

Equitrans, L.P.
Equitrans Expansion Project
Docket No. CP16-13-000
Supplemental Materials Submitted October 31, 2016

Attachment G

Botanical Surveys for Rare Plants and Habitat Assessment along the Equitrans Expansion Project

BOTANICAL SURVEYS FOR RARE PLANTS
AND HABITAT ASSESSMENT
ALONG THE EQUITRANS EXPANSION PROJECT IN
ALLEGHENY, WASHINGTON, AND GREENE COUNTIES,
PENNSYLVANIA
AND WETZEL COUNTY, WEST VIRGINIA

PNDI Receipt: 22453

26 October 2016

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TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.....	1
1.1 Overall Project Description.....	1
1.1.1 Pennsylvania Project Description.....	1
1.1.2 West Virginia Project Description.....	1
1.2 Project Setting.....	3
1.3 Project Screening.....	3
1.3.1 Federal Energy Regulatory Commission (FERC)	3
1.3.2 Pennsylvania Natural Diversity Inventory (PNDI).....	3
1.3.3 Project Screening in West Virginia.....	3
2.0 METHODS	5
2.1 Pennsylvania.....	5
2.2 Time of Survey.....	5
2.3 Survey Methods.....	5
2.3.1 Desktop Review	5
2.3.2 In-field Mapping	6
2.3.3 Field Surveys for Rare Plants	6
2.3.4 Community Types	6
2.3.5 Disturbance Analysis.....	7
2.3.6 Complete List of Flora Encountered.....	7
2.4 West Virginia.....	7
3.0 RESULTS	8
3.1 Pennsylvania.....	8
3.1.1 Time of Survey.....	8
3.1.2 Detection of Rare Plants	8
3.1.3 NLCD Land Cover Types	8
3.1.4 ROW Habitat.....	11
3.1.5 Invasive species and Disturbance Analysis	12
3.1.6 Total Floral Diversity	12
3.2 West Virginia.....	12
3.2.1 NLCD Land Cover Types.....	12
3.2.2 Invasive Species and Disturbance Analysis.....	12
4.0 DISCUSSION AND CONCLUSION	12
5.0 LITERATURE CITED.....	13

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
Figure 1. Location of the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County Virginia.....	2

LIST OF TABLES

<u>Table</u>	<u>Page</u>
Table 1. PNDI review list of six potentially impacted plant species (Receipt Number 22453) for the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania.....	4
Table 2. NLCD Land Cover Classes occurring within the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania.	11

Appendix

Appendix A: Pennsylvania Natural Diversity Inventory Environmental Review Receipt Number 22453

Appendix B: PA DCNR Wild Plant Management Permits

Appendix C: List of Flora Identified along the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania

Appendix D: (Maps 1-10). Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia

Appendix E: Pennsylvania Botanical Field Survey Forms

Appendix F: Representative Project Photographs

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1.0 Introduction

1.1 Overall Project Description

Equitrans (EQT) proposes to develop the Equitrans Expansion Project (Project) in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia (Figure 1). The Project includes construction of three new pipelines alignments in Pennsylvania as well as areal facilities (compressor and connector stations and laydown yards) in both West Virginia and Pennsylvania. On behalf of their client EQT, Tetra Tech contracted Environmental Solutions & Innovations, Inc. (ESI) to conduct botanical surveys and habitat assessments for the Project.

The two states have markedly different approaches to botanical resources and these differences are reflected in all aspects of this study.

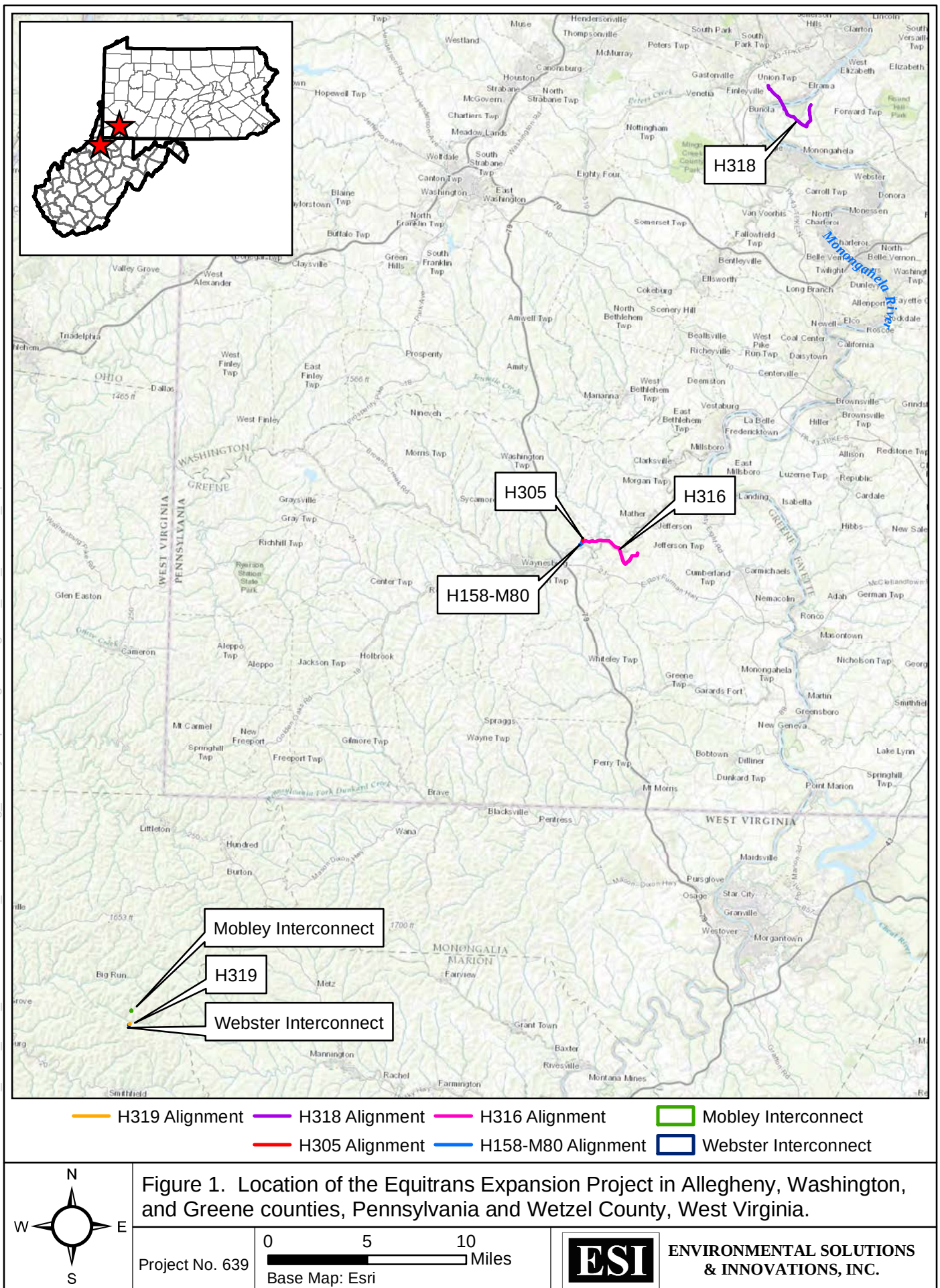
1.1.1 Pennsylvania Project Description

The Project in Pennsylvania involves construction of approximately 7.5 miles of pipeline (at multiple separate locations), and a new compressor station. Equitrans proposes the following three non-continuous system modifications in Pennsylvania: (i) build a new 3.32 mile, 30-inch diameter pipeline in Greene County, Pennsylvania (the “H-316 Pipeline”); (ii) build a new 4.18 mile, 20-inch-diameter pipeline in Allegheny and Washington Counties, Pennsylvania (the “H-318 Pipeline”); and (iii) replace and expand its existing Pratt Compressor Station with the Redhook Compressor Station in Greene County, Pennsylvania. The existing Pratt Station will become a pipe yard, and include existing and upgraded measurement and interconnect facilities.

The H-318 and H-316 segments require the use of horizontal directional drilling (HDD) to cross the Monongahela River and Ten-Mile Creek, respectively. The Project is designed to minimize greenfield construction to the extent practicable, and to parallel existing EQT Rights-of-Way (ROW). Construction and maintenance of these alignments will require the use of access roads including 2.65 miles of existing access roads. In addition to the ROW and access roads, several ancillary areas were also within the proposed sampling buffer.

1.1.2 West Virginia Project Description

Ground disturbance associated with the project in West Virginia involves the creation of two interconnects (Mobley Interconnect and Webster Interconnect) between three previously permitted pipelines. The Webster Interconnect will connect future pipelines to the proposed Mountain Valley Pipeline (MVP). The Mobley Tap will include valving and piping linking MVP’s proposed Mobley Tap and the H-302 pipeline. These activities will affect 3.89 acres of land, much of which was already disturbed.



1.2 Project Setting

The Project lies in the Appalachian Plateaus Province within both the Waynesburg Hills and Pittsburgh Low Plateau physiographic sections in Pennsylvania and the Appalachian Low Plateau physiographic section in West Virginia. The Waynesburg Hills Section is defined by narrow hilltops with steep-sloped, narrow valleys. Local relief is between 183-305 meters (600-1,000 ft). The Pittsburgh Low Plateau Section consists of smooth undulating upland surface cut by numerous narrow shallow valleys. The Appalachian Low Plateau is comprised of primarily flat rock formations with some folds and faults on the eastern side. These uplands are developed on rocks containing significant amounts of coal. Evidence of mining (both historic and recent) abound within the Project footprint.

1.3 Project Screening

1.3.1 Federal Energy Regulatory Commission (FERC)

The Project is an interstate natural gas pipeline and thus requires FERC to issue a Certificate of Public Convenience and Necessity under Section 7 of the Natural Gas Act. In support of that effort FERC has requested information about the distribution of habitat types and exotic and invasive species within the Project Workspace.

1.3.2 Pennsylvania Natural Diversity Inventory (PNDI)

In Pennsylvania, potential impacts to natural resources are managed through the PNDI process which acts as a clearing house for project proponents and the Commonwealth's natural resources agencies. Due to the Project's size, a large PNDI review was initiated by EQT on 27 April 2015 and changes in project design led to a second large project PNDI request which was submitted by ESI on 24 June 2015.

As a result of both PNDI requests, the Pennsylvania Department of Conservation and Natural Resources (DCNR) screened the Project for potential impacts to species and resources (Appendix A). The second review (PNDI# 22453) determined the Project had potential to impact six plant species listed or that have the potential to become listed as endangered, threatened, or rare (Table 1) in the state. When a rare plant survey is requested, the DCNR requires a permitted botanist to conduct the survey because the goal is not just to look for the species listed on the PNDI report, but to be able to recognize any other rare plants in the survey area and to provide the DCNR with a "reasonably complete" list of all plant species identified during the survey. Field surveys were conducted by Mr. Lawrence Brewer (PA DCNR Wild Plant Management Permits 15-546 and 16-546, Appendix B) and an assistant. This report details the methods and results of the survey.

1.3.3 Project Screening in West Virginia

In West Virginia, potential impacts to natural resources are addressed by opening direct correspondence with both the West Virginia Division of Natural Resources

Table 1. PNDI review list of six potentially impacted plant species (Receipt Number 22453) for the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania.

Scientific Name	Common Name	Current Status ¹	Proposed Status ¹	Survey Date	Preferred Habitat	Locally Documented Habitat
<i>Baptisia australis</i>	blue false-indigo	N	PT	flowers May –June.	open woods, stream banks, sandy floodplains	rich wooded riverine slope
<i>Erythronium albidum</i>	white trout-lily	N	PR	flowers Apr. – May.	moist woods and rich slopes, especially on limestone	floodplain forest on rich wooded slopes along rivers and creeks
<i>Iodanthus pinnatifidus</i>	purple rocket	PE	PE	flowers May – June.	moist alluvial woods and wooded slopes	rich wooded riverine slope
<i>Scutellaria saxatilis</i>	rock skullcap	TU	PE	flowers July – Aug.	low woods, rocky stream banks, roadsides	sycamore scrub floodplain
<i>Trillium nivale</i>	snow trillium	PR	PR	flowers March – Apr.	stream valleys and wooded slopes, especially limestone	rich stream valley wooded slopes
<i>Tipularia discolor</i>	crane-fly orchid	PR	PR	Flowers June – August; leaf visible fall, winter, spring	deciduous forest and stream banks	red oak mixed hardwood forest

¹PE = Pennsylvania Endangered, PR = Pennsylvania Rare, TU = Tentatively Undetermined, N = Not Listed, but Under Review

(WVDNR) for resources under state jurisdiction and the U.S. Fish and Wildlife Service (USFWS) field office in Elkins, West Virginia. WVDNR did not provide comments, but USFWS noted concern for the Indiana (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*), both protected under the ESA. USFWS requested a Myotis Bat Conservation Plan (MBCP) which includes an assessment of land cover. Field surveys in West Virginia were conducted as part of the MBCP by Mr. Brian Dennis, a permitted bat biologist trained to identify habitat characteristics including land cover and common invasive species.

2.0 Methods

2.1 Pennsylvania

2.2 Time of Survey

Because of the potential for rare plants, all portions of the Project in Pennsylvania were surveyed on three occasions. Surveys were completed during flowering and/or vegetative periods when one or more of the target plant species was readily identifiable. For example, crane fly orchids are readily identified in early spring when they are among the few plants with green leaves and in late summer when the species is in flower. The first survey was conducted during 6 to 9 April 2016 for crane fly orchid, snow trillium, and white trout lily. The second survey was conducted 23 and 24 May 2016 for white trout lily, purple rocket, and blue false-indigo. The last survey was conducted during 18 to 20 July 2016 for rock skullcap and flowering crane fly orchid. As such, all species and the presence or absence of potentially suitable habitat could be identified.

The six species listed (PNDI Receipt Number 22453) are primarily associated with three major habitat types (stream sides, floodplains and woodlands). Habitat within each area is described in sections 3.3 and 3.4 below.

2.3 Survey Methods

2.3.1 Desktop Review

A desktop review of National Landcover Database (NLCD 2011), publicly available aerial photographs, USGS topographic maps, elevation and aspect layers is completed by ESI to determine potential habitat for the focal species (Table 1). This analysis identifies likely habitat for potential species (e.g., stream banks for blue false-indigo or crane fly orchid, low roadsides for rock skullcap) and helps guide field survey efforts.

2.3.2 In-field Mapping

Map layers are loaded on a GPS-enabled tablet computer allowing biologists to selectively interact (i.e., turn layers on and off or zoom in or out) with maps while in the field. Using this same tablet computer, biologists create a real-time map layer that identifies the location of resources as they are identified, and also allows biologists to link these map layers to other data including habitat patches, disturbance conditions, and location and identification of rare species. In all cases, the mapped location is linked to text descriptions and representative photographs of the item being mapped.

