Snipes Property

LOWER MAKEFIELD TOWNSHIP, BUCKS COUNTY, PA

natural areas prioritization report

October 2023

Natural Lands

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1031 Palmers Mill Road
Media, PA 19063
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table of contents

purpose

This report assesses the ecological condition of the natural areas within the Snipes Property in Lower Makefield Township, Bucks County. The purpose of the report is to provide a site analysis and prioritize natural areas based on ecological quality. The report includes an overview of existing natural resources, site analysis maps, and assessment of priority areas.

To carry out this work, Natural Lands conducted two site visits to the Property. The first site visit took place on December 19, 2022 and the second on May 26, 2023. Natural Lands staff walked the entire property, noting features such as vegetation, wildlife (either observed directly or evidence of), and stewardship issues such as invasive plants. Natural Lands supplemented this on-the-ground information with Geographic Information Systems (GIS) data, information from Township staff, and a Pennsylvania Natural Diversity Index report (PNDI).

existing conditions

location & historic use

The Snipes Property is located in the northern portion of the Township between Dolington Road, Route 295, and Quarry Road (see ***Map 1: Location*** and ***Map 2: 2018 Aerial Photography***). The Property is approximately 35 acres. It is currently used to store salt in a barn structure for the Township. A small paved road system loops through the center of the Property and connects to Dolington Road. Based on historical aerial photography, the Property was fully cleared for agriculture prior to 1968 (see ***Map 3: 1968 Historical Aerial Photography***). The forest was restored in the western corner by 1995. The rest of the Property reverted to natural vegetation after 1995. Most recently, the Property was used as a Christmas tree farm.

soils & geology

There are four soil types within the Property (see ***Map 4: Soils***). The Penn-Landsdale complex covers approximately 28 acres. These soils have low water runoff, are well drained, and are not hydric. The Fountainville soils cover approximately 4 acres in the northern corner. These soils have medium water runoff, are moderately well drained, and are partially hydric. Just east of the Fountainville soils are the Abbottstown soils, covering 0.6 acres. These soils are somewhat poorly drained, have very high runoff, and are partially hydric. Finally, there is a small sliver of Buckingham soils in the lower eastern corner. Similar to the Abbottstown soils, these soils are somewhat poorly drained, have very high runoff, and are partially hydric. All soil types are potentially highly erodible. The Penn-Landsdale and Fountainville soils are prime farmland. The Abbottstown and Buckingham soils are farmland of statewide importance.

The entire property lies over the Stockton geologic formation. This formation was created during the Triassic Period and is comprised of siltstone, sandstone, and mudstone.

water resources

The water resources are limited within the Property. There is a small wetland that resulted from human disturbance of the area. There are also partially hydric soils, as discussed in the **Soils and Geology** section. The eastern meadow has a small area with plants associated with wet meadows including rushes (*Juncus* sp.).

plant communities

There are five plant communities throughout the Property, as described below. Lists of plants identified during the site visits by community are included in the appendix. ***Map 5: Plant Communities*** shows the location of the plant communities within the Property. A note about invasive plants – invasive plants are exotic species that are particularly aggressive. They outcompete our native species, overtaking an area and limiting plant diversity. This is of concern because our wildlife has not evolved with these exotic species, meaning that the invasive plants provide poorer quality food for wildlife. Additionally, low diversity means the areas provide fewer niches for wildlife and likely fewer resources for specialist wildlife species, including pollinators, that depend on specific plants.

wetland (+/-0.2 acres)

The wetland resulted from human disturbance of the area, which formed a depression that now intermittently holds water. It covers approximately 0.2 acres. Dominant plants include cattatil (Typha latifolia) and rushes (Juncus sp.). This area provides habitat diversity and is a water source for wildlife. It should be noted that this is not a technical identification of the area as a wetland, and it is not included in the National Wetland Inventory. If it is determined that this area technically qualifies as a wetland, which is determined by a professional based on characteristics like soil conditions and plant matter, a non-disturbance buffer zone may be needed.

