phone (717) 783-5957

REFERENCES

Genoways, H.H., and F.J. Benner, 1985. Species of Special Concern in Pennsylvania. Trustees of Carnegie Institute, pp. 316-318.

Pennsylvania Game Commission, 2006. Woodrat Management Plan.

Wild Resources Conservation Fund, 1995. Endangered and Threatened Species of Pennsylvania. p. 13.

APPENDIX A

ALLEGHENY WOODRAT HABITAT ASSESSMENT

In Pennsylvania Allegheny woodrats (*Neotoma magister*) are primarily forest interior species that occupy rocky islands embedded in a forested matrix. Their habitat in Pennsylvania can be categorized as 1) den sites consisting primarily of an island and/or corridor of rocks surrounded and typically overtopped by tree canopy; 2) foraging habitat that may extend greater than 100 meters beyond rocks (Wright and Hall 1996); and 3) forested dispersal habitat (between colony areas) that is often absent of surface rocks.

Den site size is a limiting factor for woodrats. The den site is a core area (s) within a rocky island of rocks and boulders with an abundance of large deep crevices characterized by tree canopy cover.

1) Den site size

Den site size is less than 1.0 acres	0.1
Den site size is 1.0 - 2.5 acres	0.3
Den site size is 2.5-3.5 acres	0.7
Den site size is greater than 3.5 acres	1.0

2) Percent of tree canopy within 300 meters of den site.

Tree canopy cover 25% or less	0.1
Tree canopy cover 26%-50%	0.4
Tree canopy cover 51%-75%	0.7
Tree canopy cover 76%-100%	1.0

3) Distance to major forest fragmentation (paved highway, large agriculture fields, large housing and commercial developments, etc.)

Fragmentation within 0.25 miles	0.0
Fragmentation between 0.25 to 0.75 mile	0.4
Fragmentation between 0.75 to 1.0 mile	0.8
No major fragmentation within 1.0 mile	1.0

4) Dispersal corridors are forested tracts of land (>200 feet wide) that connect to other rock outcrop areas

No dispersal corridors exist	0.0
One travel corridor exists	0.5
Multiple corridors exist	1.0

Appendix B

Allegheny Woodrat (*Neotoma magister*)

Site Survey form

and

Code Manual

PENNSYLVANIA GAME COMMISSION

WILDLIFE DIVERSITY SECTION

ALLEGHENY WOODRAT HABITAT SITE SURVEY

CODE MANUAL

This manual provides instructions, definitions and codes for completing the Allegheny Woodrat Habitat Site Survey

The Allegheny Saxicole or

THE ĀSAX

Saxicole: Dwelling in stony places; something that lives on or among rocks; a saxicolous species.

Chittering and twittering,
Chompin and stompin,
The āsax is home.
In the shadow of stone

PENNSYLVANIA GAME COMMISSION Revision Date: 2
May 2006

WOODRAT HABITAT SITE SURVEY

Use the accompanying Woodrat Survey Code Booklet to complete this form.

Habitat Site Name: _____ Trap-site Number: _____
Date: _____

Ownership (circle one): Public, Private, Both Access (Name, Address Telephone):
_____

Location: _____ N or _____S and _____E or _____W of:
_____

Surveyors:
_____

Effort: # of surveyors x survey minutes =_____minutes. Was the site(s) previously surveyed? Yes No

Conservation Mgmt. Area (4 letters, see Appendix 1): _____ Habitat Site Code (if known): _____

County: _____ Quadrangle: _____ Map Photocopy attached? Yes No

Habitat Site Size (m): Longest Length: _____ Average Width: _____ Width range: _____

Activity Extent (m): Longest Length: _____ Average Width: _____ Width range: _____
(Estimate the length & width of rectangle that would include all Activity Centers within Habitat Site)

Latitude_____º----_____'---- _____" & Longitude_____º----_____'----
_____"
(Center of Habitat Site in Degrees, Minutes and Seconds, NAD27)

Elevation Range: _____to_____ meters. Percent Slope: _____% to_____ %

Aspects (degrees): southerly aspects: _____% _____º northerly aspects:
_____% _____º
(135°-225°) *(315°-45°)*

easterly aspects: _____% _____º westerly aspects: _____% _____º
(45°-135°) *(225°-315°)*

Topography (ridge/valley-side, ridge top, river gorge, water gap, etc.):_____

Surface Rock Habitat Types: List the four most common surface rock habitat types (and estimate the percent coverage of each) starting with the most common (see Table 1):

1) Code #_____ %_____, 2) Code #_____ %_____,

3) Code #_____ %_____, 4) Code #_____ %_____

Geological formation:
_____

Nearest mapped water: Name: _____ Distance to: _____m

FORM PGC 4150 wdrat

Forest Fragmentation Code: _____ Two-digit Habitat Disturbance code: _____
_____ _____

Anderson Level III cover code on site: _____ and adjacent to site: _____

Tree canopy coverage overtop Habitat Site: _____%

Vegetation on and within 100 meters of the Habitat Site:

Trees Species (list most common first and least common last):
_____
_____
_____

Shrub, Vine and Briar (Rubus) Species:
_____

Herbaceous Species:
_____
_____

General Description of Surrounding Habitat (>100m & <500m):_____
_____

If applicable: this Habitat Site replaces (merges) the following Sites (enter the Site names):

Comments, e.g. threats to site, unusual tree mortality, large population of porcupines (tally number of dens), snake species observed, droppings of predators noted etc.

ACTIVITY CENTERS or POTENTIAL ACTIVITY CENTERS (circles with a 15m radius)

Establish up to 10 ACs and/or PACs for every 1 km of Habitat Site length.

No.	GPS Latitude	GPS Longitude	# Toilet Areas		# Midden-caches		#Nests/Hutches		Rock Code	% Canopy Coverage
			Fresh	Old	Fresh	Old	Fresh	Old		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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14										
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16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
		TOTAL =								

MIDDEN-CACHE CONTENTS COMBINED FOR ALL ACTIVITY CENTERS	
Green Vegetation & Buds	
Ferns	
Hard Mast	
Soft Mast	
Other Seeds	
Fungi & Lichens	
Misc. (Sticks etc.)	
Raccoon Feces	

WOODRAT HABITAT SITE SURVEY CODE BOOKLET

This booklet will help you to complete the accompanying woodrat site survey form. Some questions are self-explanatory and therefore not covered here. The site survey form should be completed for all initial surveys, resurveys, and trapping surveys of suitable rocky habitat even if no woodrats were found.