2.3.3 Field Surveys for Rare Plants

Field surveys were conducted using a meander search technique across a 91.4-meter (300-ft) wide survey corridor centered on the Right-of-Way (ROW), along access roads, and at all proposed ancillary footprints. A meander search method is an acceptable approach (Goff et al. 1982) where new habitat variations or unique areas are constantly being searched to maximize effectiveness. Investigators walk the Project limits and vicinity searching for rare plant species occurrences, and habitat types that support rare plant species. General habitat types are identified, including representative plant species. When suitable habitats for rare species or other unique areas are encountered, a more intensive search is performed to ensure adequate surveying of all suitable areas. Conversely, the search effort and detail are less intensive in areas with limited or no potential to contain rare plant species.

Photographs and detailed notes are taken for each area deemed potentially suitable during the site visits. If target species are found, the population/colony boundaries for each site are marked with flagging and mapped with GPS equipment with sub-meter accuracy.

The work is completed during the optimum search windows for the target species and any rare plants encountered within the survey area are recorded and mapped using the interactive mapping tool.

2.3.4 Community Types

A habitat assessment is completed to document habitats encountered. All distinct habitats within the Project area are identified, categorized, and evaluated for potential for any rare species. Each area of similar vegetation is identified and its boundaries are mapped using the interactive mapping program. Data collected for each patch include the overall habitat type (i.e., deciduous forest, grassland, agricultural), relative maturity, dominant plant species, and level of disturbance.

2.3.5 Disturbance Analysis

Rare plants are often associated with habitat patches where minimal anthropogenic disturbance has occurred. Biologists rate disturbance within each habitat area based on the following scale:

- **Undisturbed** is defined as an area that displays features and native vegetative cover types without disturbance. Three to four discernible strata levels of vegetation are present, such as canopy, sub-canopy, shrub, and herbaceous. Examples include an old growth forest with no signs of logging or development within the past 40 years and/or few invasive species present.
- **Light Disturbance** is defined as an area that displays features and native vegetative cover types with evidence of slight disturbance. Three to four discernible strata levels of vegetation such as canopy, sub-canopy, shrub, and herbaceous are present, but one or two strata levels may not be mature. Examples include a deciduous hardwood forest with some prior logging within the past 40 years, or development such as trails sparsely distributed through an area, or the presence of some invasive plant species.
- **Moderate Disturbance** is defined as an area that displays native vegetative cover types with evidence of moderate disturbance. Two to three discernible strata levels of vegetation such as canopy, shrub, and herbaceous are present, but one or two strata levels may not be mature. Examples include a forest with obvious signs of logging, development such as dirt roads traversing the area, and/or the presence of numerous invasive species.
- **High Disturbance** is defined as an area that displays few native vegetative cover types with evidence of significant disturbance. One or two discernible strata levels of vegetation such as shrub, and herbaceous are present but, not mature or in complete succession. Examples include a hay field or an old-field subsequent to clear cutting or development such as residential areas.

2.3.6 Complete List of Flora Encountered

As required by DCNR, ESI biologists maintain a list of all plants identified during the survey (Appendix C).

2.4 West Virginia

Field surveys in West Virginia were completed on 5 December 2016 and included both new areas and ground truthing of data collected during two prior trips (20 May 2014 and 24 October 2015) to the site for other pipeline projects that partly overlap the site. Because rare plant surveys were not required in West Virginia, biologists identified habitat patches which included information on land cover, dominant species, and areas

invaded by invasive species. Studies were conducted within a 17.13-acre area of interest (AOI) surrounding the 3.89 acres that will be disturbed.

3.0 Results

3.1 Pennsylvania

3.1.1 Time of Survey

Surveys were completed during three time periods: 6 to 9 April; 23 to 24 May; and 18 to 20 July 2016 by Mr. Brewer and an assistant. During the three survey periods, conditions were appropriate for discovery of the six rare plants identified in Table 1.

3.1.2 Detection of Rare Plants

None of the target species were detected, but two other species of concern for the DCNR were identified. One population of nodding rattlesnakeroot (*Prenanthes crepidinea*) was identified in a lightly disturbed section of forest along the ROW on the H318 line (Map 3, Appendix D; 40.22807°N -79.93216°W). Nodding rattlesnakeroot is listed as endangered in Pennsylvania. Two populations of goldenseal (*Hydrastis canadensis*) were also identified (in along the ROW in the H316 line (Maps 8 and 9, Appendix D; 39.9125334359136°N -80.0939988224441°W and 39.907430851277°N, -80.090918116565°W). Goldenseal is listed as vulnerable in Pennsylvania. Pennsylvania Botanical Field Survey Forms are included in Appendix E.

3.1.3 NLCD Land Cover Types

Nine NLCD land cover types were detected during the survey. Land cover types observed and documented include: deciduous forest; developed, high intensity; developed, medium intensity; developed, open space; emergent herbaceous wetlands; evergreen forest; grassland/herbaceous; open water; pasture/hay. Maps depicting the extent and locations of each of the land cover class along each line are provided in Appendix D. A complete description of each vegetative community is described below. Representative photographs are provided in Appendix F. Areas where land owners failed to allow permission for the survey are labeled as “**No Access**”.

- **Deciduous Forest:** Deciduous forests are areas dominated by trees generally greater than 5 meters (16 ft) tall, and comprising greater than 20 percent of total vegetation cover. In addition, more than 75 percent of the tree species shed foliage simultaneously in response to seasonal change. This was the most common habitat type encountered. The vast majority of the deciduous forest encountered was highly disturbed by invasive species. Disturbed forests do not resemble forest types that existed prior to Euro-

American settlement and plant species that do not respond well to frequent disturbance are often excluded. Dominant tree species in this habitat include wild black cherry (*Prunus serotina*), black locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), red elm (*Ulmus rubra*), box elder (*Acer negundo*), hackberry (*Celtis occidentalis*), American sycamore (*Platanus occidentalis*), and sugar maple (*Acer saccharum*). Dominant shrubs and vines mostly included invasive exotic species such as multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), common privet (*Ligustrum vulgare*), Tatarian honeysuckle (*Lonicera Tatarica*), tree of heaven (*Ailanthus altissima*), oriental bittersweet (*Celastrus orbiculatus*), and Japanese honeysuckle (*Lonicera japonica*). Native species such as hornbeam (*Ostrya virginiana*), flowering dogwood (*Cornus florida*), and spicebush (*Lindera benzoin*) are also found. The most abundant herbs included garlic mustard (*Alliaria petiolata*), lesser celandine (*Ranunculus ficaria*), spring beauty (*Claytonia caroliniana*), cutleaf toothwort (*Cardamine concetenata*), woodland phlox (*Phlox divaricata*), common blue violet (*Viola pubescens*), star of Bethlehem (*Ornithogalum umbellatum*), sweet cicely (*Osmorhiza claytonii*), zigzag goldenrod (*Solidago flexicaulis*), pokeweed (*Phytolacca americana*), wingstem (*Verbesina altissima*), and large flowered trillium (*Trillium grandiflorum*).

- **Developed, High Intensity:** These are highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover. For this Project, these areas included paved or highly graveled areas, urban areas with mowed lawns and landscaping, an older commercial lot, a railroad yard and natural gas facilities. These areas had very little plant cover. The plant cover that existed was mainly exotic herbs such as multiflora rose, Chinese silvergrass, common periwinkle, dandelion, and Kentucky blue grass
- **Developed, Medium Intensity:** These areas are a mixture of constructed materials and vegetation. Impervious surfaces account for 50 to 79 percent of the total cover. These areas most commonly include single-family housing units. In this Project, this land cover type primarily consisted of areas along gravel or paved roads, areas of abandoned homesteads, and an abandoned academy. Gravel dominates the land cover, however, scattered herbaceous plants occur including Kentucky blue grass, dandelion, white clover (*Trifolium repens*), red clover (*Trifolium pratense*), roundleaf ragwort (*Packera obovata*), garlic mustard, and orchard grass (*Dactylis glomerata*). Invasive shrubs such as multiflora rose, Tatarian honeysuckle and common privet were also dominant in these areas.
- **Developed, Open Space:** These areas contain a mixture of some constructed materials, but primarily consist of vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover.

These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes. In this Project, a single developed open space occurred comprising a large gravel lot containing invasive species on the edges and growing from the rock. These species included multiflora rose, Tatarian honeysuckle, Japanese honeysuckle, Amur honeysuckle, common privet, and tree of heaven.

- **Emergence Herbaceous Wetlands:** These areas include greater than 80 percent perennial herbaceous vegetation cover and soil or substrate is periodically saturated with or covered with water. Two small emergent wetlands were identified in the Project area in Greene County. Dominant species included black willow (*Salix nigra*), pussy willow (*Salix discolor*), black walnut (*Juglans nigra*), autumn olive, Tatarian honeysuckle, *Rubus* spp., narrowleaf cattail (*Typha angustifolia*), reed canarygrass (*Phalaris arundinacea*), and Allegheny monkeyflower (*Mimulus ringens*). Several of these species are invasive, thus the quality of the wetlands has been compromised.
- **Evergreen Forest:** These areas are dominated by trees generally taller than 5 meters (16 ft) tall that comprise greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year, thus the canopy is never void of green foliage. Two small areas were noted as evergreen forest in the Project area. One, in Washington County was dominated by hemlock and Norway spruce. A few Japanese yew were also observed. This area was highly disturbed and several invasive species were observed. A second area and previous pine plantation in Greene County, was dominated by Austrian pine (*Pinus nigra*), white pine (*Pinus strobus*), white spruce (*Picea glauca*), and Norway spruce (*Picea abies*). Primarily invasive shrubs such as autumn olive and common privet comprised the understory. The herbaceous layer was mainly grasses.
- **Grassland/Herbaceous:** These are areas dominated by graminoid or herbaceous vegetation which generally accounts for greater than 80 percent of total vegetation. Grasslands were the second most common land cover classification for the Project, predominantly consisting of old fields and existing ROWs for natural gas lines and powerlines. Dominant grass species included broomsedge bluestem (*Andropogon virginicus*), perennial ryegrass (*Lolium perenne*), orchard grass (*Dactylis glomerata*), kentucky bluegrass (*Poa pratensis*), purpletop tridens (*Tridens flavus*), and fescue (*Festuca* spp.). Dominant forbs included wild garlic (*Allium veniale*), indianhemp (*Apocynum cannabinum*), white clover (*Trifolium repens*), dandelion (*Taraxacum officinale*), Joe pye weed (*Eupatorium fistulosum*), flat-top goldenrod (*Euthamia graminifolia*), Canada goldenrod (*Solidago canadensis*), American pokeweed (*Phytolacca americana*), yarrow (*Achillea millefolium*), and mountainmint (*Pycnanthemum* spp.). The introduced

lesser celandine (*Ranunculus ficaria*) was very common in a few grasslands. Dominant shrubs and briars included Allegheny blackberry (*Rubus allegheniensis*), black raspberry (*Rubus occidentalis*) and the introduced multiflora rose, and autumn olive. A few American sycamore (*Platanus occidentalis*), boxelder (*Acer negundo*), tulip tree (*Liriodendron tulipifera*), sassafras (*Sassafras albidum*) and red maple (*Acer rubrum*) were scattered across this habitat type.

- **Open Water:** These are areas of open water with less than 25 percent cover of vegetation or soil. This habitat type is represented by the Monongahela River at the Washington and Allegheny county borders and by the Ten-mile Creek crossing in Greene County.
- **Pasture/Hay:** These are areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. Pasture was the third most common habitat type encountered during the Project, primarily in Washington and Allegheny counties. Dominant plants included orchard grass, Kentucky bluegrass, broomsedge bluestem, fescue, white clover, dandelion, multiflora rose, Tatarian honeysuckle, Amur honeysuckle, and tree of heaven.

3.1.4 ROW Habitat

The Project area is dominated by deciduous forest (32.17%), grassland/herbaceous (26.77%), and pasture/hay (17.32%; Table 2). Developed, medium intensity (8.66%), and developed, high intensity (6.27%) were occasionally encountered. All other documented habitat types (developed, open space, open water, evergreen forest, and emergent herbaceous wetlands) comprised less than five percent of the land cover.

Table 2. NLCD Land Cover Classes occurring within the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania.

NLCD Land Cover Class	Acreage	%	Miles of Centerline
Deciduous Forest	127.80	32.17	2.44
Grassland/Herbaceous	106.32	26.77	1.83
Pasture/Hay	68.79	17.32	1.74
Developed Medium Intensity	34.42	8.66	0.50
Developed High Intensity	24.92	6.27	0.29
No Access	18.36	4.62	0.51
Developed, Open Space	7.30	1.84	0.02
Open Water	6.95	1.75	0.19
Evergreen Forest	2.20	0.55	0.13
Emergent Herbaceous Wetlands	0.16	0.04	0.00
Total	397.21	100.00	7.65

3.1.5 Invasive species and Disturbance Analysis

Invasive species were very prevalent throughout the Project area. Overall, 29 species listed on the DCNR invasive plant list and an additional four species on the DCNR watch list were identified (Appendix C). The most common introduced species included multiflora rose, garlic mustard, Tatarian honeysuckle, Amur honeysuckle, Japanese honeysuckle, lesser celandine, autumn olive, oriental bittersweet, and tree of heaven.

Most deciduous forest and grasslands were scored as highly disturbed. Only two small areas were scored as moderately to lightly disturbed. These included areas with some aspects indicative of a mature forest and were examined closely for the potential for rare plants even though disturbances (invasive species) may have produced less than optimal habitat.

3.1.6 Total Floral Diversity

Overall botanists identified 290 species belonging to 82 plant families and 213 genera during the surveys and this list is provided in Appendix C.

3.2 West Virginia

3.2.1 NLCD Land Cover Types

The AOI surrounding the Project site was dominated by deciduous forest (11.62 acres, 67.88%), and developed, open space (5.34 acres, 31.16%) with a very small amount of developed low intensity (0.17 acre, 0.97%). The 3.89 acre LOD contained 1.54 acres (39.50%) of deciduous forest and 2.35 acres (60.50 percent) of developed, open space (primarily pipeline ROW).

3.2.2 Invasive Species and Disturbance Analysis

EQT has specifically selected the LOD in West Virginia to maximize use of areas disturbed by previous activities. As such, developed portions of the LOD and AOI in West Virginia are characterized as heavily disturbed. The remnant forest within the LOD is moderately disturbed including the presence of multiple Invasive species. Invasive species noted during the survey included multiflora rose, Tatarian honeysuckle, Japanese honeysuckle, and Amur honeysuckle.