The wetland intermittently holds water, providing a water source for wildlife.

conifer forest (+/-1.7 acres)

This area most strongly reflects the Christmas tree farm history of the property. The area contains dense rows of small conifer trees. The understory is primarily invasive plants, including invasive vines. There is also an old path/ dirt road that runs through this area. This path is dominated by invasive shrubs and invasive herbaceous plants. While conifers provide winter shelter for birds and some mammals like squirrels, this area is of low ecological quality. Over time, the conifers will continue to compete with each other, leading to suppression mortality as individual trees are shaded out and die. Combined with the highly invaded understory, this is likely to lead to a condition of fewer trees and more invasive plants over time.

meadow (+/-7.6 acres)

The are four distinct areas of meadow. The first area is located along Dolington Road. The southern half of this area has a high proportion of native plants and a low proportion of invasive plants. Warm season grasses (Poaceae spp.) and goldenrod (Solidago sp.) are the dominant plants. The northern half of this area has many similar species, but also a high prevalence of mugwort (Artemisia vulgaris). The meadows in the northern corner and center of the property around the wetland have a similar composition of plants to the meadow along Dolington Road. There is also a manmade berm in the central meadow with invasive plants and some tree saplings. The fourth meadow area is located around the salt barn. This area is heavily colonized by invasive plants.

Meadows in general are important habitat for birds and pollinators. In particular, the combination of meadow adjacent to forest provides a variety of food and shelter for wildlife. Even smaller patches of meadow can provide habitat for declining species such as the giant swallowtail butterfly and the monarch butterfly. Additionally, meadows store carbon through their long root systems, especially when dominated by native plants and warm-season grasses.

This forest is comprised of densely planted conifers

The central meadow, shown here, is comprised primarily of native plants.

shrubland/woodland (+/-5.7 acres)

The middle of the Property contains shrubland/woodland, characterized by a mix of open meadow, shrubs, and scattered trees. Some areas have a greater proportion of trees, creating a woodland. The shrubland/woodland areas have a moderate level of invasive plants. Dominant plants include Eastern red-cedar (*Juniperus virginiana*), goldenrod (*Solidago* sp.), and autumn-olive (*Elaeagnus umbellata*) – an invasive plant. Shrublands and woodlands provide a type of scrubby habitat that is preferred by some bird species due to an abundance of perching and sheltering plants while also having open areas for food.

mixed hardwood forest (+/-19.8 acres)

The mixed hardwood forest is the dominant plant community, covering the majority of the southern half of the Property and two patches in the northern half. The properties of this community vary throughout the various areas in composition and ecological quality. The highest quality areas are in the southern half of the Property. These areas have a mix of Eastern white pine (*Pinus strobus*), pin oak (*Quercus palustris*), and other conifers. Understory trees include bradford pear (*Pyrus calleryana*) – an invasive plant, and Eastern red-cedar (*Juniperus virginiana*).

Poorer quality areas include the eastern edge of the southern forest. Overall, this area has more canopy gaps and younger trees. A portion of this area near the eastern

The shrubland/woodland area contains a mix of open meadow, shrubs, and young trees.

meadow is heavily invaded by vines, which can compromise trees by girdling small trees and making older trees top heavy and more susceptible to breakage. This area is also seeing a die-off of ash trees. As the understory is sparse, there are few young trees ready to move into the canopy as the ash trees die off.

The northern areas are also generally poorer quality forest. The western-most corner of the Property contains mature tuliptrees (*Liriodendron tulipifera*) as the dominant canopy tree. However, this area is completely covered in invasive wisteria, a vine that is incredibly aggressive and forms dense mats of roots and stems. The upper stems and foliage form a thick blanket that can smother other plants. Moving east, the center areas of northern forest have a greater diversity of canopy species. However, they also have a high prevalence of invasive plants, including Japanese honeysuckle (*Lonicera japonica*), climbing into the canopy. The shrub and vine layer is also primarily comprised of invasive plants.

Overall, forests provide many ecological benefits, including habitat, air purification, and carbon storage. The higher quality forests can carry out these functions to a greater extent and are more likely to be sustainable over time with fewer management needs. The areas with a heavy proportion of invasive plants will continue to deteriorate over time without active management to control the invasive plants. This will lead to a further degradation of the forest and its ability to provide ecological benefits like habitat.

The better quality mixed hardwood forests have a higher proportion and diversity of native trees.

wildlife

During the site visits, Natural Lands staff observed deer and squirrels. Fox scat was also noted. Using the Merlin Bird ID app, staff also identified the following birds:

- America Robin
- American Goldfinch
- Blue Jay
- Chipping Sparrow
- Common Yellowthroat
- Eastern Towhee
- Gray Catbird
- House Finch
- Northern Cardinal
- Northern Mockingbird
- Red-Eyed Vireo
- Red-Winged Blackbird
- Song Sparrow

These are all common species of low conservation concern according to The Cornell Lab.