Important Definitions:

Activity Center: Activity centers are overtop or near subsurface woodrat nesting or denning sites. Activity centers are characterized by observable woodrat sign in the form of toilet area(s) and midden-cache(s) linked in most cases to a complex of surface rocks and fissures or to a cave/mine entrance zone. The estimated center of activity is GPSed. Then all toilet areas and midden-caches within a 15 m radius of this GPS point are tallied. Multiple Activity Centers within the same Habitat Site should not overlap. Repeatedly or perennially used Activity Centers likely consist of an adult female and her young. Older daughters are tolerated nearby. In essence, Activity Centers (previously referred to as den sites) contain a breeding assemblage. Males disperse from, visit, travel through, or occasionally occupy vacant activity centers. Generally, prime den sites or Activity Centers are defended and are rarely closer than 30 m to one another.

Potential Activity Center: Some areas look like good woodrat habitat but fail to have any sign of being used by woodrats. In these survey instances, the most complex surface rock found, characterized by rock overhangs, ledges, small caves and numerous fissures, can be defined as a Potential Activity Center.

Habitat Site: A Habitat Site is a variable sized area of more or less contiguous surface rock without a break in the surface rock of 200 m or more. A Habitat Site is an island or a "patch" of rock (sometimes referred to as a rock pile) or a cluster of islands. A Habitat Site and its adjacent fringing apron (ecotone) of rock and non-rock surface area has all the necessary resources for the persistence of a local subpopulation, and it is separated by unsuitable denning habitat from other Habitat Sites. At any given time, a Habitat Site may be occupied or empty. Adjacent Habitat Sites are separated by at least 200 m of non-surface rock habitat or by a substantial barrier in the form of a major, hardtop road or wide stream. Habitat Sites contain one or more Activity Centers or Potential Activity Centers. An active Habitat Site contains a woodrat subpopulation which may be as small as a single breeding assemblage or contain multiple breeding assemblages. The most common kinds of movements by woodrat are foraging forays within and on the fringe of the Habitats Site, den shifts within a Habitat Site, and short distance dispersal within larger Habitat Sites. See Figure 2.

Metapopulation Area: Metapopulation Areas are separated from the nearest, adjacent Metapopulation Area by at least 10 km of non-woodrat habitat or a significant barrier to dispersal, e.g. a river or farmed valley bottom. A Metapopulation Area contains at least one but usually numerous topographically related woodrat Habitat Sites; some Habitat Sites may not be occupied. A Metapopulation Area contains a metapopulation defined as a set of subpopulations (one per active Habitat Site) where typically migration from one subpopulation to at least some other subpopulations (Habitat Sites) is possible. The

subpopulations are able to exchange individuals and recolonize Habitat Sites in which the species has recently become extinct.

Conservation Management Unit: A Conservation Management Unit contains physiographically related Metapopulation Areas. Administratively, a Conservation Management Unit represents an economy of scale; and different Metapopulation Areas within a Conservation Management Unit are likely to be impacted similarly regarding regional threats and public land management.

INSTRUCTIONS FOR COMPLETING FORM PGC 4150 wdrat

Habitat Site Name: Give each site a short individual name consisting of no more than two words. Group names (e.g. Big Mountain #4) may also be appropriate. Resurveys of previous Sites may require these Sites to me merged under a new name because previous adjacent Sites may not have the required ≥ 200m of non-surface rock between them. The ≥ 200 m rule is new as of the year 2006. For example, Ellendale 1 through Ellendale 17 (absent ≥ 200 between adjacent Sites) would be merged into a single Habitat Site renamed Ellendale Merged or Ellendale A.

Trap-site Number: Enter if known otherwise leave blank, a number will be assigned later.

Location: Miles or kilometers due north or south and due east and west of nearest town on the topographic map.

Conservation Management Unit: Use only the approved name or abbreviation from Appendix I and Figure 1.

Habitat Site Code: Enter if known, otherwise leave blank and a code will be assigned later.

Habitat Site size: See definition of Habitat Site. The longest length is measured along or close to the contour. Find the end of surface rock adjacent to an area spanning at least 200 m of mostly non-surface rock. The longest length of the surface rock island, without a break of 200 m or more, is estimated to the nearest 50 m, but not zero. Habitat Sites longer than 2 km (about a mile) should be GPSed at both ends and the longest length should be taken off of a topographic map rather than visually estimated. The width of a surface rock island is usually but not always at right angles to the contour, i.e. downhill or uphill. The average width in a few instances will be longer than the length. Estimate the average width of the Habitat Site to the nearest 25 m but not zero. The width range is the shortest and widest width of the surface rock island.

Area of Occupancy or Activity Extent: Estimate the length and width of a rectangle that includes all Activity Centers that have evidence (new and/or old) of being used by woodrats.

Latitude and Longitude: On the contour, estimate the middle of the Habitat Site and GPS this point.

Elevation Range, Example: 332' to 610' **Percent Slope, Example** (%):10% to 15%.

Aspects (degrees), Example: southerly aspects: 100 % 180º; in this example 100% of the Habitat Site was facing due south.

northerly aspects	clockwise 315º to 45º
southerly aspects	clockwise 135º to 225º
easterly aspects	clockwise 45º to 135º
westerly aspects	clockwise 225º to 315º

Note: numerous ridgetop sites will have contrasting aspects.

Classification of Rocky Habitat: This code can be determined with the use of Appendix II. Key down from column 1 to column 3; the number in the third column is the code number(s) to use. Spaces are available for only the four most common rocky habitat types.

Geological formation: This data comes from the Preliminary Atlas of Geologic Quadrangles for
Pennsylvania, Map 61 from the Pennsylvania Geological Survey; refer to the DCNR website. If not available, briefly describe rock (limestone outcrop, sandstone talus, etc.).

Nearest mapped water: Provide the distance to and name of the nearest stream or other body of water taken from the 7.5' quadrangle map.

Forest Fragmentation: This is a basic distance code to measure massive encroachment of agricultural/urban areas into the forest cover type. For this reason consider only agricultural/urban areas >100 hectares. Usually this entry will be the closest measurement from the Habitat Site to the edge of the forest cover type where it meets the expansive, developed, cleared land of the valley.

Code Number	Distance from >100 ha opening	Code Number	Distance from >100 ha opening
1	On site	**5**	>1km to 2km
2	≤ 100m	**6**	>2km to 3km
3	>100m to 500m	**7**	>3km to 5 km
4	>500m to 1km	**8**	>5km

Normally the measurement can be taken off a 7.5 minute topographic map (closest distance to edge of white areas >100 hectares). However, this is not always the case. For example, large housing developments (>100ha.) in a forested site may still be colored green on a topographic map.

Linear agricultural/urban areas >100 hectares should be considered. Example: an agricultural/urban river bottom that measures 250m x 5,000m would qualify for this entry.