4.0 Discussion and Conclusion

ESI completed three surveys for rare plants. None of the focal plant species (Table 1) were observed but one population of nodding rattlesnakeroot, a Pennsylvania state endangered species, and two populations of goldenseal, a state vulnerable species, were identified and mapped. Locations of these rare plants were provided to EQT, who

indicated the project, as currently designed, will not be able to avoid impacts to the population of nodding rattlesnakeroot. However, EQT would be willing to move the plants to the edge of ROW. EQT is evaluating the potential to voluntarily avoid and/or move individual goldenseal.

Nine distinct vegetative community types were contained within the Project. The most common habitat type was deciduous forest which is the preferred habitat type for many of the focal species (Table 1).

Pervasive anthropogenic disturbance limits the value of the proposed ROW, access roads and ancillary facilities as rare plant habitat. The prevalence of introduced species, maintained existing ROWs, mowing, grazing, and road development has resulted in soil disturbance, competition with native plant species, and loss of habitat for native plant species. Disturbed soils and communities lack natural qualities essential for moisture, pH and mycorrhizal relationships and also potentially diminish native seed banks. Areas with minimal anthropogenic disturbance in the Project are rare, and are associated with the two areas where rare plants were found.

5.0 Literature Cited

Goff, F. G., A. Dawson, and J. Rochow. 1982. Site examination for threatened and endangered plant species. *Environmental Management* 6:307-316.

APPENDIX A
PENNSYLVANIA NATURAL DIVERSITY INVENTORY ENVIRONMENTAL REVIEW
RECEIPT NUMBER 22453



BUREAU OF FORESTRY

July 22, 2015

PNDI Number: 22453

Dale Sparks**Environmental Solutions & Innovations, Inc.**

4525 Este Avenue

Cincinnati, OH 45232

Email: dsparks@envsi.com (hard copy will not follow)

Re: Equitrans Expansion Project**Allegheny, Washington, and Greene Counties, PA**

Dear Mr. Sparks,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Large Project Number 22453 for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

Potential Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

Segment H318

Scientific Name	Common Name	PA Current Status	PA Proposed Status
<i>Baptisia australis</i>	Blue False-indigo	Not Listed	Threatened
<i>Erythronium albidum</i>	White Trout-lily	Not Listed	Rare
<i>Iodanthus pinnatifidus</i>	Purple Rocket	Endangered	Endangered
<i>Scutellaria saxatilis</i>	Rock Skullcap	Undetermined	Endangered
<i>Trillium nivale</i>	Snow Trillium	Rare	Rare

Segments H316/H158-M80

Scientific Name	Common Name	PA Current Status	PA Proposed Status
<i>Erythronium albidum</i>	White Trout-lily	Not Listed	Rare
<i>Scutellaria saxatilis</i>	Rock Skullcap	Undetermined	Endangered
<i>Tipularia discolor</i>	Cranefly Orchid	Rare	Rare
<i>Trillium nivale</i>	Snow Trillium	Rare	Rare

Survey Request

DCNR requests a survey for the following species:

- ***Baptisia australis* (Blue False-indigo):** locally documented on a rich wooded riverine slope; prefers open woods, stream banks, and sandy floodplains; flowers May – June
- ***Erythronium albidum* (White Trout-lily):** locally documented in floodplain forest and on rich wooded slopes along rivers and creeks; prefers moist woods and rich slopes, especially on limestone; flowers April – May

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- ***Iodanthus pinnatifidus* (Purple Rocket):** locally documented on a rich wooded riverine slope; prefers moist alluvial woods and wooded slopes; flowers May – June
 - ***Scutellaria saxatilis* (Rock Skullcap):** locally documented in sycamore scrub floodplain; prefers low woods, rocky stream banks, and roadsides; flowers July – August
 - ***Tipularia discolor* (Crane-fly Orchid):** locally documented in red oak mixed hardwood forest; prefers deciduous forest and stream banks; leaf visible fall, winter, and spring
 - ***Trillium nivale* (Snow Trillium):** locally documented on rich stream valley wooded slopes; prefers stream valleys and wooded slopes, especially on limestone; flowers late March – April
- ✓ A survey for the above species should be conducted by a qualified botanist *at the appropriate time of year and then submitted to our office for review. Your botanist should carefully review the new DCNR Botanical Survey Protocols available at <http://www.gis.dcnr.state.pa.us/hgis-er/Login.aspx>. These protocols are recommended to ensure that the all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.*
 - ✓ Your botanist should *fill out the field survey form while performing their survey: <http://www.gis.dcnr.state.pa.us/hgis-er/hgis/2012%20DCNR%20Field%20Survey%20Form.pdf>. Contact our office prior to the survey for detailed information about the species, or for a list of qualified surveyors.*
 - ✓ Any target and non-target state-listed species found during the site visit should be reported to our office. Mitigation measures and monitoring may be requested if species or communities of special concern are found on or adjacent to site.
 - ✓ If the land type(s) does not exist on site, a survey may not be necessary; please submit a habitat assessment report which describes the current land cover, habitat types, and species found on site.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an “Update” (including an updated PNDI receipt, project narrative and accurate map). As a reminder, this finding applies to potential impacts under DCNR’s jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth’s other resource agencies for environmental review.

Should you have any questions or concerns, please contact Jason Ryndock, Ecological Information Specialist, by phone (717-705-2822) or via email (c-jryndock@pa.gov).

Sincerely



Greg Podnieszinski, Section Chief
Natural Heritage Section

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APPENDIX B
PA DCNR WILD PLANT MANAGEMENT PERMIT



WILD PLANT MANAGEMENT PERMIT

Date: 22 June 2015

Permit No. 15-546

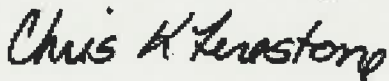
THIS PERMIT IS ISSUED TO:

Larry Brewer for collection of Pennsylvania Endangered and Threatened plant species for submission as voucher specimens while conducting botanical studies and research in Pennsylvania.

THE PERMITTEE MUST CARRY THIS PERMIT DURING THE REMOVAL, COLLECTION, OR TRANSPLANTING OF PA ENDANGERED AND PA THREATENED PLANT SPECIES AND WILL PRESENT THIS PERMIT FOR INSPECTION UPON REQUEST. THE PERMITTEE MUST ALSO COMPLY WITH CHAPTER 45, SECTION 47 AND 48 RELATING TO REPORT INFORMATION.

PERMIT CONDITIONS:

Vouchers are to be deposited in an accredited institution. Notify land managers before conducting permitted activities. Permittee shall report results to the Bureau of Forestry, Ecological Services.
Land owner permission must be acquired before conducting work.



DCNR, BUREAU OF FORESTRY, WILD PLANT PROGRAM MANAGER

THIS PERMIT WILL EXPIRE JUNE 22, 2016

NONTRANSFERRABLE

THIS PERMIT MAY BE REVOKED FOR GOOD CAUSE.

WILD PLANT MANAGEMENT PERMIT

Date: 15 June 2015

Permit No. 16-546

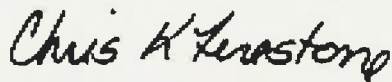
THIS PERMIT IS ISSUED TO:

Larry Brewer for collection of Pennsylvania Endangered and Threatened plant species for submission as voucher specimens while conducting botanical studies and research in Pennsylvania.

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DCNR, BUREAU OF FORESTRY, WILD PLANT PROGRAM MANAGER

THIS PERMIT WILL EXPIRE **JUNE 15, 2017**

NONTRANSFERRABLE

THIS PERMIT MAY BE REVOKED FOR GOOD CAUSE.

APPENDIX C
LIST OF FLORA IDENTIFIED ALONG THE EQUITRANS EXPANSION PROJECT IN
ALLEGHENY, WASHINGTON, AND GREENE COUNTIES, PENNSYLVANIA

List of Flora Identified along the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania.

Species Number	Common Name ¹	Scientific Name
1	Norway maple ²	<i>Acer platanoides</i> ²
2	boxelder	<i>Acer negundo</i>
3	red maple	<i>Acer rubrum</i>
4	silver maple	<i>Acer saccharinum</i>
5	sugar maple	<i>Acer saccharum</i>
6	sweetflag	<i>Acorus</i> sp.
7	winged sumac	<i>Rhus copallinum</i>
8	smooth sumac	<i>Rhus glabra</i>
9	staghorn sumac	<i>Rhus typhina</i>
10	eastern poison ivy	<i>Toxicodendron radicans</i>
11	pawpaw	<i>Asimina triloba</i>
12	poison hemlock ²	<i>Conium maculatum</i> ²
13	Queen Anne's lace	<i>Daucus carota</i>
14	longstyle sweetroot	<i>Osmorhiza longistylis</i>
15	wild parsnip ²	<i>Pastinaca sativa</i> ²
16	sanicle	<i>Sanicula</i> sp.
17	yellow pimpernel	<i>Taenidia integerrima</i>
18	Indianhemp	<i>Apocynum cannabinum</i>
19	common periwinkle ³	<i>Vinca minor</i> ³
20	American holly	<i>Ilex opaca</i>
21	Jack in the pulpit	<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>
22	Canadian wildginger	<i>Asarum canadense</i>
23	common milkweed	<i>Asclepias syriaca</i>
24	ebony spleenwort	<i>Asplenium platyneuron</i>
25	common yarrow	<i>Achillea millefolium</i>
26	white snakeroot	<i>Ageratina altissima</i>
27	annual ragweed	<i>Ambrosia artemisiifolia</i>
28	lesser burdock	<i>Arctium minus</i>
29	annual wormwood	<i>Artemisia annua</i>
30	devil's beggarticks	<i>Bidens frondosa</i>
31	chicory	<i>Cichorium intybus</i>
32	Canada thistle ²	<i>Cirsium arvense</i> ²
33	bull thistle ²	<i>Cirsium vulgare</i> ²
34	field thistle	<i>Cirsium discolor</i>
35	eastern daisy fleabane	<i>Erigeron annuus</i>
36	Philadelphia fleabane	<i>Erigeron philadelphicus</i>
37	Joe Pye weed	<i>Eupatorium fistulosum</i>
38	common boneset	<i>Eupatorium perfoliatum</i>
39	late boneset	<i>Eupatorium serotinum</i>
40	flat-top goldentop	<i>Euthamia graminifolia</i>
41	smooth oxeye	<i>Heliopsis helianthoides</i>
42	lettuce	<i>Lactuca</i> sp.
43	oxeye daisy	<i>Leucanthemum vulgare</i>

Species Number	Common Name ¹	Scientific Name
44	roundleaf ragwort	<i>Packera obovata</i>
45	cutleaf coneflower	<i>Rudbeckia laciniata</i>
46	Canada goldenrod	<i>Solidago canadensis</i>
47	zigzag goldenrod	<i>Solidago flexicaulis</i>
48	early goldenrod	<i>Solidago juncea</i>
49	common blue wood aster	<i>Symphyotrichum cordifolium</i>
50	calico aster	<i>Symphyotrichum lateriflorum</i>
51	New England aster	<i>Symphyotrichum novae-angliae</i>
52	Short's aster	<i>Symphyotrichum shortii</i>
53	common dandelion	<i>Taraxacum officinale</i>
54	coltsfoot	<i>Tussilago farfara</i>
55	wingstem	<i>Verbesina alternifolia</i>
56	giant ironweed	<i>Vernonia gigantea</i>
57	spotted knapweed ²	<i>Centaurea stoebe</i> ²
58	jewelweed	<i>Impatiens capensis</i>
59	Japanese barberry ²	<i>Berberis thunbergii</i> ²
60	twinleaf	<i>Jeffersonia diphylla</i>
61	Mayapple	<i>Podophyllum peltatum</i>
62	smooth alder	<i>Alnus serrulata</i>
63	American hornbeam	<i>Carpinus caroliniana</i>
64	American hazelnut	<i>Corylus americana</i>
65	hophornbeam	<i>Ostrya virginiana</i>
66	southern catalpa	<i>Catalpa bignonioides</i>
67	beggarslice	<i>Hackelia virginiana</i>
68	Virginia bluebells	<i>Mertensia virginica</i>
69	garlic mustard ²	<i>Alliaria petiolata</i> ²
70	smooth rockcress	<i>Arabis laevigata</i>
71	garden yellowrocket	<i>Barbarea vulgaris</i>
72	black mustard	<i>Brassica nigra</i>
73	bulbous bittercress	<i>Cardamine bulbosa</i>
74	cutleaf toothwort	<i>Cardamine concatenata</i>
75	crinkleroot	<i>Cardamine diphylla</i>
76	limestone bittercress	<i>Cardamine douglassii</i>
77	spring draba	<i>Draba verna</i>
78	watercress ⁴	<i>Nasturtium officinale</i> ⁴
79	common hop	<i>Humulus lupulus</i>
80	Japanese Honeysuckle ²	<i>Lonicera japonica</i> ²
81	Amur honeysuckle ²	<i>Lonicera maackii</i> ²
82	Tatarian honeysuckle ²	<i>Lonicera tatarica</i> ²
83	American black elderberry	<i>Sambucus nigra</i> ssp. <i>canadensis</i>
84	mapleleaf Viburnum	<i>Viburnum acerifolium</i>
85	blackhaw	<i>Viburnum prunifolium</i>
86	mouse-ear chickweed	<i>Cerastium</i> sp.
87	common mouse-ear chickweed	<i>Cerastium fontanum</i>
88	Deptford pink	<i>Dianthus ameria</i>