Bald Eagles have been identified in the region. However, Natural Lands staff did not see any Bald Eagles or nests during the site visits and no nests were noted through the US Fish and Wildlife Bald Eagle Nesting Map. If a Bald Eagle nest is identified at the Property, mitigation measures should be taken to minimize disturbance. The US Fish and Wildlife Service (USFW) has guidance documents available

to manage use around Bald Eagle nests. Recommendations include avoiding disturbance during the nesting season, particularly any disruptions to which the Eagles have not been previously exposed. Specifically, the USFW management document recommends 330-foot and 660-foot buffers depending on the type of activity. As there are no known nests at the Property, these measures are not currently necessary.

Additionally, the Pennsylvania Natural Diversity Index (PNDI) report for the Property identified voluntary conservation measures for bats. This includes retaining mature forests that have at least 60% forest cover and retaining large diameter (larger than 12 inches diameter at base height) snags and dead trees. Hickory was called out as an important species to conserve, however, no hickory trees were noted on site. Beyond the PNDI report, another recommendation is to consider any future lighting and implement "dark sky" best practices like directed and downturned lighting. Additional PNDI restrictions may apply for any type of recreation infrastructure, as that would have additional impacts beyond what was assessed for this PNDI report.

climate

According to The Nature Conservancy's Resilient Land Mapping Tool, the Snipes Property stores 605 metric tons of carbon based on 2010 forest levels. For reference, this is equivalent to 135 gasoline-powered cars driven for a year or 76.3 homes' energy use for one year. By 2050, the Property is projected to store 760 metric tons of carbon, which is equivalent to 169 gasoline-powered passenger cars for a year or 95.8 homes' energy use for one year.

prioritization

The Property was divided into four priority categories based on ecological conditions. The rankings are as follows: High, Medium-High, Medium-Low, and Low. The following descriptions include where the categories apply and why. ***Map 6: Prioritization*** shows the location of the priority areas.

Overall, no exceptional areas or species were identified during the report process. All areas are impacted by the past history of disturbance, both in age and in plant composition, particularly the forest tree composition and the presence of invasive plants. All rankings were determined relative to the conditions within the Property, not considering importance compared to other township or regional properties or compared to sensitive or rare plant communities.

high priority

The high priority areas include the highest quality forest, adjacent meadow, and wetland. These forests are the highest quality within the Property as they have older trees, more native plants in the understory, fewer invasive plants, and better native plant diversity. Additionally, the large Eastern white pines provide important habitat, particularly in the winter. The forests in this category are also the closest areas to mature forests, which are identified by the PNDI as important for bat habitat, and if left intact can age to a mature forest. The meadow area is primarily native plants and provides key habitat for wildlife, particularly birds. It is also primarily surrounded by high quality areas. The wetland also provides habitat diversity and is primarily comprised of native plants.

The high priority areas include large eastern white pine trees, which provide habitat for wildlife, particularly in the winter months when leaves fall off deciduous trees.

As noted above, this wetland has not been technically identified as a wetland by a qualified professional or the National Wetland Inventory. If it is determined that this area technically qualifies as a wetland, the PNDI report notes that no activity should take place within 300 feet of the wetland. This would affect portions of lower ranking areas as shown on ***Map 6: Prioritization***.

These areas should be of highest priority for conservation and stewardship. Stewardship needs include control of invasive plants and deer management.

medium – high priority

The medium-high areas still have good ecological value but are not quite as ecologically intact as the high value areas. These areas include the meadow near Dolington Road and the shrubland/woodland. The meadow near Dolington is not adjacent to any high priority areas and has a slightly higher proportion of invasive plants compared to the central meadow. The shrubland/woodland is being impacted by vines and autumn-olive, but still has a high proportion of native plants. Additionally, these areas

The medium-high priority areas include the shrubland/woodland and higher quality meadows. (above and right)

provided habitat diversity for wildlife, particularly birds.

While these areas have some invasive plants, this is outweighed by the value of the areas for pollinators and birds. Additionally, the level of invasive plants is manageable with some action.

medium – low priority

The medium-low areas include more compromised forest areas and the berm within the center meadow. The eastern forest area categorized as medium-low includes a higher proportion of invasive plants and canopy gaps. The canopy gaps lack native tree seedlings to fill in and are instead being filled by herbaceous plants and invasive plants. The western medium-low forest area has healthy canopy trees, however they are being overtaken by invasive shrubs and vines. It is also adjacent to low-quality areas which increases the risk of further degradation by invasive plants. The berm area was also included due to the high proportion of invasive plants.