For this code, do not measure the distance to small housing developments, strip mines, clearcuts, forest clearings or other small disturbances <100 hectares. These smaller site disturbances should be recorded in the following "Two-digit Habitat Disturbance Codes."

Two-digit Habitat Disturbance Code: Disturbance code that may affect the Habitat Site. Space is available to list up to 3 disturbance codes. Get from Appendix IV.

Anderson Level III land cover code: Determine from Appendix III. Key down from column 1 to column 3; use the 3 digit number (code number) in the third column.

Tree canopy coverage overtop Habitat Site: Estimate to nearest 10%.

ACTIVITY CENTERS and POTENTIAL ACTIVITY CENTERS (PAC): (see definitions) this is a major change compared to previous (pre-2006) surveys.

Within Habitat Sites, Activity Centers are over-top or near subsurface woodrat nesting or denning sites. Activity Centers are characterized by observable woodrat sign in the form of toilet area(s) and midden-cache(s) linked in most cases to a complex of surface rocks and fissures or to a cave/mine entrance zone. Some areas look like good woodrat habitat but fail to have any sign of being used by woodrats. In these survey instances, the most complex surface rock found, characterized by rock overhangs, ledges, small caves and numerous fissures, can be defined as a Potential Activity Center (PAC). The estimated center of activity (actual or potential) is GPSed. Then, if present, all toilet areas and midden-caches within a 15 m radius of this GPS point are tallied. Multiple Activity Centers and/or PACs within the same Habitat Site

should not overlap. Establish up to 10 Activity Centers and/or PACs for every 1 km of Habitat Site length.

- Step 1: Starting at either end of the Habitat Site's "longest length," look for the closest Activity Center or Potential Activity Center. GPS the Activity Center or PAC.

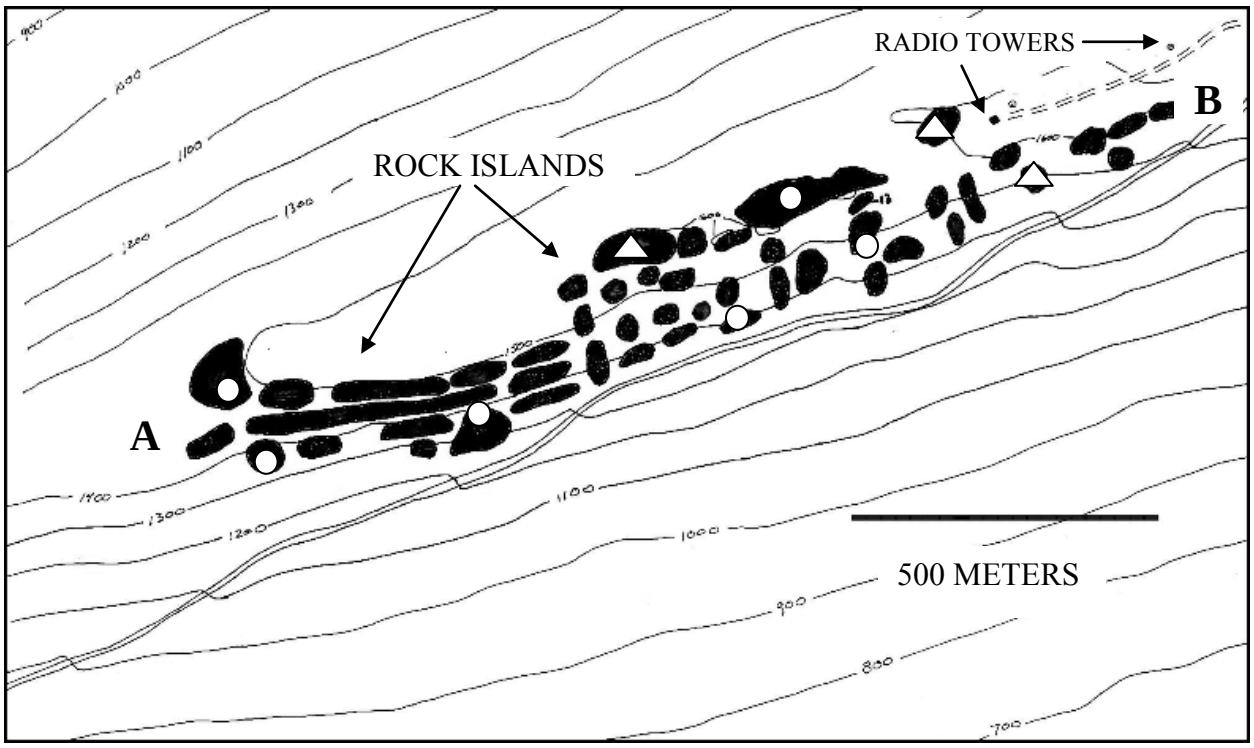
- Step 2: Tally all toilet areas and midden-caches within 15m of the GPSed spot. Also note the rock type (Appendix 2) within and the tree canopy coverage over-top the Activity Center or PAC.

- Step 3: Look for the next closest, non-overlapping (≥30 m from nearest other Activity Center or PAC) Activity Center or PAC and continue in the fashion until no more qualifying Activity Center or PACs exist on the Habitat Site. Note, for every 1 km of Habitat Site length, the Centers (from 1 to 10) can be: 1) all Activity Centers with fresh and/or old signs of woodrat activity; **or** they can be: 2) all Potential Activity Centers with qualifying surface rock but no sign of ever being used by woodrats, **or** 3**)** very likely they will be a combination of 1 and 2. Ten is the maximum number of Centers to GPS within any 1 km stretch of Habitat Site.

Midden-cache contents: List by indicated category. Be as specific as possible, i.e. sassafras leaves, blackberry twigs, tulip poplar fruits, hay-scented ferns. If you are not sure of the identity of an item, collect it and have it identified.

Vegetation: Be specific. Note anything that is exceptionally abundant such as large patches of fern or blueberries.

Figure 1. Example: The Ellendale Towers Habitat Site.