Species Number	Common Name ¹	Scientific Name
89	bouncing bet	<i>Saponaria officinalis</i>
90	common chickweed	<i>Stellaria media</i>
91	star chickweed	<i>Stellaria pubera</i>
92	Oriental bittersweet ²	<i>Celastrus orbiculatus</i> ²
93	winged burning bush ²	<i>Euonymus alatus</i> ²
94	common St. John's wort	<i>Hypericum perforatum</i>
95	shrubby St. John's wort	<i>Hypericum prolificum</i>
96	flowering dogwood	<i>Cornus florida</i>
97	woodland stonecrop	<i>Sedum ternatum</i>
98	Pennsylvania sedge	<i>Carex pensylvanica</i>
99	yellow nutsedge	<i>Cyperus esculentus</i>
100	softstem bulrush	<i>Schoenoplectus tabernaemontani</i>
101	green bulrush	<i>Scirpus atrovirens</i>
102	Fuller's teasel	<i>Dipsacus fullonum</i>
103	lowland bladderfern	<i>Cystopteris protusa</i>
104	silver false spleenwort	<i>Deparia arostichoides</i>
105	woodfern	<i>Dryopteris</i> sp.
106	spinulose woodfern	<i>Dryopteris carthusiana</i>
107	intermediate woodfern	<i>Dryopteris intermedia</i>
108	sensitive fern	<i>Onoclea sensibilis</i>
109	Christmas fern	<i>Polystichum acrostichoides</i>
110	autumn olive ²	<i>Elaeagnus umbellata</i> ²
111	field horsetail	<i>Equisetum arvense</i>
112	Blue Ridge blueberry	<i>Vaccinium pallidum</i>
113	deerberry	<i>Vaccinium stamineum</i>
114	eastern redbud	<i>Cercis canadensis</i>
115	honeylocust	<i>Gleditsia triacanthos</i>
116	sericea lespedeza ²	<i>Lespedeza cuneata</i> ²
117	bird's-foot trefoil	<i>Lotus corinculatus</i>
118	sweetclover	<i>Melilotus</i> sp.
119	black locust	<i>Robinia pseudoacacia</i>
120	crown vetch ²	<i>Coronilla varia</i> / <i>Securigera varia</i> ²
121	alsike clover	<i>Trifolium hybridum</i>
122	red clover	<i>Trifolium pratense</i>
123	white clover	<i>Trifolium repens</i>
124	American beech	<i>Fagus grandifolia</i>
125	white oak	<i>Quercus alba</i>
126	swamp white oak	<i>Quercus bicolor</i>
127	shingle oak	<i>Quercus imbricaria</i>
128	chestnut oak	<i>Quercus montana</i>
129	chinquapin oak	<i>Quercus muehlenbergii</i>
130	northern red oak	<i>Quercus rubra</i>
131	black oak	<i>Quercus velutina</i>
132	yellow fumewort	<i>Corydalis flavula</i>
133	squirrel corn	<i>Dicentra canadensis</i>

Species Number	Common Name ¹	Scientific Name
134	Dutchman's breeches	<i>Dicentra cucullaria</i>
135	eastern prickly gooseberry	<i>Ribes cynosbati</i>
136	Ohio buckeye	<i>Aesculus glabra</i>
137	wild hydrangea	<i>Hydrangea arborescens</i>
138	mock orange	<i>Philadelphus coronarius</i>
139	great waterleaf	<i>Hydrophyllum appendiculatum</i>
140	narrowleaf blue-eyed grass	<i>Sisyrinchium angustifolium</i>
141	bitternut hickory	<i>Carya cordiformis</i>
142	red hickory	<i>Carya ovalis</i>
143	shagbark hickory	<i>Carya ovata</i>
144	black walnut	<i>Juglans nigra</i>
145	common rush	<i>Juncus effusus</i>
146	poverty rush	<i>Juncus tenuis</i>
147	Canada horsebalm	<i>Collinsonia canadensis</i>
148	ground ivy	<i>Glechoma hederacea</i>
149	henbit deadnettle	<i>Lamium amplexicaule</i>
150	purple deadnettle	<i>Lamium purpureum</i>
151	common motherwort	<i>Leonurus cardiaca</i>
152	spearmint	<i>Mentha spicata</i>
153	peppermint	<i>Mentha x piperita</i>
154	wild bergamot	<i>Monarda fistulosa</i>
155	common selfheal	<i>Prunella vulgaris</i>
156	mountainmint	<i>Pycnanthemum</i> sp.
157	northern spicebush	<i>Lindera benzoin</i>
158	sassafras	<i>Sassafras albidum</i>
159	wild garlic	<i>Allium vineale</i>
160	dogtooth violet	<i>Erythronium americanum</i>
161	orange daylily ³	<i>Hemerocallis fulva</i> ³
162	feathery false lily of the valley	<i>Maianthemum racemosum</i>
163	star of Bethlehem ²	<i>Ornithogalum umbellatum</i> ²
164	smooth Solomon's seal	<i>Polygonatum biflorum</i>
165	red trillium	<i>Trillium erectum</i>
166	white trillium	<i>Trillium grandiflorum</i>
167	false mermaidweed	<i>Floerkea proserpinacoides</i>
168	tulip tree	<i>Liriodendron tulipifera</i>
169	osage orange	<i>Maclura pomifera</i>
170	forsythia	<i>Forsythia viridissima</i>
171	white ash	<i>Fraxinus americana</i>
172	European privet ²	<i>Ligustrum vulgare</i> ²
173	broadleaf enchanter's nightshade	<i>Circaea canadensis</i>
174	purpleleaf willowherb	<i>Epilobium coloratum</i>
175	common evening primrose	<i>Oenothera biennis</i>
176	cutleaf grapefern	<i>Botrychium dissectum</i>
177	downy rattlesnake-plantain	<i>Goodyera pubescens</i>
178	tall rattlesnakeroot	<i>Prenanthes altissima</i>

Species Number	Common Name ¹	Scientific Name
179	nodding rattlesnakeroot	<i>Prenanthes crepidinea</i>
180	beechnuts	<i>Epifagus virginiana</i>
181	violet woodsorrel	<i>Oxalis violacea</i>
182	bloodroot	<i>Sanguinaria canadensis</i>
183	American pokeweed	<i>Phytolacca americana</i>
184	Norway spruce	<i>Picea abies</i>
185	Colorado spruce	<i>Picea pungens</i>
186	white spruce	<i>Picea glauca</i>
187	Austrian pine	<i>Pinus nigra</i>
188	eastern white pine	<i>Pinus strobus</i>
189	eastern hemlock	<i>Tsuga canadensis</i>
190	narrowleaf plantain	<i>Plantago lanceolata</i>
191	American sycamore	<i>Platanus occidentalis</i>
192	broomsedge bluestem	<i>Andropogon virginicus</i>
193	smooth brome	<i>Bromus inermis</i>
194	orchardgrass	<i>Dactylis glomerata</i>
195	poverty oatgrass	<i>Danthonia spicata</i>
196	deertongue	<i>Dichanthelium clandestinum</i>
197	barnyard grass	<i>Echinochloa crus-galli</i>
198	Canada wildrye	<i>Elymus canadensis</i>
199	riverbank wildrye	<i>Elymus riparius</i>
200	hairy wildrye	<i>Elymus villosus</i>
201	fescue	<i>Festuca</i> sp.
202	fowl mannagrass	<i>Glyceria striata</i>
203	common velvetgrass ³	<i>Holcus lanatus</i> ³
204	Japanese stiltgrass ²	<i>Microstegium vimineum</i> ²
205	Chinese silvergrass ³	<i>Miscanthus sinensis</i> ³
206	switchgrass	<i>Panicum virgatum</i>
207	witchgrass	<i>Panicum capillare</i>
208	reed canarygrass ²	<i>Phalaris arundinacea</i> ²
209	timothy	<i>Phleum pratense</i>
210	Canada bluegrass	<i>Poa compressa</i>
211	Kentucky bluegrass	<i>Poa pratensis</i>
212	green bristlegrass	<i>Setaria viridis</i>
213	purpletop tridens	<i>Tridens flavus</i>
214	wild blue phlox	<i>Phlox divaricata</i>
215	fall phlox	<i>Phlox paniculata</i>
216	Greek valerian	<i>Polemonium reptans</i>
217	Japanese knotweed ²	<i>Fallopia japonica</i> / <i>Polygonum cuspidatum</i> ²
218	jumpseed	<i>Polygonum virginianum</i>
219	curly dock	<i>Rumex crispus</i>
220	bitter dock	<i>Rumex obtusifolius</i>
221	Carolina springbeauty	<i>Claytonia caroliniana</i>
222	Virginia springbeauty	<i>Claytonia virginica</i>
223	creeping Jenny ²	<i>Lysimachia nummularia</i> ²

Species Number	Common Name ¹	Scientific Name
224	northern maidenhair	<i>Adiantum pedatum</i>
225	black baneberry	<i>Actaea racemosa</i>
226	dwarf larkspur	<i>Delphinium tricorne</i>
227	liverleaf	<i>Hepatica nobilis</i> var. <i>acuta</i>
228	goldenseal	<i>Hydrastis canadensis</i>
229	fig buttercup ²	<i>Ranunculus ficaria</i> ²
230	littleleaf buttercup	<i>Ranunculus abortivus</i>
231	bristly buttercup	<i>Ranunculus hispidus</i>
232	early meadow-rue	<i>Thalictrum dioicum</i>
233	king of the meadow	<i>Thalictrum pubescens</i>
234	rue anemone	<i>Thalictrum thalictroides</i>
235	glossy buckthorn ²	<i>Frangula alnus</i> ²
236	harvestlice	<i>Agrimonia parviflora</i>
237	hawthorn	<i>Crataegus</i>
238	Virginia strawberry	<i>Fragaria virginiana</i>
239	white avens	<i>Geum canadense</i>
240	spring avens	<i>Geum vernum</i>
241	apple	<i>Malus</i> sp.
242	common ninebark	<i>Physocarpus opulifolius</i>
243	sulphur cinquefoil	<i>Potentilla recta</i>
244	common cinquefoil	<i>Potentilla simplex</i>
245	sweet cherry	<i>Prunus avium</i>
246	black cherry	<i>Prunus serotina</i>
247	callery pear ²	<i>Pyrus calleryana</i> ²
248	multiflora rose ²	<i>Rosa multiflora</i> ²
249	Allegheny blackberry	<i>Rubus allegheniensis</i>
250	northern dewberry	<i>Rubus flagellaris</i>
251	black raspberry	<i>Rubus occidentalis</i>
252	Pennsylvania blackberry	<i>Rubus pensilvanicus</i>
253	stickywilly	<i>Galium aparine</i>
254	licorice bedstraw	<i>Galium circaezans</i>
255	lanceleaf wild licorice	<i>Galium lanceolatum</i>
256	false baby's breath	<i>Galium mollugo</i>
257	fragrant bedstraw	<i>Galium triflorum</i>
258	acure bluet	<i>Houstonia caerulea</i>
259	bigtooth aspen	<i>Populus grandidentata</i>
260	pussy willow	<i>Salix discolor</i>
261	sandbar willow	<i>Salix interior</i>
262	black willow	<i>Salix nigra</i>
263	Allegheny monkeyflower	<i>Mimulus ringens</i>
264	moth mullein	<i>Verbascum blattaria</i>
265	common mullein	<i>Verbascum thapsus</i>
266	common gypsyweed	<i>Veronica officinalis</i>
267	birdeye speedwell	<i>Veronica persica</i>
268	thymeleaf speedwell	<i>Veronica serpyllifolia</i>

Species Number	Common Name ¹	Scientific Name
269	tree of heaven ²	<i>Ailanthus altissima</i> ²
270	common greenbriar	<i>Smilax rotundifolia</i>
271	jimsonweed ²	<i>Datura stramonium</i> ²
272	Carolina horsenettle	<i>Solanum carolinense</i>
273	West Indian nightshade	<i>Solanum ptycanthum</i>
274	American bladderhut	<i>Staphylea trifolia</i>
275	New York fern	<i>Thelypteris noveboracensis</i>
276	American basswood	<i>Tilia americana</i>
277	narrowleaf cattail ²	<i>Typha angustifolia</i> ²
278	common hackberry	<i>Celtis occidentalis</i>
279	American elm	<i>Ulmus americana</i>
280	slippery elm	<i>Ulmus rubra</i>
281	smallspike false nettle	<i>Boehmeria cylindrica</i>
282	cornsalad	<i>Valerianella</i> sp.
283	white vervain	<i>Verbena urticifolia</i>
284	eastern greenviolet	<i>Hybanthus concolor</i>
285	common blue violet	<i>Viola sororia</i>
286	striped cream violet	<i>Viola striata</i>
287	Virginia creeper	<i>Parthenocissus quinquefolia</i>
288	riverbank grape	<i>Vitis riparia</i>
289	frost grape	<i>Vitis vulpina</i>
290	perennial ryegrass	<i>Lolium perenne</i>

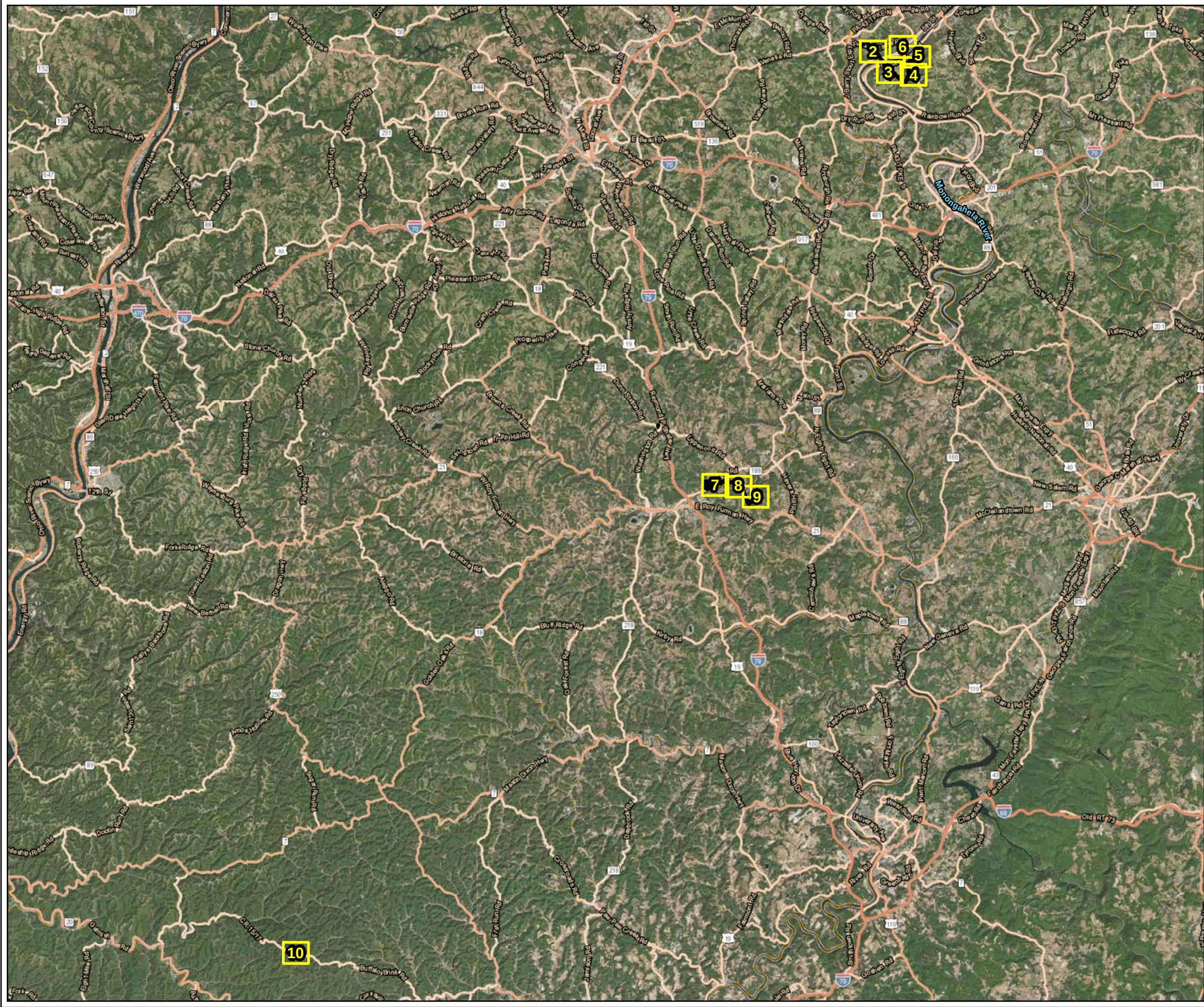
¹Common names follow those listed in the United States Department of Agriculture National Data Base. Common names in the text may differ.