These areas are currently on a downward trajectory in terms of ecological quality. Stewardship of the areas to

reverse this decline includes controlling invasive plants, controlling deer to allow for regeneration, and potentially planting trees to aid regeneration.

low priority

These areas have the poorest environmental quality within the site. They have a high abundance of invasive plants, particularly vines, and a low diversity of native plants. Their ecological value is highly compromised and would require the most time and resources to restore.

The low priority areas include the conifer forest, which has a high abundance of invasive plants, few native understory plants, and a declining canopy. The area also has a very limited diversity of native tree species. As the conifers die off, they are replaced by invasive plants, not other native trees.

The medium area include mixed hardwood forest with a higher proportion of invasive vines and canopy gaps.

Three sections of mixed hardwood forest are included for similar reasons. They have a high proportion of invasive plants, specifically vines and shrubs that are smothering out the canopy, and a limited diversity of native plants. The northwestern forest area is being overgrown by invasive wisteria. The wisteria is severely compromising the health of this area despite the large, native tuliptrees. The eastern-central forest area is experiencing die-off of young ash trees and Eastern red-cedar without native trees to replace them. There is also a high proportion of grape vines, a native though aggressive vine, growing into the canopy which can further damage the canopy through girdling and overtopping trees. The southeastern forest area is experiencing higher proportions of canopy gaps and a high level of invasive plants.

The low priority areas include a sections of mixed hardwood forest severely compromised by invasive vines. (below, right, and following page)

While forests are generally important for habitat and other ecosystem benefits, these areas will keep declining unless there is a high level of active management to control the invasive plants and plant native species. A higher level of management is needed to properly steward these areas, particularly the invasive vines and grape vine. Deer management and replanting are also likely needed to restore these areas.

The heavily invaded meadow area around the salt barn is also included as there are few native species and the area is also likely to continue to rapidly decline without active management.

summary

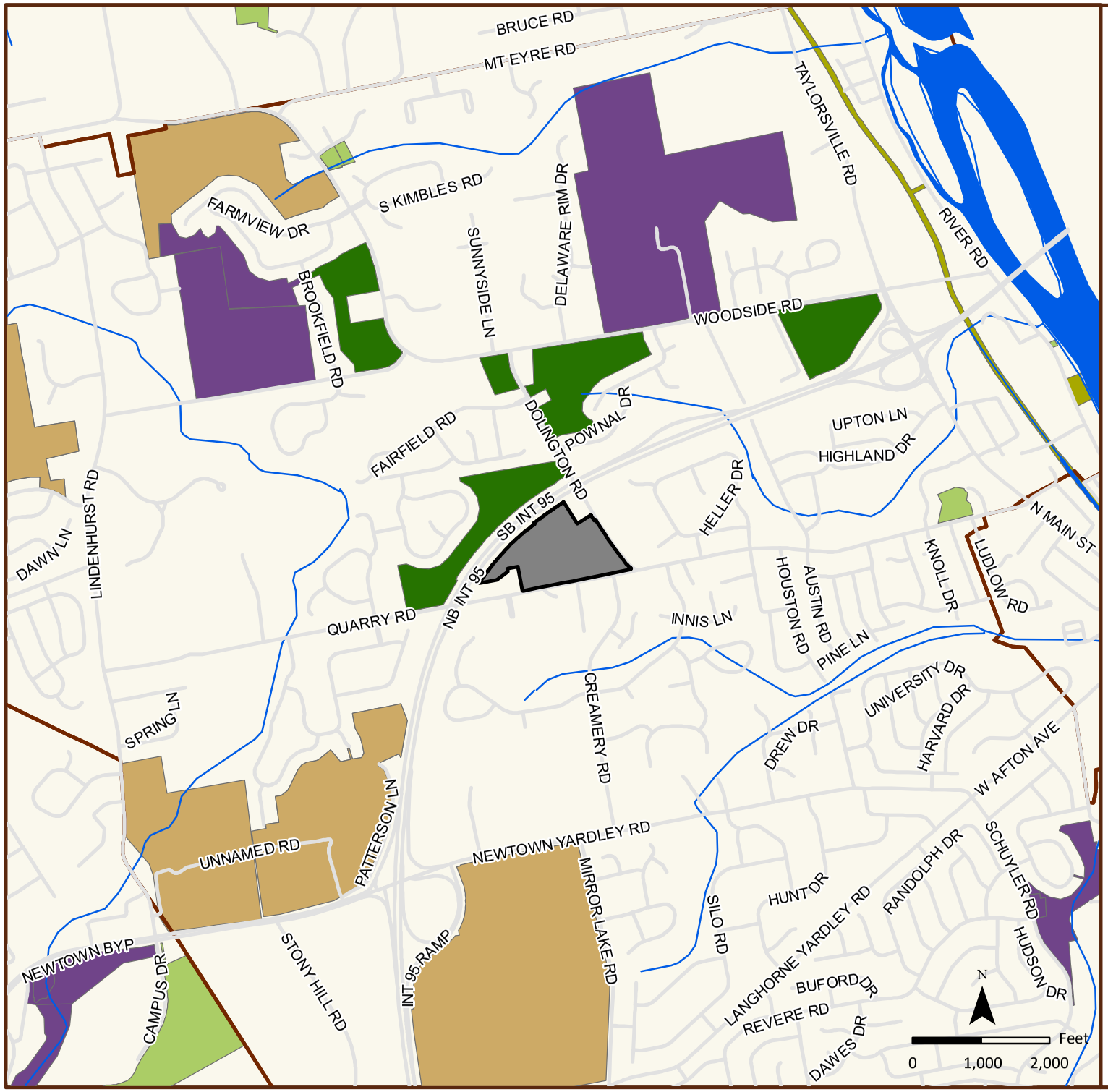
This report assessed the natural areas of the Snipes Property to determine the highest priority areas in terms of ecological quality. Overall, the higher quality areas are concentrated towards the central section of the Property, while the northern and southeastern sections are more degraded. The high priority areas represent a mix of plant communities, offering different habitat types to support wildlife. These areas will require some active management to maintain but will require less resources to maintain than the lower quality areas. While this report divides the Property based on ecological quality, consideration should also be given to the ecological function of the Property as a whole, including its ability to store carbon, the diversity of habitat throughout the site, and its role in managing stormwater for the area, when considering how to manage the property.