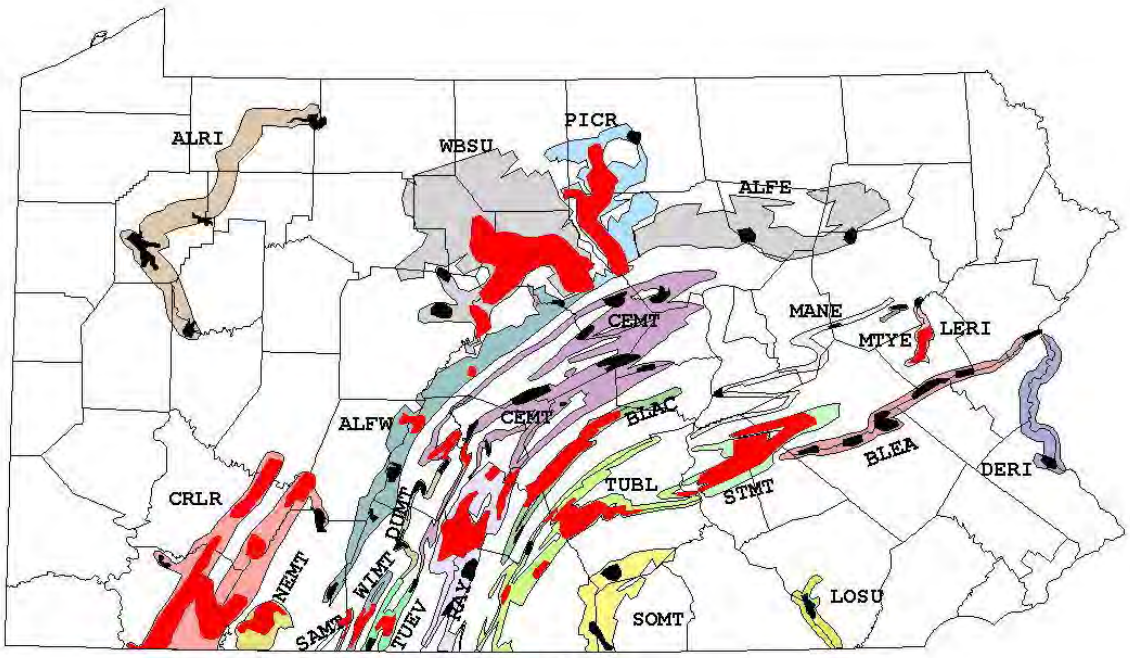
○ = Activity Center with fresh and/or old woodrat sign

Δ = Potential Activity Center with "good" rock

Explanation:

- Ellendale Towers (the Habitat Site Name) is a cluster of rock islands treated as a single Habitat Site because each island is within 200 m of one or more adjacent islands.
- The Habitat Site Length is measured from A to B.
- Proceeding from A towards B, 7 Activity Centers and 1 Potential Activity Center were GPSed in the first kilometer. Two Activity Centers and 2 Potential Activity Centers were GPSed in the next 500 meters.

Figure 2. A 2006 map illustrating 23 Conservation Management Units and 78 Metapopulation Areas.



Metapopulation Areas
- Active (N=29)
- Inactive (N=49)
- PA Countys

Conservation Management Areas
- ALFE=Allegheny Front East
- ALFW=Allegheny Front West
- ALRI=Allegheny River
- BLAC=Blacklog Mountain
- BLEA=Blue Mountain East
- CEMT=Central Mountains
- CRLR=Chestnut/Laurel Ridges
- DERI=Delaware River
- DUMT=Dunning Mountain
- LERI=Lehigh River
- LOSU=Lower Susquehanna R.
- MANE=Mahantango/Nescopck Mt.
- MTYE=Mount Yerger
- NEMT= Negro Mountain
- PICR=Pine Creek
- RAYS=Raystown Branch
- SAMT=Savage Mountain
- SOMT=South Mountain
- STMT=Stony Mountain
- TUBL=Tuscarora/Blue Mts.
- TUEV=Tussey/Evitts Mts.
- WBSU=W. Br. Susquehanna
- WIMT=Wills Mountain

Table 1. Classification of surface rock habitat.

Enter as a three digit code from the following table.

HABITAT TYPE	QUALITY OF HABITAT	SIZE OF ROCK
1 talus	11 bare rock, deep interstices	111 blocks less than 1 meter 112 blocks 1-3 meters 113 blocks 3-5 meters
	12 bare rock, shallow interstices	121 blocks less than 1 meter 122 blocks 1-3 meters 123 blocks 3-5 meters
	13 rock covered by organic material including humus, leaves, moss, with deep interstices	131 blocks less than 1 meter 132 blocks 1-3 meters 133 blocks 3-5 meters
	14 rock covered by organic material including humus, leaves, moss, with shallow interstices	141 blocks less than 1 meter 142 blocks 1-3 meters 143 blocks 3-5 meters
2 rock city, large float blocks	21 numerous overhangs, crevices, and "caves" 22 few or no overhangs, crevices, and "caves"	211 blocks 5-10 meters 212 blocks 10 meters+ 221 blocks 5-10 meters 222 blocks 10 meters+
3 cliffs, rock outcrops	31 numerous overhangs, crevices, and "caves" 32 few or no overhangs, crevices, and "caves"	311 less than 3 meters high 312 3+ meters high 321 less than 3 meters high 322 3+ meters high
4 Cave or mine entrance zone	41 rarely visited, may be gated 42 occasionally visited 43 active, heavily visited or commercialized	411 entrance 0-2 meters 412 entrance 2+ meters 421 entrance 0-2 meters 422 entrance 2+ meters 431 entrance 0-2 meters 432 entrance 2+ meters
Quarry or mine pit	51 highwall with numerous crevices, boulders, etc. 52 highwall with few or no crevices, boulders, etc.	511 less than 3 meters high 512 3+ meters high 521 less than 3 meters high 522 3+ meters high
6 Other man made rocky habitat such as stone walls, railroad and road cuts, buildings, etc.	61 few or no suitable crevices, overhangs, or other interstices 62 numerous suitable crevices, overhangs, or other interstices	611 less than 3 meters high 612 3+ meters high 621 less than 3 meters high 622 3+ meters high

Table 2. Anderson Level III Land-cover Codes Pertinent To Woodrat Habitat

4 Forest Land	41 deciduous forest	411 sapling stage: shrub land layer moderate to dense 412 sapling stage: grazed and/or shrub layer sparse 413 pole stage: shrub layer moderate to dense 414 pole stage: grazed and/or shrub layer sparse 415 mature stage shrub layer moderate to dense 416 mature stage: grazed and/or shrub layer sparse
	42 evergreen forest land	421 sapling stage: shrub land layer moderate to dense 422 sapling stage: grazed and/or shrub layer sparse 423 pole stage: shrub layer moderate to dense 424 pole stage: grazed and/or shrub layer sparse 425 mature stage shrub layer moderate to dense 426 mature stage: grazed and/or shrub layer sparse
	43 mixed forest land	431 sapling stage: shrub land layer moderate to dense 432 sapling stage: grazed and/or shrub layer sparse 433 pole stage: shrub layer moderate to dense 434 pole stage: grazed and/or shrub layer sparse 435 mature stage shrub layer moderate to dense 436 mature stage: grazed and/or shrub layer sparse
7 Barren land	74 bare exposed rock 75 strip mines, quarries and grade pits 76 transitional areas 77 mixed barren land	740 bare exposed rock 750 strip mines, quarries and grade pits 760 transitional areas 770 mixed barren land

Table 3. Classification of Habitat Disturbance.