²Species on DCNR list of invasive plants

³Species on DCNR "Watch List" for invasive plants

⁴Exotic species considered invasive in adjacent states

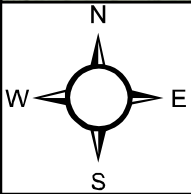
APPENDIX D
(MAPS 1-10). LAND COVER AND RARE PLANT SPECIES WITHIN THE
EQUITRANS EXPANSION PROJECT AOI IN ALLEGHENY, WASHINGTON, AND
GREENE COUNTIES, PENNSYLVANIA AND WETZEL COUNTY, WEST VIRGINIA



Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 1 of 10

 Area of Investigation (AOI)



0 28,500 57,000 Feet

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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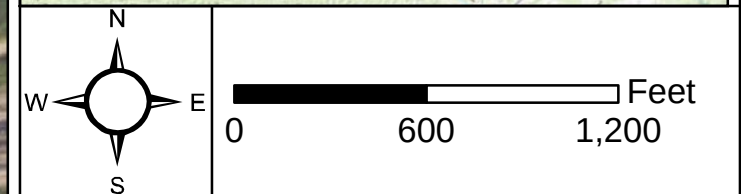
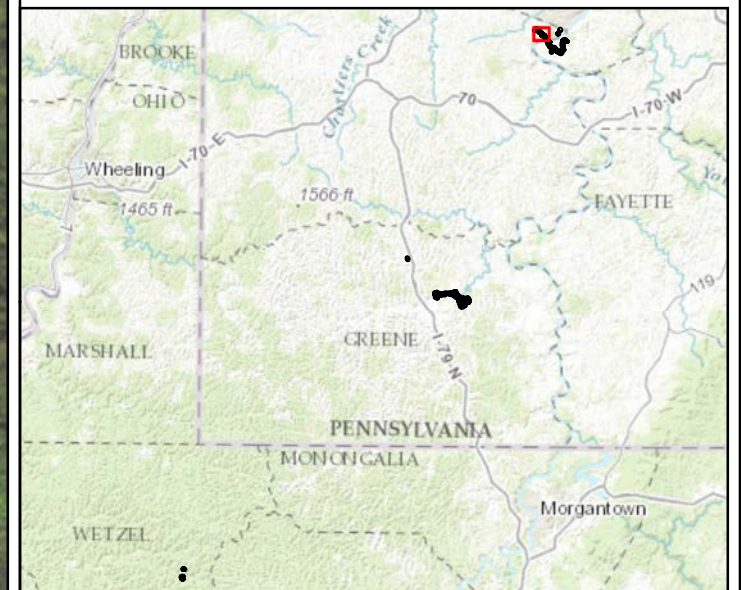
Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 2 of 10

Area of Investigation (AOI)

Land Cover Patch

- Open Water
- Developed, High Intensity
- Deciduous Forest
- Evergreen Forest
- Pasture/Hay



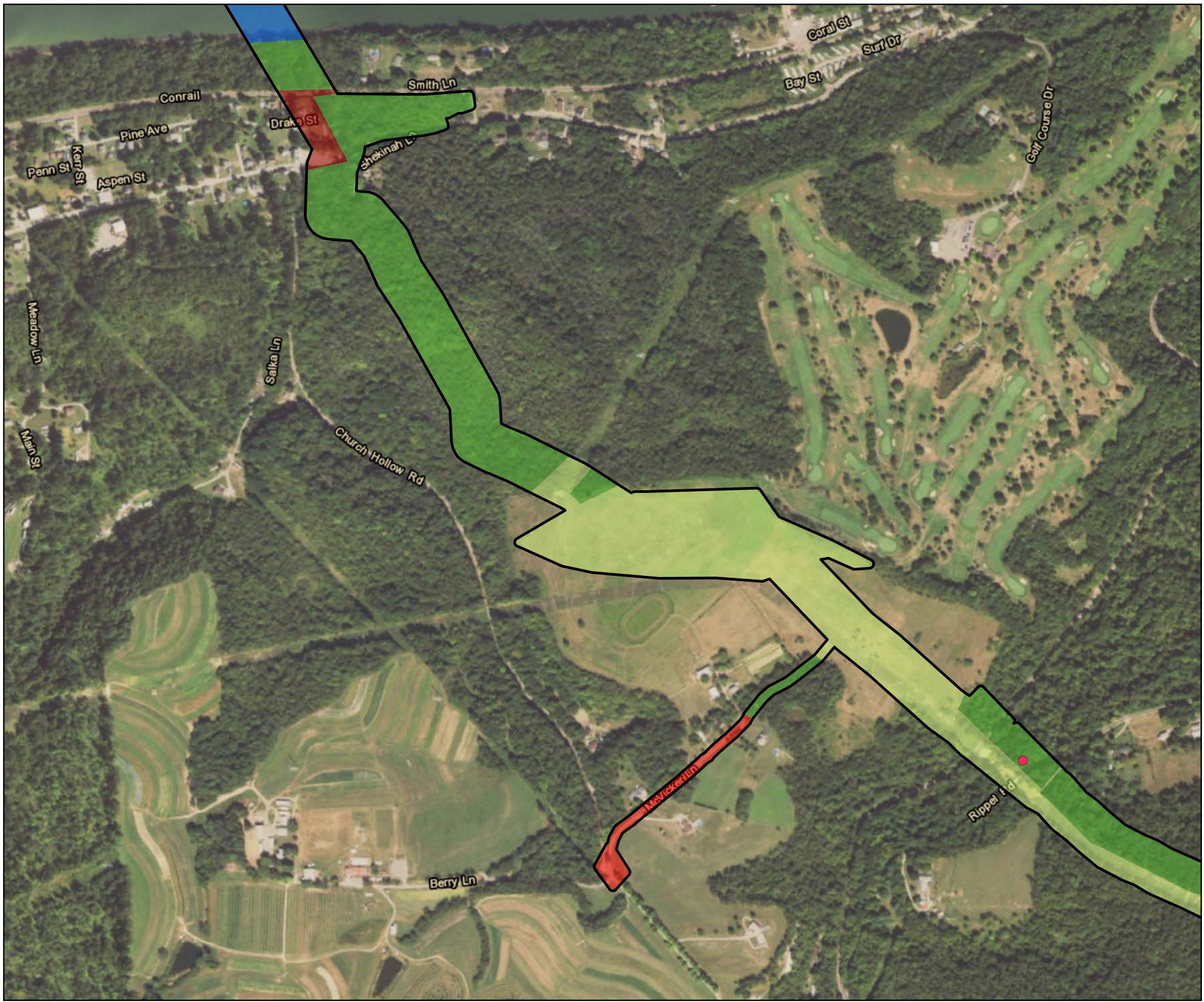
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 3 of 10

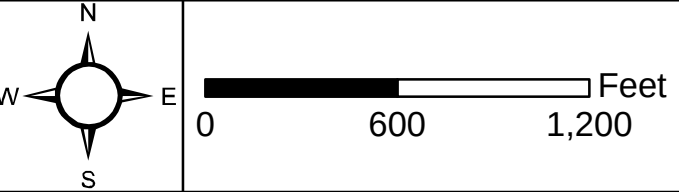
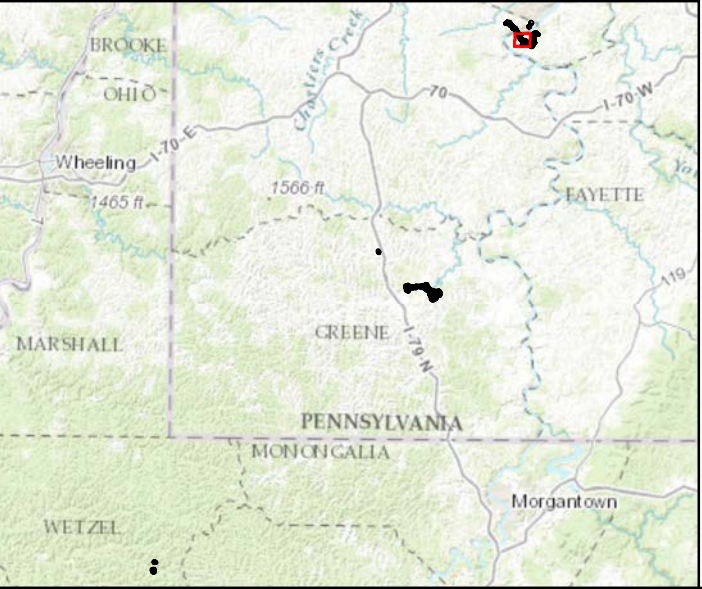
Area of Investigation (AOI)

Land Cover Patch

- Open Water
- Developed, Medium Intensity
- Developed, High Intensity
- Deciduous Forest
- Grassland/Herbaceous

Rare Plant Location

- Prenanthes crepidinea*



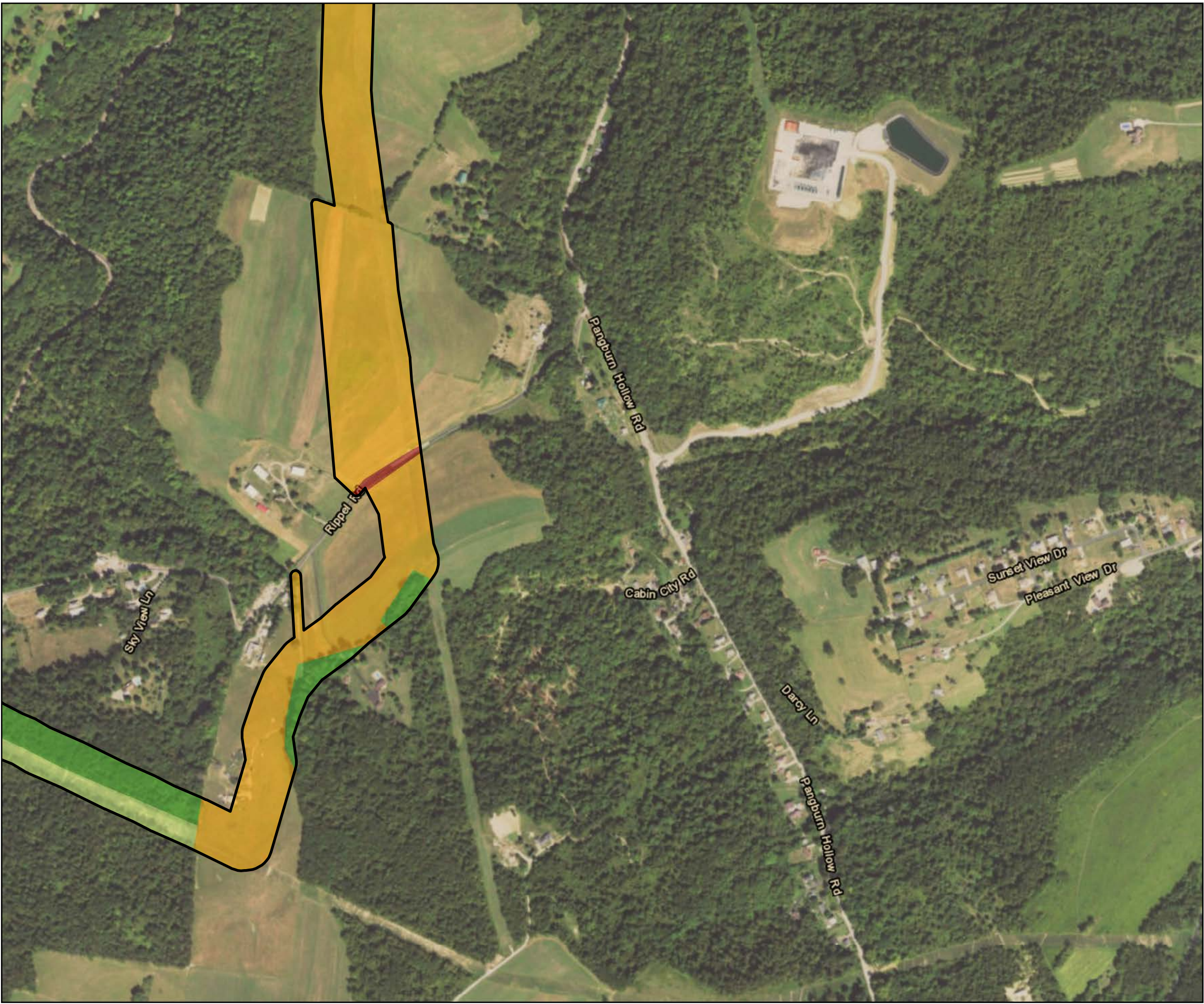
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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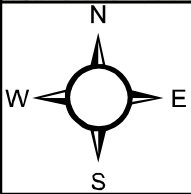
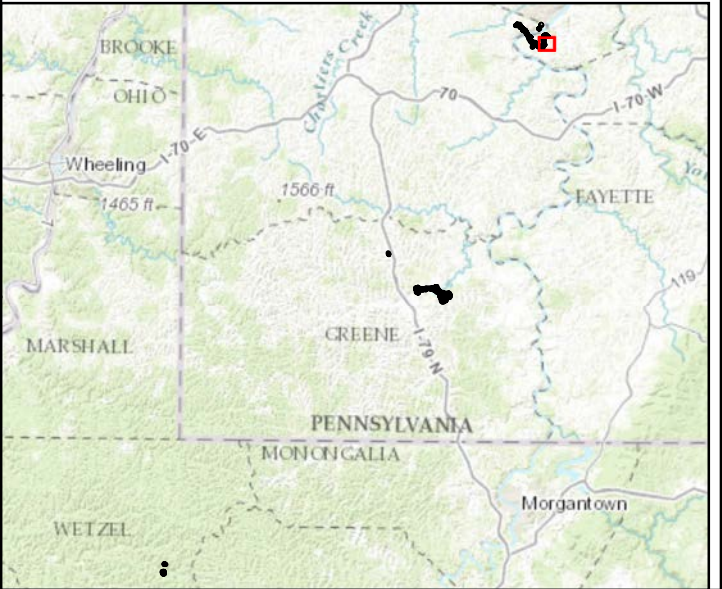
Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 4 of 10