appendices

maps

1. Location
2. 2018 Aerial Photography
3. Historic Aerial 1968
4. Soils
5. Plant Communities
6. Prioritization

plant communities



Map 1: Location

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

- Snipes Boundary
- Roadway
- Waterways
- Municipal Boundary
- Conservation Easement
- Agricultural Easement
- Local Owned
- Land Trust Owned
- State Land

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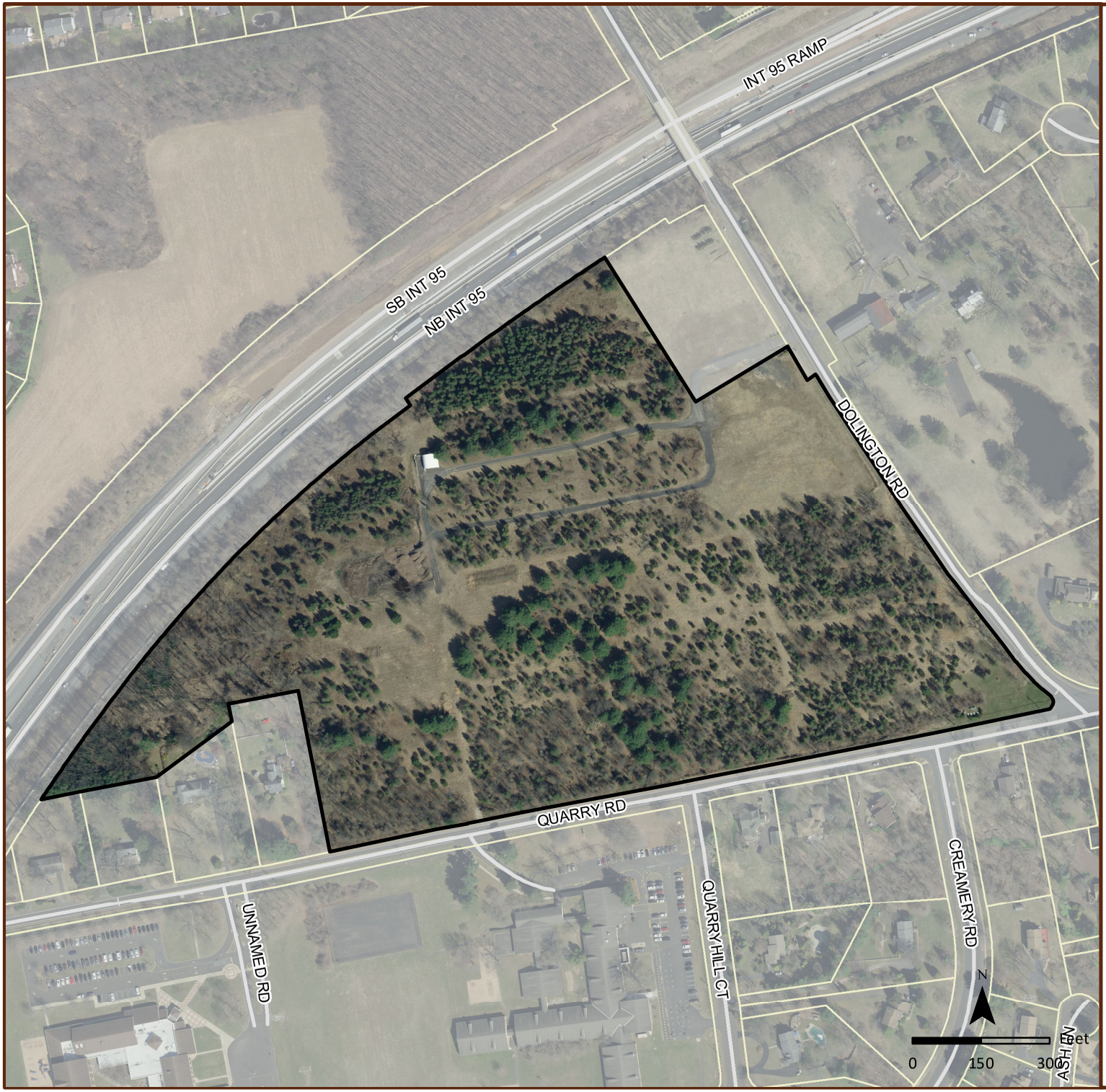
1. Parcel boundaries from Bucks County.
2. Protected lands from WeConservePA.