Use the category(s) that best defines the site:

Code Number	PROXIMITY OF DISTURBANCE	Code Letter	TYPE OF DISTURBANCE
1	On-site	A	Dumping
2	<100m	B	Party spot
3	100m to 500m	C	Buildings
4	>500m to 1km	D	Agriculture
5	>1km to 2km	E	Utility rights-of-way
6	No significant disturbance	F	Railroad rights-of-way
		G	Improved roads
		H	Unimproved roads
		I	Recreation area
		J	Mining
		K	Fire
		L	Main logging haul road
		M	Concentrated tree mortality
		N	No significant disturbance

Example 1: Pastureland approximately 600 meters from suitable rocky habitat would be coded as **4D.**

Example 2: A rock outcrop/cliff used for beer parties would be coded **1B.**

Example 3: Excellent rocky habitat surrounded by uninterrupted forest for 2 or more kilometers in every direction would be coded **6N.**

Example 4: A main logging haul road and log loading site within 300 meters of the edge of the Habitat Site would be coded **3L.**

APPENDIX C

Allegheny Woodrat (*Neotoma magister*) Survey Protocol

COMMONWEALTH OF PENNSYLVANIA

Pennsylvania Game Commission, Bureau of Wildlife Management, Wildlife Diversity Section
2001 Elmerton Avenue, Harrisburg, PA 17110-9797

Allegheny Woodrat (*Neotoma magister*) Survey Protocol

Equipment for each site

1. Forty - 6" x 6" x 19" Livetraps (squirrel size) with wire mesh no larger than 1" x 1" (collapsible traps work best).
2. Forty plastic bags (grocery bags work well) & rubber bands. Drape bags over rear $^1/_2$ to $^1/_3$ of trap using rubber bands to hold in place. This will provide a dry shelter during rain and wind.
2. Scale for weighing woodrats in cage or holding cone.
3. Homemade Squirrel handling cone or Erickson adjustable small-mammal holder.
4. Max/Min thermometer
5. GPS unit
6. Required PGC Forms: P-4150-WdRat and PT-4150-WdRat.

Bait

1. One quarter slice of apple dipped in peanut butter.

Timing

1. Trapping can be conducted 15 May through 15 October.

2. Whenever possible, trapping should be done between mid-September and mid-October to avoid stress on reproductive females and young.

3. If trapping during any other period, the traps will be inspected at least once every 3 hours throughout the night.

4. If overnight temperatures may get below **12.7°C (55°F)**, a softball size wad of dry leaves or grass (compressed) will be placed in each trap for captured animals to use as thermal cover. (Do not use cotton for thermal material because of a possible problem with ingested cotton wads.)

5. Suspend trapping if:

    A. Temperatures fall below **10°C (50°F)**. This limit may be extended to freezing 0°C (32°F) if traps are checked/animals released every 3 hours through the night.
    B. Rain occurs, unless **ALL** traps are protected from rain.

Live Trapping

Habitat is mainly rock piles and cliffs with small openings

1. Forty traps will be set throughout each site > ½ acre in size. For smaller areas, use appropriate number of traps to thoroughly cover the area. Place traps deep within rock crevices when possible. Look for areas with food caches and/or toilet areas (often under rock overhangs).

2. Live traps to be set for minimum of two consecutive nights unless a successful woodrat capture occurs on the first night.

3. Record Site Description on PGC Form: P-4150-WdRat and Record all species of animals captured on PGC Form: PT-4150-WdRat. These forms will be completed for each continuous trapping session at a site. The site description will be completed even if no animals were captured; noting negative captures and trap dates.

PGC Form:
P-4150-WdRat
(03/06)

Commonwealth of Pennsylvania
Pennsylvania Game Commission

Allegheny Woodrat Site Description Summary

Site[a] Name/No.:_____ Date Start:_____ End:_____ Trap Nights[b]:_____

[*] *Site is defined as contiguous rocky habitat suitable for woodrats.* [b]*Trap Nights = no. nights trapped x no. traps*

Surveyor Name:_____ Phone: ( )_____ E-Mail:_____

Organization:_____ Address:_____

Site Access Information (owner):_____

_____

(attach map with site circled-this is REQUIRED)

County:_____ 7.5' Quadrangle:_____ Map Attached: _____Yes _____No

GPS Coordinates (required): Latitude (DMS): _____°-_____'-_____" Longitude (DMS): _____°-_____'-_____"

Lat./Lon. Datum: ____**NAD27** (Preferred), ____NAD83, _____WGS84, Other (specify):_____

Site Size (m): _____ Length _____ Width

Woodrat Sign (*Check familiarity and leave **caches & toilets blank if No is checked***)

Are you familiar with woodrat sign? _____Yes _____No

Number of Food caches Found: Fresh:_____ Old:_____

Contents:_____

Toilet areas: Fresh:_____ Old:_____ # Hutches (Nests): Fresh:_____ Old:_____

Other Wildlife Sign on Site (Raccoon, Porcupines etc.):_____

Classification of Rocky Habitat code and percentage at site

(see rock habitat code Appendix I)

	Rock Habitat Code	Percentage			Rock Habitat Code	Percentage
1st Most Common:				3rd Most Common:		
2nd Most Common:				4th Most Common:		

Anderson Level III Habitat Codes for Site

(See Anderson III Codes, Appendix II)

Level III land cover code on site (*3 digits*): _____ Level III land cover code within 100 m of site: _____

Vegetation on site:_____

_____

Vegetation 100m surrounding site: _____

Comments:

PGC Form:
PT-4150-WdRat
(03/04)

Site Name/Number:_____ **Page:** _____ **of**_____

Date	Species	Sex	Repro.[b]	Wt.(g)	Disp.[c]	Recapture? Yes/No/Unk.	Tagged Yes/No	Left Tag Number	Right Tag Number	Lat/Lon of Capture[d]	Comments

[a] *DZ = drizzle; FG = fog; HZ = haze (humid hazy nite); R = rain; TS = thunderstorms; WD = windy; C = clear; PC = partly cloudy; OC = full cloud cover/overcast*
[b] *Reporduction: NR= nonreproductive, PG= pregnant, L= lactating, PL= post lactating, SCR= scrotal*
[c] *Disposition: R=released, C=collected (specify location in comments), PGC=collected and delivered to Game Comm. (specify location in comments).*
[d] *Record Lat/Lon in DMS, NAD27 for trap locations of each woodrat capture. Example: 45-22-06/78-55-33 (Nad27).*