 Area of Investigation (AOI)

Land Cover Patch

-  Developed, High Intensity
-  Deciduous Forest
-  Grassland/Herbaceous
-  Pasture/Hay



0 600 1,200 Feet

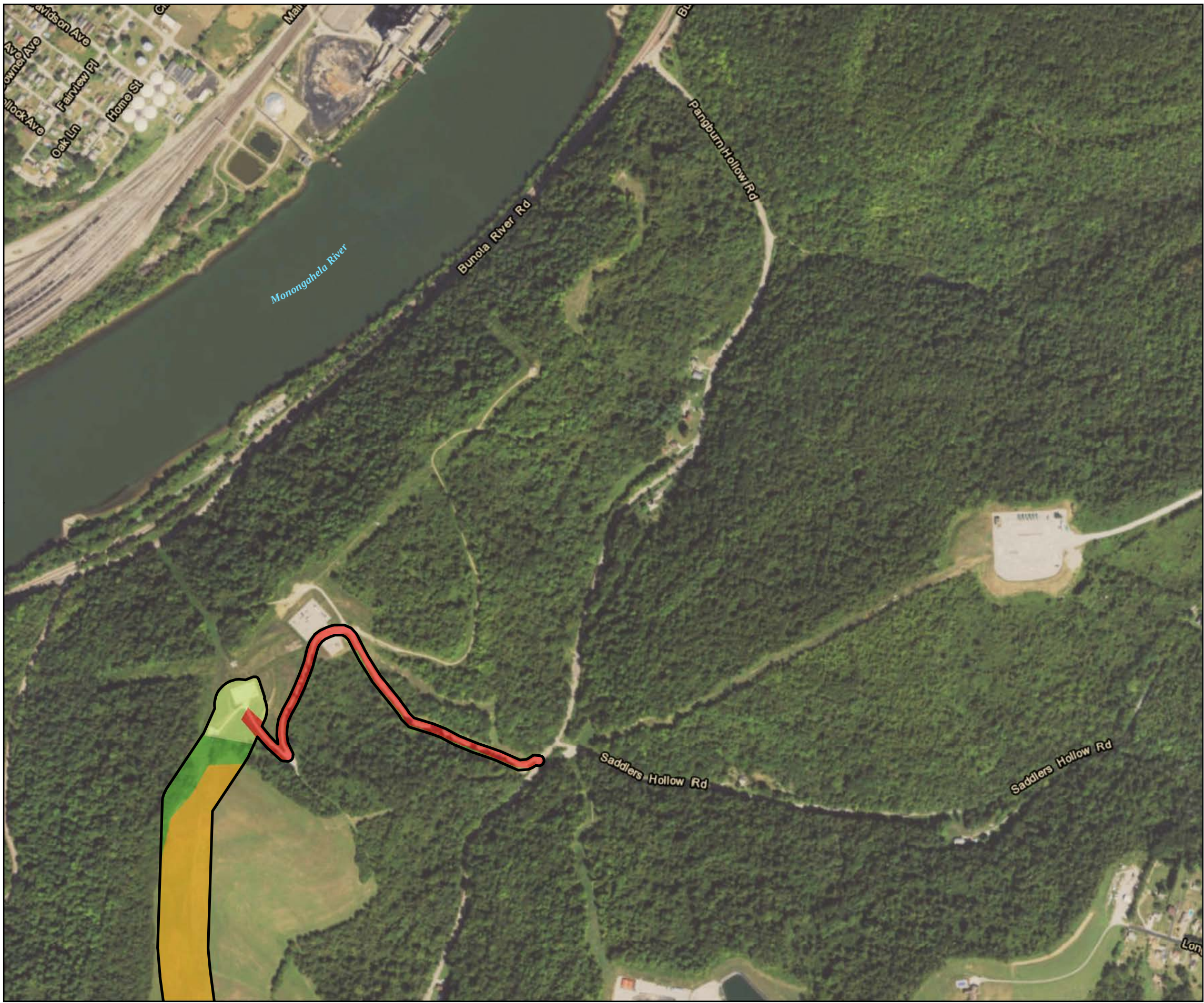
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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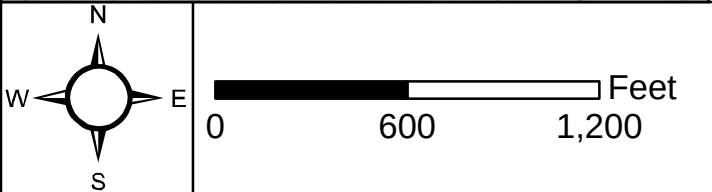
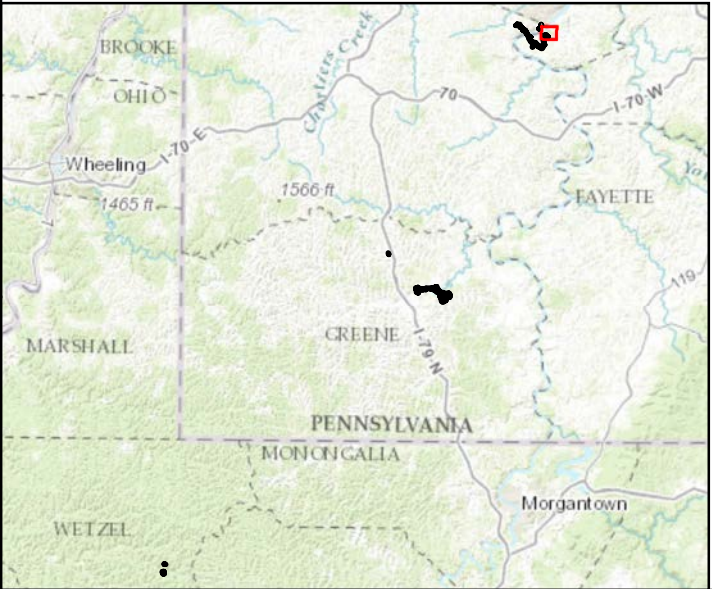
Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 5 of 10

 Area of Investigation (AOI)

Land Cover Patch

-  Developed, Medium Intensity
-  Deciduous Forest
-  Grassland/Herbaceous
-  Pasture/Hay



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 6 of 10

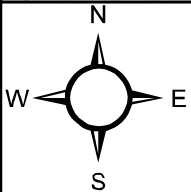
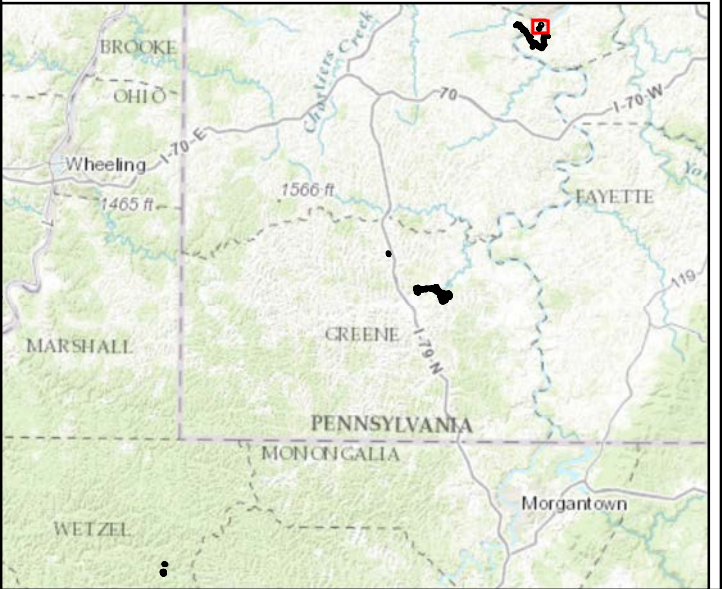
Area of Investigation (AOI)

Land Cover Patch

Developed, Open Space

Developed, High Intensity

Deciduous Forest



0 600 1,200 Feet

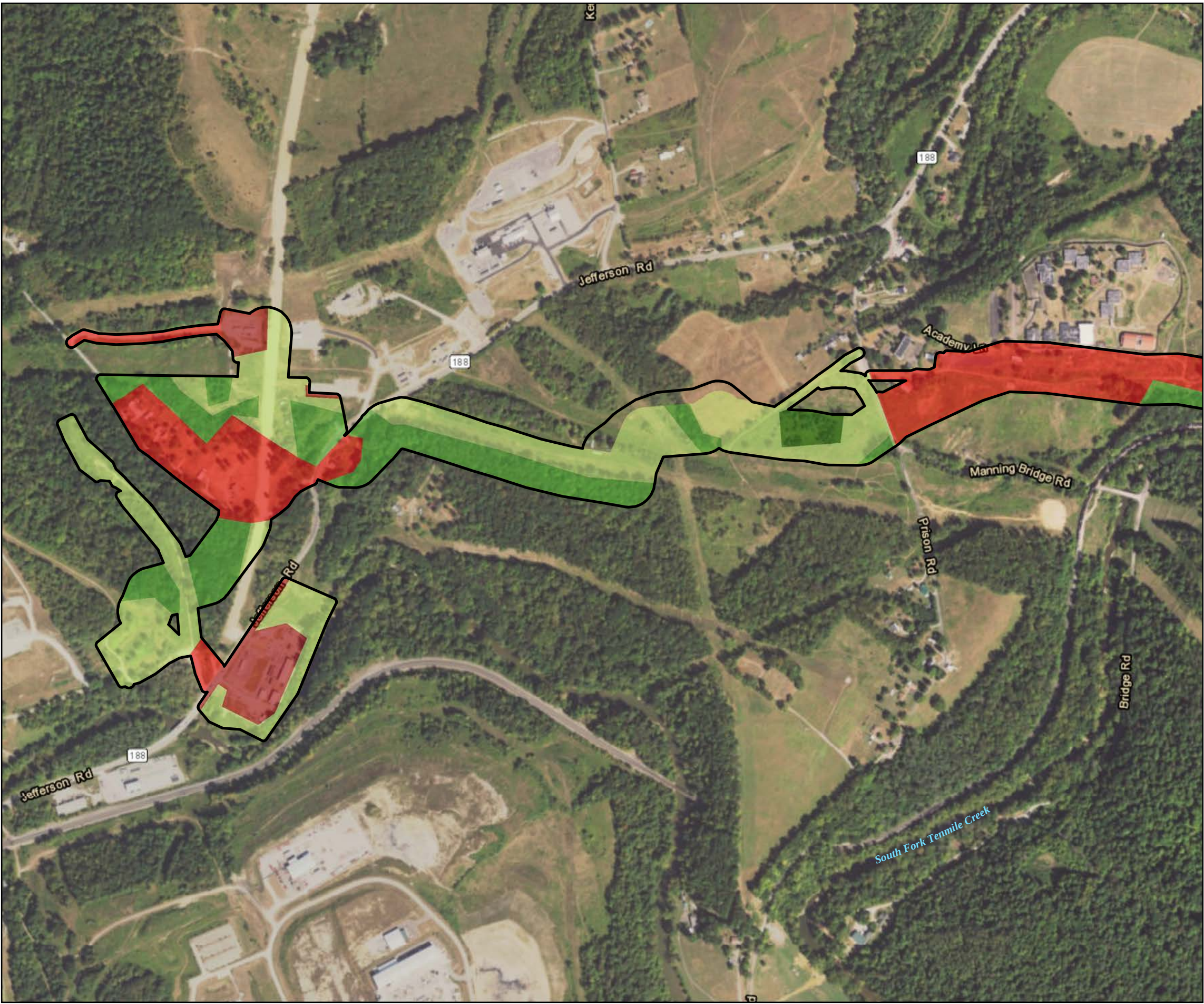
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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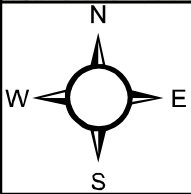
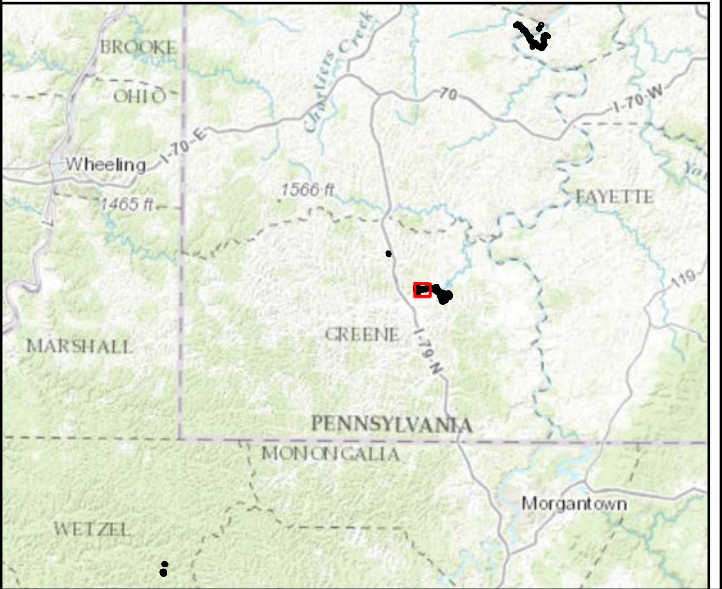
Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 7 of 10

Area of Investigation (AOI)

Land Cover Patch

- Developed, Medium Intensity
- Developed, High Intensity
- Deciduous Forest
- Evergreen Forest
- Grassland/Herbaceous