Compiled By: KEB 8/28/23



Map 2: 2018 Aerial Photography

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

- Snipes Boundary
- Parcel Boundary
- Roadway

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1. Parcel boundaries from Bucks County.
2. Historical aerial photography from PennPilot.

Compiled By: KEB 8/28/23

Map 3: 1968 Historical Aerial Photography

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

Snipes Boundary

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1. Parcel boundaries from Bucks County.
2. Historical aerial photography from PennPilot.

Compiled By: KEB 8/28/23

Map 4: Soils

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

Snipes Boundary

Roadway

Snipes_soils_Clip

Soils

- Abbottstown
- Buckingham
- Fountainville
- Penn

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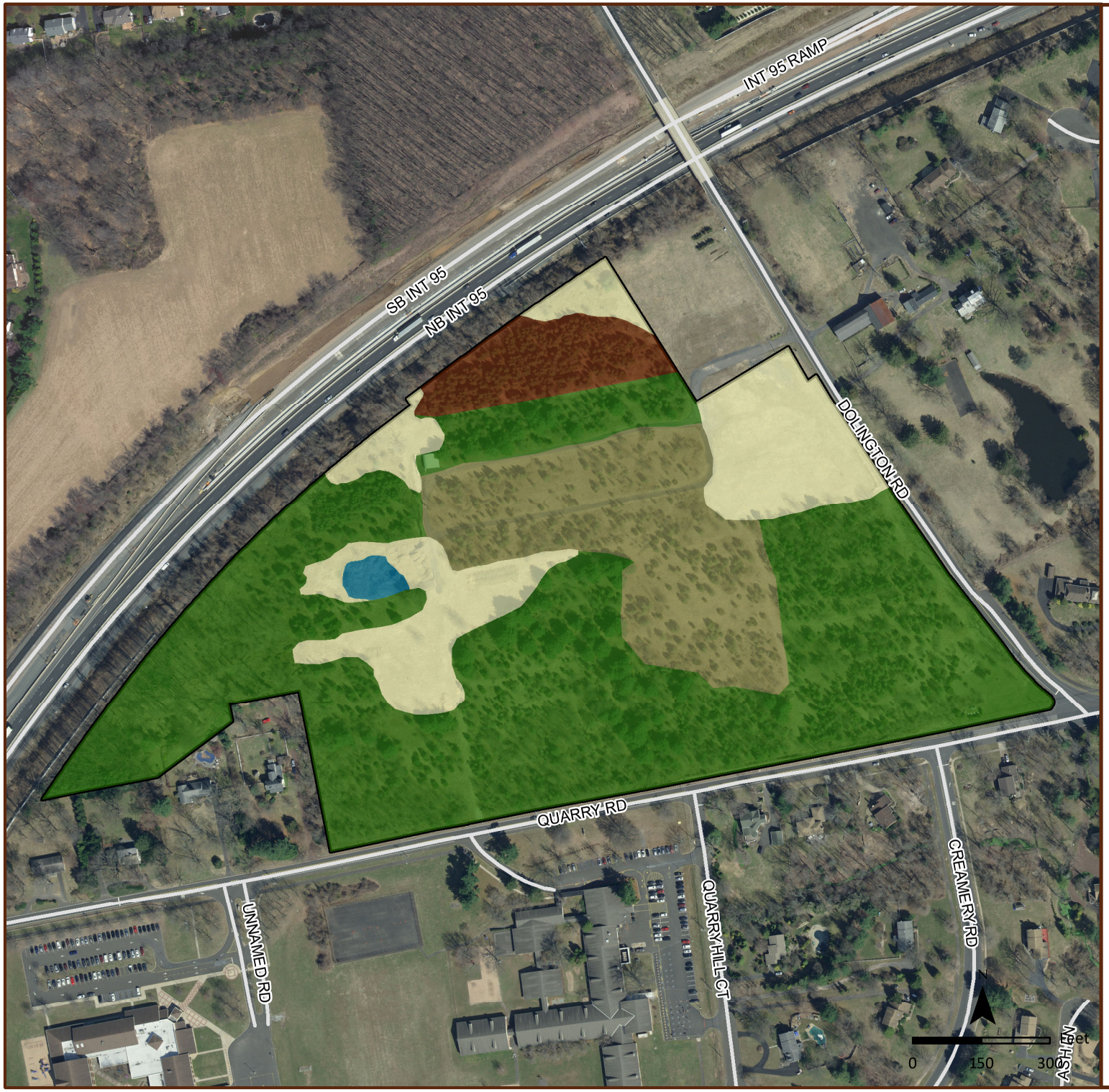
1. Parcel boundaries from Bucks County.
2. Soils from USDA NRCS.