Appendix II: Anderson Level III Land-cover Codes

(*Enter a 3 digit code from the following matrix)*

1	urban or built-up land	110	residential		
		120	commercial and services		
		130	industrial		
		140	transportation, communications, and utilities		
		150	industrial and commercial complexes		
		160	mixed urban or built-up land		
		170	other urban or built-up land		
2	agricultural land	21	cropland and pasture	211	cropland
				212	pastureland
				213	hayland
		22	orchards, groves, vineyards, nurseries and ornamental horticultural areas		
		23	confined feeding operations		
		24	other agricultural land		
3	rangeland	31	herbaceous rangeland not grazed, at least 2/3 herbs, grass, and grasslike vegetation	311	herbaceous rangeland: mowed areas such as recreation fields
				312	herbaceous rangeland: early succession old field
		32	shrub and brush rangeland at least 2/3 of area grown up in shrubs	321	shrub and brush rangeland shrub layer moderate dense - lateral visibility somewhat restricted
				322	shrub and brush rangeland area grazed and/or shrub layer vegetation thin and scattered, lateral visibility relatively good
		33	mixed rangeland more than 1/3 intermixture of either shrub and brush rangeland or herbaceous rangeland	331	mixed rangeland: shrub and herbaceous layer vegetation moderate to dense
				332	mixed rangeland: area grazed and/or herbaceous and shrub layer vegetation thin
4	forest land	41	deciduous forest	411	sapling stage: shrub land layer moderate to dense
				412	sapling stage: grazed and/or shrub layer sparse
				413	pole stage: shrub layer moderate to dense
				414	pole stage: grazed and/or shrub layer sparse
				415	mature stage: shrub layer moderate to dense
				416	mature stage: grazed and/or shrub layer sparse
		42	evergreen tree land	421	sapling stage: shrub land layer moderate to dense
				422	sapling stage: grazed and/or shrub layer sparse
				423	pole stage: shrub layer moderate to dense
				424	pole stage: grazed and/or shrub layer sparse
				425	mature stage: shrub layer moderate to dense
				426	mature stage: grazed and/or shrub layer sparse

APPENDIX D

Sunoco – Pennsylvania Pipeline

SGL 71 Woodrat Mitigation Plan

Sunoco – Pennsylvania Pipeline
SGL 71 Woodrat Mitigation Plan

Vegetation Planting Requirements

1. Sunoco and/or their subcontractors (hereafter "Sunoco") must obtain seedlings with documented Pennsylvania provenance. Sunoco will provide nursery's documentation of Pennsylvania provenance for all seedlings. If Pennsylvania seedlings cannot be obtained, seedlings must be obtained from states adjacent to Pennsylvania with prior PGC approval.
2. Sunoco will plant 100 American chestnut (*Castanea dentata*) seedlings. The seedlings must be 2- or 3-year-old seedlings obtained from The American Chestnut Foundation or its approved chestnut orchards. Seedlings must be the most advanced back-cross generation available (15/16ths backcross seedlings).
3. Sunoco will plant 100 common (black) elderberry (*Sambucus canadensis*) seedlings, and 100 seedlings in any combination of blackberry (*Rubus allegheniensis*), smooth gooseberry (*Ribes hirtellum*), American black currant (*Ribes americanum*), devil's walking stick (*Aralia spinosa*), and/or American hazelnut (*Corylus americana*).
4. Sunoco will plant all seedlings within the green polygons identified in Figure 1. Further, 50% of all seedlings (50% of each species) must be planted within the red polygons identified in Figure 1.
5. PGC recognizes that microsite planting conditions will dictate locations of planting holes. However, Sunoco must make significant effort to plant seedlings in canopy gaps.
6. Sunoco must attempt to protect each planted seedling with a plastic tree tube 3 feet tall and 3-4 inches diameter. Each tube must be attached to a hardwood stake via 2 outdoor-quality (UV resistant) zip ties. PGC recognizes that microsite planting conditions will dictate whether stakes can be driven into the ground to a depth (at least 8 inches) to provide rigidity for the tube, and expects that some seedlings may not receive a tube and stake. Therefore, at least 75% of seedlings or each planted species must be tubed and staked.
7. Sunoco will record and provide to PGC in an ArcGIS shapefile and in an Excel file the GPS coordinates in decimal degrees, WGS84 datum, of the location of each planted seedling, with species identified for each set of coordinates.
8. Sunoco will mark each planted seedling with a semi-permanent tag (for example: Forestry Suppliers "Al tag" product number 79500 http://www.forestry-suppliers.com/product_pages/Products.asp?mi=11781&itemnum=79500) to facilitate relocating that seedling to confirm survival.
9. Sunoco must guarantee a minimum 70% survival rate of these 200 hand-planted seedlings at 3 months post-planting or at the end (October) of the growing season in or after which they were planted, whichever is later. Survival cannot be assessed during the dormant season. That is, if seedlings are planted in fall, survival must be assessed at 3 months into the following growing season. If survival, as determined by a PGC representative, does NOT meet or exceed 70%, Sunoco will plant an equal number of