0 600 1,200 Feet

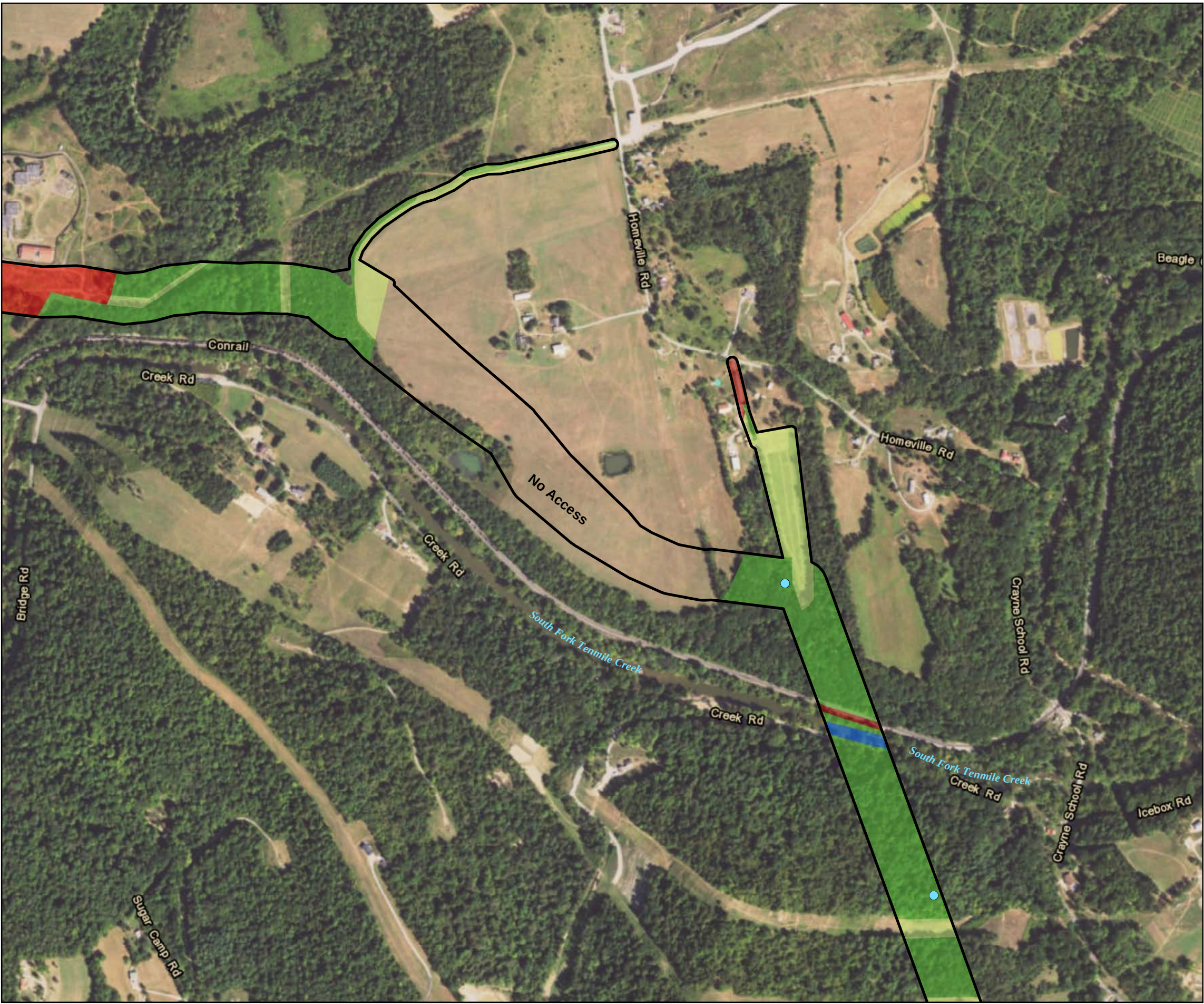
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 8 of 10

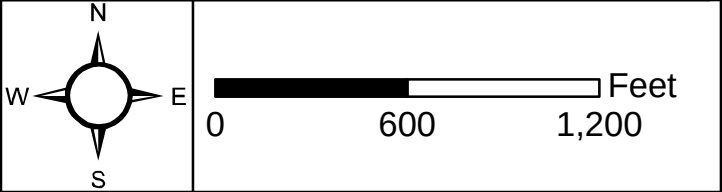
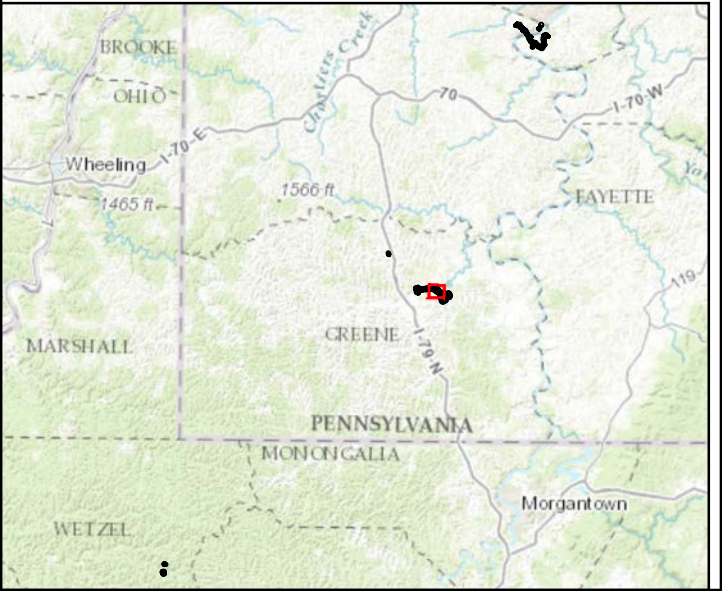
Area of Investigation (AOI)

Land Cover Patch

- Open Water
- Developed, Medium Intensity
- Developed, High Intensity
- Deciduous Forest
- Grassland/Herbaceous

Rare Plant Location

- Hydrastis canadensis*



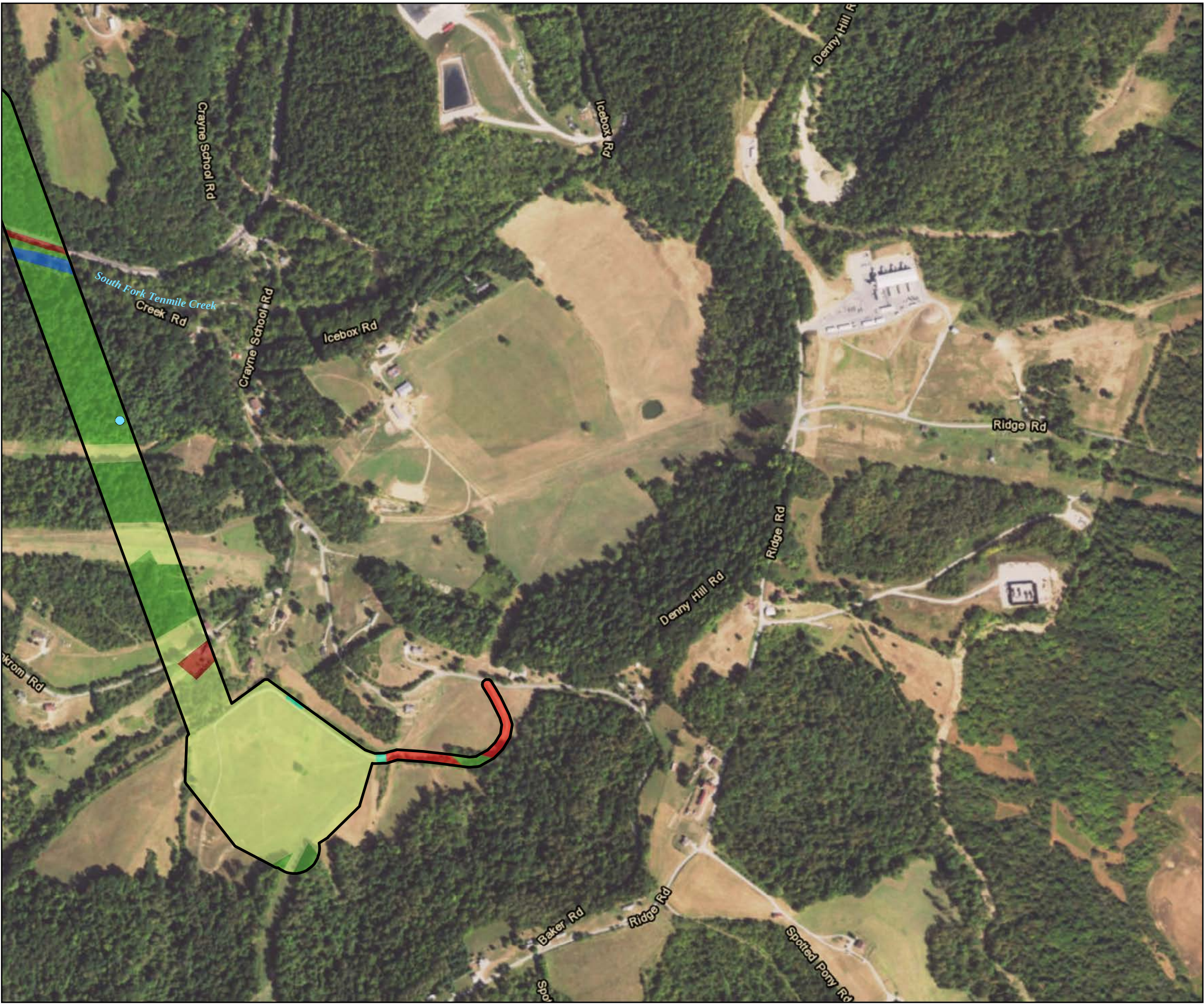
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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Land cover and rare plant species within the Equitrans Expansion Project AOI in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia.

Map 9 of 10

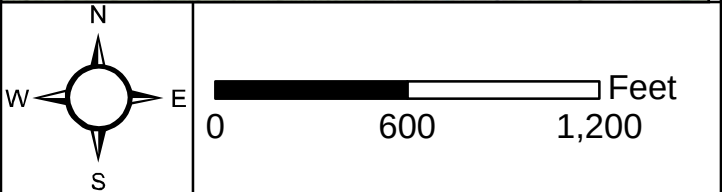
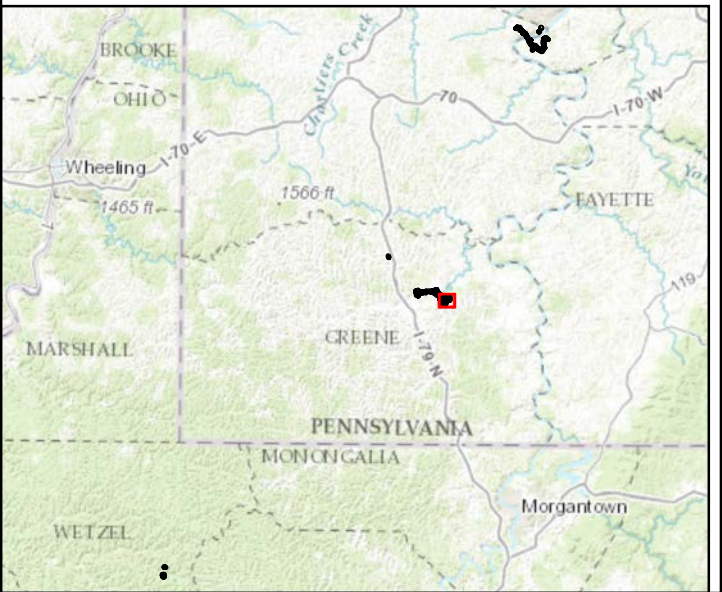
Area of Investigation (AOI)

Land Cover Patch

- Open Water
- Developed, Medium Intensity
- Developed, High Intensity
- Deciduous Forest
- Grassland/Herbaceous
- Emergent Herbaceous Wetlands

Rare Plant Location

- Hydrastis canadensis*



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User

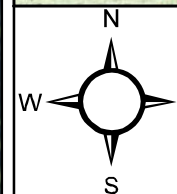
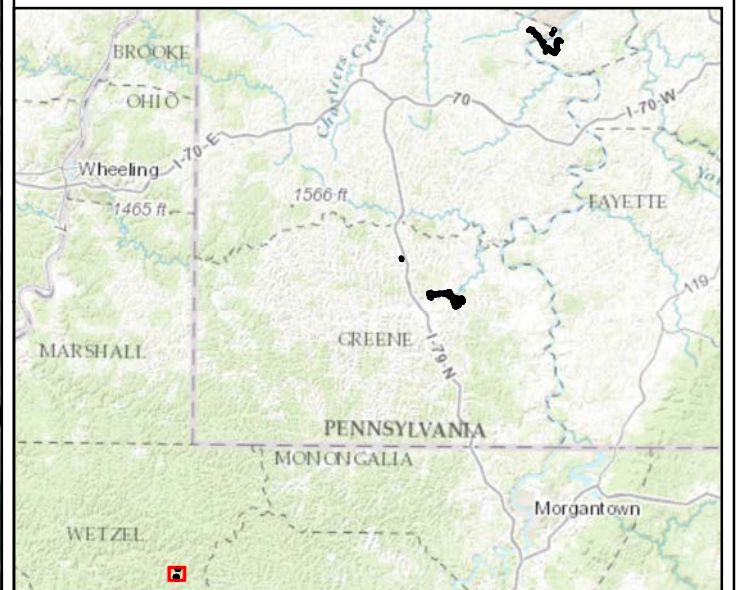


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Map 10 of 10

-  Developed, Open Space
-  Developed Low Intensity
-  Deciduous Forest



A horizontal number line is shown with tick marks at 0, 600, and 1,200. The word "Feet" is written at the right end of the line. A solid black bar is drawn from the 0 mark to the 600 mark. A white bar with a black outline is drawn from the 600 mark to the 1,200 mark.

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User



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Project No. 639

APPENDIX E
PENNSYLVANIA BOTANICAL FIELD SURVEY FORMS

BOTANICAL FIELD SURVEY FORM – PA PLANT SPECIES OF SPECIAL CONCERN

DCNR requests a Botanical Field Survey Form be submitted for each occurrence/population of a PA Plant Species of Special Concern (SOSC) found during a survey. Please attempt to complete as many fields as possible. Please direct any questions to DCNR Bureau of Forestry, Ecological Services Section at (717)-787-3444.