Compiled By: KEB 8/28/23



Map 5: Plant Communities

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

Snipes Boundary

Roadway

Plant Community

- Conifer Forest (+/-1.7 acres)
- Meadow (+/-7.6 acres)
- Mixed Hardwood Forest (+/-19.8 acres)
- Shrubland/Woodland (+/-5.7 acres)
- Wetland (+/-0.2 acres)

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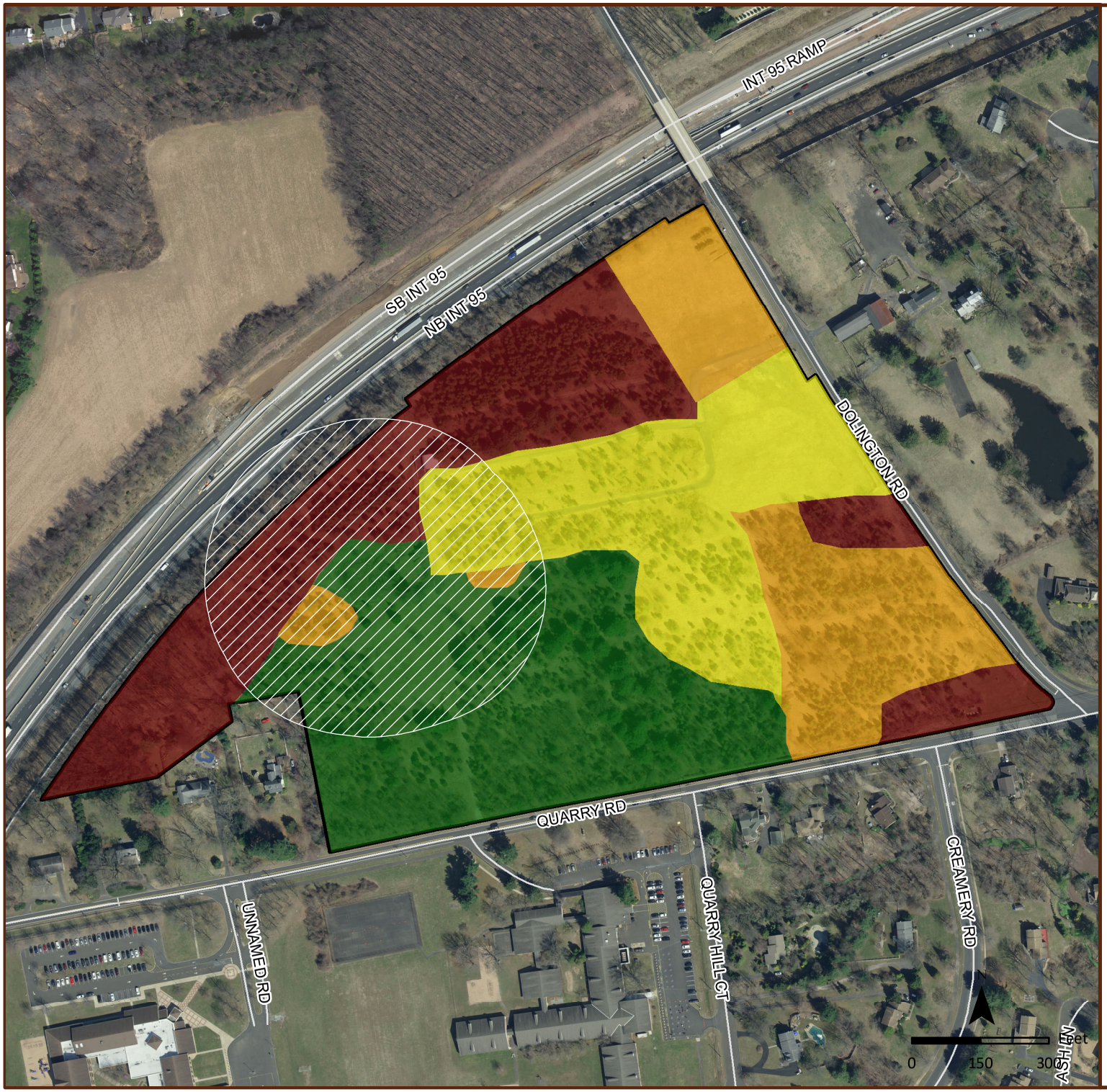
1. Parcel boundaries and roads from Bucks County.