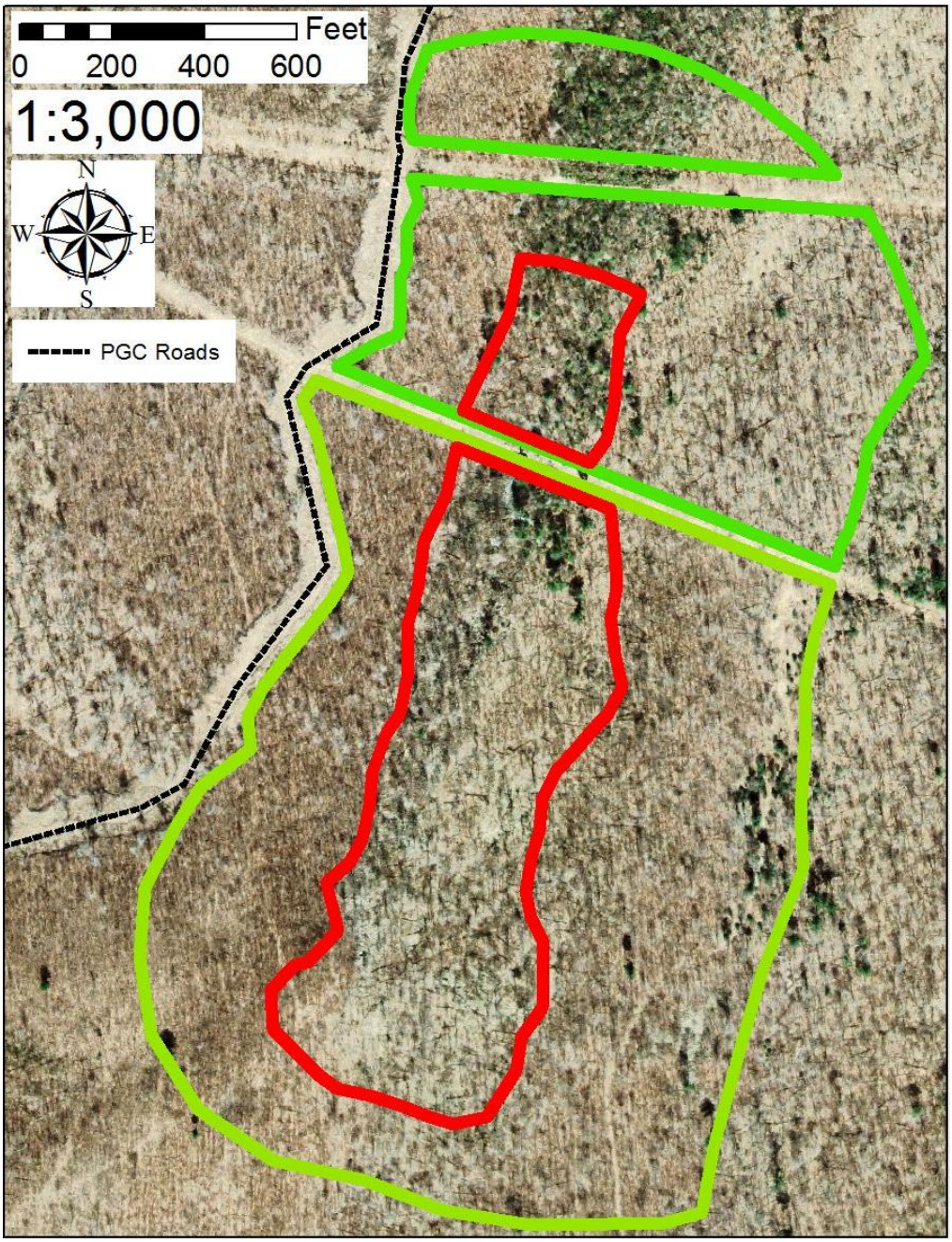
seedlings the following spring (March-April) according to these specifications.

10. Sunoco will notify a PGC representative at least three days prior to beginning the project. Sunoco may work at times other than the schedule of the PGC representative. Sunoco may be present at the final inspection.
11. Sunoco will remove all trash and garbage, personal and otherwise, generated from the completion of this contract.
12. A representative of Sunoco, with the ability to communicate easily and effectively with PGC representatives, both orally and in writing in the English language, and with the ability to communicate easily and effectively with all workers on the planting crew, shall be present at all times at the work site.
13. Sunoco will haul seedlings in a covered or enclosed vehicle or trailer to prevent seedling exposure to wind, cold, and heat during transport. Sunoco may, at Sunoco expense, use a refrigerated van for long term-storage of seedlings on site, provided the refrigeration unit is monitored. Temperature should be maintained at 40 degrees, humidity levels maintained at 95%. PGC reserves the right to inspect seedling storage and transport facilities.
14. On-site storage of seedlings must be in shipping or storage bundles in closed packages and under a tarp and in shade at all times.
15. Planters must carry seedlings in moisture-holding planter's bags with no more trees in hand than can be planted without the fine roots (<1/16 inch diameter) from becoming dry before planting.
16. Seedlings in storage or shipping bundles or packages, and in planter's tree bags, must be kept moist at all times.
17. Seedlings must be planted when the soil is unfrozen and air temperature is above 25° F.
18. Seedling roots shall not be beaten or otherwise damaged.
19. Root pruning by the planters is permitted only when absolutely necessary to prevent J-rooting and to fit seedling to planting hole.
20. Use of root gel to prevent desiccation is required if ambient temperature exceed 45° F or if relative humidity falls below 60%.
21. All tree seedlings are to be hand planted with a dibble, planting bar, spade shovel, etc. to create a hole approximately 2" deeper than the length of the root mass.
22. One seedling is to be planted per planting hole, and planted to nursery depth, but no deeper than 1 inch below nursery depth.
23. Main seedling root must be placed in the planting hole so that it is vertical. Trees planted with curved or bent roots (J-shaped roots) are unacceptable. Trees planted with roots exposed or above ground level are unacceptable.
24. Seedling root systems must be naturally arranged in the planting hole with no twisted or balled arrangement.
25. Planting hole must be filled with >75% mineral soil, including small (<3 inch diameter) rocks, collected from the excavation hole or nearby on-site that is packed completely and firmly around the roots to eliminate air pockets. Leaves, twigs or sticks, potting soil, or any soil or

amendments (other than root dip, gel anti-desiccant, and any nursery bed material that clings to seedling roots) are not permitted. All planting soil must come from the excavated hole or nearby on-site.

26. Seedlings with straight stems must be planted within 20% of vertical in all directions, seedlings with curved or crooked stems must be within 40% of vertical.
27. Sunoco will apply 1 gallon of water per seedling per week for one month following planting if less than 1 inch of rain precipitation falls per week within one month of planting.
28. Sunoco will remove all trash and garbage, personal and otherwise, generated from the completion of this contract.
29. Sunoco shall comply with all State Game Land (State Game Land) rules and regulations.

Figure 1. Planting locations at the SGL 071 mitigation site. Green polygons (62.4 aces): area in which all seedlings must be planted (ROW are excluded). Red polygons (16.4 acres): area in which at least one half of all seedlings (one half of each species' seedlings) must be planted.



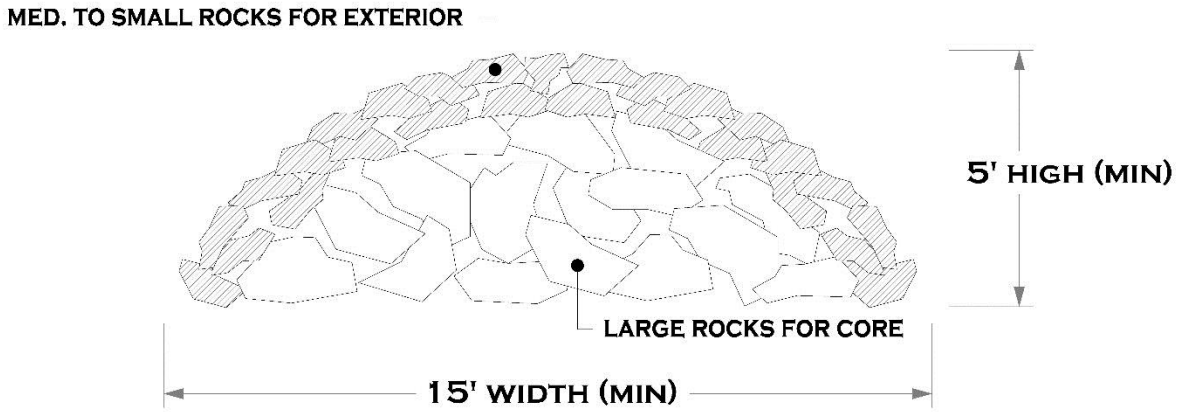
Woodrat Rock Structure Requirements

Two rock structured should be constructed to provide travel corridors across the right-of-way, thereby connecting the woodrat habitats to the north and south. Each structure should start at the southern edge of the right-of way and extend to the northern edge of the new right-of-way (Figure 2). Location of woodrat structures will be reviewed and approved by PGC prior to construction. Rock encountered during the construction of the pipeline should be placed to create structures not less than 5 feet in height and 15 feet in width, with the height of the rock given priority to ensure complexity within the pile (Appendix 1).