Species Name: Nodding rattlesnake root (<i>Prenanthes crepidinea</i>)	PNDI # (if applicable): 22453	☒ New Occurrence
	EO ID # (if applicable):	☐ Update
Surveyor(s): Larry Brewer Allyssa (Lopez) Rooks	Survey Date(s): 5/23/16	Time Spent: 30 minutes
Site Name: unknown	GPS Coordinates of Occurrence (include datum): see GIS maps ; 40.22807°N -79.93216° W (NAD 83), shapefiles available upon request.	
Directions to Site: see GIS maps		
Site Owner: unknown	Landowner aware of Species of Special Concern? ☐ YES ☒ NO	
Owner Contact Information:	Landowner consent for data submission to PA Heritage Program? ☐ YES ☒ NO	
	Landowner consent for voucher collection? ☐ YES ☒ NO	
General SOSC Habitat Description: Mature Mesic Hardwood Forest The forest has a rich herb layer.		
Estimate of Area of Potential Habitat: 75 acres		
Soil conditions (Substrate and soil type, soil moisture, underlying geology, etc.): loam		
Relative age/Successional stage: Young to mature forest	Aspect: west facing slope	Elevation (provide units): no topographical map provided

Moisture: ☐ Inundated (hydic) ☐ Saturated (wet-mesic) X Moist (mesic) ☐ Dry (mesic) ☐ Dry (xeric)	Light: ☐ Open ☐ Partial X Filtered ☐ Shaded	Topo Position: ☐ Crest ☐ Upper Slope X Mid-slope ☐ Lower Slope Bottom	Slope: X Flat ☐ 0-10% ☐ 10-35% ☐ 35+% ☐ Vertical
--	--	---	---

SOSC Occurrence Information (de Phenology: # 20 trees) X In leaf ☐ In bud ☐ ☐ In flower ☐ ☐ Immature fruit ☐ ☐ Mature fruit ☐ ☐ Seed dispersing ☐	Plants: 1-10 11-50 51-100 Ramets¹ 101-1000 1001-10K 10K+ EST # 200 ☐ Genets² ☐ ☐ ☐ ☐ ☐ ☐	Age Structure: ___ Annuals ___ % Seedlings ___ % Immature ___ % 1st Year ___ % Mature ___ % Senescent Population Area: ☐ 1 yd ² ☐ 1-5 yd ² X 5-10 yd² ☐ 10-100 yd ² ☐ 100 yd ² – 1 ac ☐ 1+ acres ___ Est Area	Vigor: ☐ Very Feeble X Feeble Normal ☐ Vigorous ☐ Exceptional vigor
ID Confidence: X Positive ID ☐ Somewhat certain ☐ Uncertain		ID Problems (explain):	
___ Known or ___ Inferred Land Use History: unknown			
Integrity/Fragmentation of Habitat: This Mesic Hardwood Forest has good ecological integrity. It has a rich herb layer and few invasives.			
Land Use/Disturbance Information: unknown but probably selectively logged in the past – probably never clear-cut or grazed by cattle – lots of spring ephemerals			
Threats (on- or off-site): A pipeline is scheduled to go through the area –maybe it can be avoided			
Conservation or Management Recommendations: If the pipeline cannot be moved the plants can be moved.			

Additional SOSC Comments:

1

Ramet: individual reproduced vegetatively (a clone) Genet: individual generated by sexual reproduction (a seedling)

2

Associated Species :: Most Abundant/Dominant by Strata (est. % cover):		
Canopy: Sugar maple (<i>Acer saccharum</i>) Bitternut hickory (<i>Carya cordiformis</i>) White oak (<i>Quercus alba</i>)	Sub-Canopy/Shrub: Sugar maple (<i>Acer saccharum</i>) Blue beech (<i>Carpinus caroliniana</i>) Spicebush (<i>Lindera benzoin</i>) Multiflora rose (<i>Rosa multiflora</i>) Invasive exotic	Herbaceous: Poison ivy (<i>Toxicodendron radicans</i>) Mayapple (<i>Podophyllum peltatum</i>) Wild ginger (<i>Asarum canadense</i>) Solomon Seal (<i>Polygonatum biflorum</i>) White trillium (<i>Trillium grandiflorum</i>) Eastern waterleaf (<i>Hydrophyllum virginiana</i>) Woodland stonecrop (<i>Sedum ternatum</i>) Zigzag goldenrod (<i>Solidago flexicalus</i>) Longstyle sweetroot (<i>Osmorhiza longistylis</i>) Early bluegrass (<i>Poa cuspidata</i>) Sanicle (<i>Sanicula</i> sp.)
Other Species Present:		
Canopy: Tree-of-heaven (<i>Ailanthus altissima</i>) Invasive exotic		Herbaceous:
Invasive Species Present at Site (est. % Cover): Multiflora rose (<i>Rosa multiflora</i>), tree-of-heaven (<i>Ailanthus altissima</i>). Data on land-cover available in a GIS format.		

****Please also submit site maps indicating species location, any photographs taken (to aid in confirming ID) and if a voucher specimen is collected, the label data, number, and repository.**

BOTANICAL FIELD SURVEY FORM – PA PLANT SPECIES OF SPECIAL CONCERN

DCNR requests a Botanical Field Survey Form be submitted for each occurrence/population of a PA Plant Species of Special Concern (SOSC) found during a survey. Please attempt to complete as many fields as possible. Please direct any questions to DCNR Bureau of Forestry, Ecological Services Section at (717)-787-3444.

Species Name: Goldenseal (<i>Hydrastis canadensis</i>)	PNDI # (if applicable): 22453	☒ New Occurrence
	EO ID # (if applicable):	☐ Update
Surveyor(s): Larry Brewer Justin Bower	Survey Date(s): 7/19/16	Time Spent: 20 minutes
Site Name: unknown	GPS Coordinates of Occurrence (include datum): (39.9125334359136, -80.0939988224441 NAD 1983)see GIS maps	
Directions to Site: see GIS maps		
Site Owner: unkown	Landowner aware of Species of Special Concern? ☐ YES ☒ NO	
Owner Contact Information:	Landowner consent for data submission to PA Heritage Program? ☐ YES ☒ NO	
	Landowner consent for voucher collection? ☐ YES ☒ NO	

General SOSC Habitat Description: Mature Mesic Hardwood Forest The forest has a rich herb layer. Area of goldenseal is 15 x 10 feet			
Estimate of Area of Potential Habitat: 10 acres			
Soil conditions (Substrate and soil type, soil moisture, underlying geology, etc.): loam			
Relative age/Successional stage: young to mature forest		Aspect: flat	
		Elevation (provide units): no topographical map provided	
Moisture: ☐ Inundated (hydric) ☐ Saturated (wet-mesic) ☒ Moist (mesic) ☐ Dry (mesic) ☐ Dry (xeric)	Light: ☐ Open ☐ Partial ☒ Filtered ☐ Shaded	Topo Position: ☒ Crest ☐ Upper Slope ☐ Mid-slope ☐ Lower Slope ☐ Bottom	Slope: ☒ Flat ☐ 0-10% ☐ 10-35% ☐ 35+% ☐ Vertical

SOSC Occurrence Information (define Phenology: # 20 trees) ☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit Mature fruit x 5 fruits ☐ Seed dispersing		Plants: 1-10 11-50 51-100 101-1000 1001-10K 10K+ EST # 200	Age Structure: ____ Annuals ____ % Seedlings ____ % Immature ____ % 1st Year ____ % Mature ____ % Senescent	Population Area: ☐ 1 yd ² ☐ 1-5 yd ² ☒ 5-10 yd ² ☐ 10-100 yd ² ☐ 100 yd ² – 1 ac ☐ 1+ acres ____ Est Area	Genets² ☐ ☐ ☐ ☐ ☐ ☐	Vigor: ☐ Very Feeble ☐ Feeble ☐ Normal ☒ Vigorous ☐ Exceptional vigor
ID Confidence: ☒ Positive ID ☐ Somewhat certain ☐ Uncertain		ID Problems (explain):				
____ Known or ____ Inferred Land Use History: unknown						
Integrity/Fragmentation of Habitat: This Mesic Hardwood Forest has good ecological integrity. It has a rich herb layer and few invasive exotics.						
Land Use/Disturbance Information: unknown but probably selectively logged in the past – probably never clear-cut or grazed by cattle – lots of spring ephemerals						
Threats (on- or off-site): A pipeline is scheduled to go through the area						
Conservation or Management Recommendations: A voluntary conservation measure would be to move the plants if they cannot be avoided.						
Additional SOSC Comments:						

1

Ramet: individual reproduced vegetatively (a clone) Genet: individual generated by sexual reproduction (a seedling)

2

Associated Species :: Most Abundant/Dominant by Strata (est. % cover):

Canopy: Sugar maple (<i>Acer saccharum</i>) Shagbark hickory (<i>Carya ovata</i>) Black cherry (<i>Prunus serotina</i>) Red maple (<i>Acer rubrum</i>)	Sub-Canopy/Shrub: red maple (<i>Acer rubrum</i>) white ash (<i>Fraxinus americana</i>) bitternut hickory (<i>Carya cordiformis</i>) Spicebush (<i>Lindera benzoin</i>) Multiflora rose (<i>Rosa multiflora</i>) Invasive exotic	Herbaceous: Christmas fern (<i>Polystichum acrostichoides</i>) White avens (<i>Geum canadense</i>) Tall Rattlesnake-root (<i>Nabalus altissimus</i>) Common blue violet (<i>Viola sororia</i>) Wingstem (<i>Verbesina alternifolia</i>) Enchanter's nightshade (<i>Circaea canadensis</i>) Blue-stemmed goldenrod (<i>Solidago caesia</i>) Virginia creeper (<i>Parthenocissus quinifolia</i>) Sweet-scented bedstraw (<i>Galium triflorum</i>) Dewberry (<i>Rubus flagellaris</i>) Hog-peanut (<i>Amphicarpaea bracteata</i>)
Other Species Present:		
Canopy:		Herbaceous:
Invasive Species Present at Site (est. % Cover): 2% Multiflora rose (<i>Rosa multiflora</i>),		

****Please also submit site maps indicating species location, any photographs taken (to aid in confirming ID) and if a voucher specimen is collected, the label data, number, and repository.**

BOTANICAL FIELD SURVEY FORM – PA PLANT SPECIES OF SPECIAL CONCERN

DCNR requests a Botanical Field Survey Form be submitted for each occurrence/population of a PA Plant Species of Special Concern (SOSC) found during a survey. Please attempt to complete as many fields as possible. Please direct any questions to DCNR Bureau of Forestry, Ecological Services Section at (717)-787-3444.

Species Name: Goldenseal <i>(Hydrastis canadensis)</i>	PNDI # (if applicable): 22453	☒ New Occurrence ☐ Update		
	EO ID # (if applicable):			
Surveyor(s): Larry Brewer Justin Bower	Survey Date(s): 7/19/16	Time Spent: 20 minutes		
Site Name: unknown	GPS Coordinates of Occurrence (include datum): (39.907430851277, -80.090918116565 NAD 1983)see GIS maps see GIS maps			
Directions to Site: see GIS maps				
Site Owner: unknown	Landowner aware of Species of Special Concern? ☐ YES ☒ NO			
Owner Contact Information:	Landowner consent for data submission to PA Heritage Program? ☐ YES ☒ NO			
	Landowner consent for voucher collection? ☐ YES ☒ NO			
General SOSC Habitat Description: Mature Mesic Hardwood Forest The forest has a rich herb layer. Area of goldenseal is 10 x 10 feet				
Estimate of Area of Potential Habitat: 50 acres				
Soil conditions (Substrate and soil type, soil moisture, underlying geology, etc.): loam				
Relative age/Successional stage: young to mature forest	Aspect: SE facing slope	Elevation (provide units): no topographical map provided		

Moisture: ☐ Inundated (hydic) ☐ Saturated (wet-mesic) X Moist (mesic) ☐ Dry (mesic) ☐ Dry (xeric)	Light: ☐ Open ☐ Partial X Filtered ☐ Shaded	Topo Position: X Crest Upper Slope Mid-slope ☐ Lower Slope Bottom	Slope: Flat X 0-10% ☐ 10-35% ☐ 35+% ☐ Vertical
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SOSC Occurrence Information (de Phenology: # 20 trees) X In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☐ Seed dispersing	Plants: 1-10 11-50 51-100 Ramets¹ (130 ramets) 101-1000 1001-10K 10K+ EST # 200 Genets² ☐ ☐ ☐ ☐ ☐ ☐	Age Structure: ___ Annuals ___ % Seedlings ___ % Immature ___ % 1st Year ___ % Mature ___ % Senescent Population Area: ☐ 1 yd ² ☐ 1-5 yd ² X 5-10 yd² ☐ 10-100 yd ² ☐ 100 yd ² – 1 ac ☐ 1+ acres ___ Est Area	Vigor: ☐ Very Feeble ☐ Feeble ☐ Normal X Vigorous ☐ Exceptional vigor
ID Confidence: X Positive ID ☐ Somewhat certain ☐ Uncertain		ID Problems (explain):	
___ Known or ___ Inferred Land Use History: unknown			
Integrity/Fragmentation of Habitat: This Mesic Hardwood Forest has good ecological integrity. It has a good herb layer and few invasive exotics.			
Land Use/Disturbance Information: unknown but probably selectively logged in the past – probably never clear-cut or grazed by cattle – lots of spring ephemerals			
Threats (on- or off-site): A pipeline is scheduled to go through the area			
Conservation or Management Recommendations: A voluntary conservation measure would be to move the plants if they cannot be avoided.			

Additional SOSC Comments:

1

Ramet: individual reproduced vegetatively (a clone) Genet: individual generated by sexual reproduction (a seedling)

2

Associated Species :: Most Abundant/Dominant by Strata (est. % cover):

Canopy: Sugar maple (<i>Acer saccharum</i>) Tulip-tree (<i>Liriodendron tulipifera</i>)	Sub-Canopy/Shrub: Sugar maple (<i>Acer saccharum</i>) Black haw (<i>Viburnum prunifolium</i>)	Herbaceous: Blue cohosh (<i>Caulophyllum thalictroides</i>) Common blue violet (<i>Viola sororia</i>) Wingstem (<i>Verbesina alternifolia</i>) Enchanter's nightshade (<i>Circaea canadensis</i>) Virginia creeper (<i>Parthenocissus quinquefolia</i>) Forest bedstraw (<i>Galium circaezans</i>) Woodland stonecrop (<i>Sedum ternatum</i>) Hairy wild rye (<i>Elymus villosus</i>) Striped violet (<i>Viola striata</i>) White snakeroot (<i>Ageratina altissima</i>) Jack-in-the-pulpit (<i>Arisaema triphyllum</i>) Garlic mustard (<i>Alliaria petiolata</i>) White ash (<i>Fraxinus americana</i>) Heart-leaved aster (<i>Symphyotrichum cordifolium</i>)
Other Species Present:		
Canopy:		Herbaceous:
Invasive Species Present at Site (est. % Cover): 2% Multiflora rose (<i>Rosa multiflora</i>), garlic mustard (<i>Alliaria petiolata</i>)		

****Please also submit site maps indicating species location, any photographs taken (to aid in confirming ID) and if a voucher specimen is collected, the label data, number, and repository.**

APPENDIX F
REPRESENTATIVE PROJECT PHOTOGRAPHS



Typical highly disturbed forest



Typical highly disturbed forest



Typical grassland



Typical grassland



Wetland in Greene County



Pine plantation



Ten-Mile Creek



Invasion by Fig Buttercup
(*Ranunculus ficaria*)



Typical high intensity developed area



White-flowered trillium
(*Trillium grandiflorum*) patch



Fruit of Goldenseal
(*Hydrastis canadensis*)



Vegetation of Goldenseal
(*Hydrastis canadensis*)



Vegetation of noddling rattlesnakeroot
(*Prenanthes crepidinea*)