Figure 1. Approximate location for placement of woodrat rock structures on SGL 71.

APPENDIX 1

ALLEGHENY WOODRAT ROCK PILE



CROSS SECTION

NOT TO SCALE

1. To the greatest extent possible, rock excavated during construction should be saved and used for woodrat rock structure creation.
2. Large angular rocks, no less than 3 feet in diameter, should be placed in the core of the structure in a manner to promote ledges, overhangs, caves, and interior passages.
3. Medium to small angular rocks, no less than 1 foot in diameter, should be placed over the core rocks to a depth of 2 feet.
4. Avoid transferring soil from excavation site to rock structures. Smaller rocks may need to be screened/washed to remove excess soil prior to final placement on structures.
5. A biologist with knowledge of woodrat habitat requirements should be involved with the layout and construction of woodrat rock structures.

APPENDIX E

DCNR Bureau of Forestry – Wood Rat Habitat Plan Parameters

DCNR Bureau of Forestry - Wood Rat Habitat Plan Parameters

ME II PA PIPELINE PROJECT – SUNOCO PIPELINE L.P.

Tuscarora State Forest

Tobyne Township, Perry County

1. Enhance Existing Habitat

Sunoco will be expected to cut undesirable trees (birch - *Betula lenta;* and all maple to include- striped maple-*Acer pensylvanicum*, red maple-*Acer rubrum*) immediately adjacent to the rocky habitat followed by planting of mast producing trees: Hawthorn-*Crataegus sp.*, black oak-*Quercus velutina*, scrub oak-*Quercus ilicifolia*, and American mountain ash-*Sorbus americana.*

2. Temporary Workspace Adjacent to Existing Habitat

a. Sunoco will be expected to re-vegetate temporary workspace areas adjacent to the existing wood rat habitat with mast producing species: Sassafras-*Sassafras albidum*, grape-*Vitis spp.*, black gum-*Nysa sylvatica*, sumac-*Rhus typhina*, hawthorn, and pitch pine-*Pinus rigida* and scrub oak-*Quercus ilicifolia* – at least on the upper slope portion of temporary workspace of the right of way near the wood rat habitat.

b. Sunoco will be expected to pile any rocks that are un-earthed during the pipeline construction in the temporary workspace adjacent to the existing habitat to provide additional cover. These rock piles will be *15 feet wide by 5 feet in height.* Any exposed soil around the created rock piles shall be planted with either grape or Virginia creeper-*Parthenocissus quinquefolia.*

c. DCNR Bureau of Forestry would rather have the two new pipelines re-route to site on the south side of the existing right of way in a co-location or parallel manner, not south of and into the forested interior stand as proposed.

3. Food Plot Area

a. Sunoco will be expected to cut undesirable vegetation (all birch, maple and dead eastern hemlock-Tsuga canadensis) in a ¼ acre area on the south side of the existing ROW at a location as designated by the District Forester. Sunoco must retain other species such as black gum-*Nyssa sylvatica* and basswood-*Tilia Americana.*

b. Sunoco will need not till or utilize heavy equipment, only remove tree boles and tops in the newly created food plot.
   - Stumps may remain
   - Remove the tops to clear a space for planting the trees and shrubs.

c. Once the undesirable vegetation is cut, Sunoco will follow up next with diverse plantings of desirable mast producing vegetation: **Grey dogwood-***Cornus racemosa*, **arrowwood viburnum-***Viburnum*

dentatum, **nannyberry-***Viburnum lentago*, **maple-leaf viburnum-***Viburnum acerifolium*, **black-haw-***Viburnum prunifolium*, **hawthorn, and beaked hazelnut-***Corylus cornuta*.

Also plant: Scrub oak, black oak, flowering dogwood-*Cornus florida*, silky dogwood-*Cornus amomum*, chokeberry-*Aronia melanocarpa*, American mountain ash-*Sorbus americana*, and hybrid chestnuts if available. Rubus is a desirable species that is expected to volunteer and is not necessary to plant.

Spacing Requirements:
Scrub oak should be placed 3 feet apart.
Shrub species must be planted close together.

d. Sunoco will be expected to install woven wire fencing around the perimeter of the food plot and related access gates. Access would need created to the food plot and an access barricade installed - a steel gate. The area to-be-fenced and the number, location, and type of access gate(s) will be determined by the District Forester. Preliminary the scope of work expected includes: installing a man gate and a vehicle gate within or as a part of the woven wire fence; creating access from the Wolf Road and installing a standard steel gate that meet the specifications to be issued by the District Forester. The new steel gate will serve as access for both the new food plot and future access to the right of way.

4. Right of Way Maintenance

a. Sunoco must allow vegetation in the pending legal right of way corridor width adjacent to the existing habitat to grow as long as it does not pose a risk to pipeline integrity or the operational maintenance of the right of way corridor such as to interfere with aerial inspection.
b. Sunoco must maintain the rocky substrate on pipeline right of way as it exists. The existing right of way has a rocky surface that provides cover for woodrats.
c. Sunoco must seed with a native warm-season mix (DCNR native seed mix attached.)

5. Plantings in General

a. Sunoco will need to provide for adequate spacing for tree plantings. Spacing will vary with the species e.g. 12X12 for chestnut, 8X8 for hawthorn, 3X3 for small shrubs such as arrowwood, grey dogwood, silky dogwood, scrub oak, etc. One primary goal of the habitat enhancement effort is to achieve a closed canopy to provide some protection for the woodrats when they forage rather than an open orchard type of structure. Shrubs could be planted close to the chestnut.
b. A 75% survival of plantings over 2 growing seasons will be a requirement.
c. If tree planting mortality exceeds 25%, Sunoco will need to replant trees and shrubs
d. **No blasting near woodrat habitat.**
e. Sunoco will need to submit a copy of the woodrat conservation plan to the DCNR Bureau of Forestry for review; written approval of the plan must be obtained from the DCNR Bureau of Forestry prior to Sunoco's implantation.