Compiled By: KEB 8/28/23



Map 6: Prioritization

SNIPES PROPERTY (+/-35 acres)

Tax ID: 20-016-022; 20-016-001-001

Lower Makefield, Bucks County, PA

- Snipes Boundary
- Roadway
- Wetland Buffer

Priority

- High
- Medium-High
- Medium-Low
- Low

Note: These priority rankings are based on relative ecologicial quality within the Snipes Property. The rankings are not in relation to any other propertiesor exceptional plant communities.

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1. Parcel boundaries and roads from Bucks County.

Compiled By: KEB 9/11/23

plant communities

WETLAND	
herbaceous	
mugwort	***Artemisia vulgaris***
bermuda grass	***Cynodon dactylon***
rushes	*Juncus* sp.
common reed	***Phragmites australis***
goldenrod	*Solidago* sp.
asters	*Symphyotrichum* sp.
cattail	*Typha latifolia*

CONIFER FOREST	
canopy	
balsam fir	*Abies balsamea*
shrub & vine	
Japanese honeysuckle	***Lonicera japonica***
multiflora rose	***Rosa multiflora***
grape	*Vitis* sp.
herbaceous	
Japanese stiltgrass	***Microstegium vimineum***
grasses	*Poaceae* sp.
goldenrod	*Solidago* sp.
poison-ivy	*Toxicodendron radicans*

MEADOW	
woody plants	
birch	*Betula* sp.
bradford pear	*Pyrus calleryana*
multiflora rose	***Rosa multiflora***
brambles	*Rubus* sp.

herbaceous	
broomsedge	*Andropogon virginicus*
Indian hemp	*Apocynum* sp.
yarrow	*Achillea millefolium*
mugwort	***Artemisia vulgaris***
common milkweed	*Asclepias syriaca*
sedges	*Carex* sp.
Canada thistle	***Cirsium arvense***
bindweed	*Convolvulus* sp.
fleabane	*Erigeron* sp.
dame's rocket	***Hesperis matronalis***
rushes	*Juncus* sp.
rye grass	*Lolium perenne*
Japanese stiltgrass	***Microstegium vimineum***
Chinese silvergrass	***Miscanthus sinensis***
grasses	*Poaceae* sp.
mountain mint	*Pycnanthemum muticum*
crown vetch	***Securigera varia***
bue-eyed grass	*Sisyrinchium* sp.
goldenrod	*Solidago* sp.
poison-ivy	*Toxicodendron radicans*

Salt Barn Meadow	
dogbane	*Apocynum* sp.
mugwort	***Artemisia vulgaris***
thistle	***Cirsium sp.***
Japanese stiltgrass	***Microstegium vimineum***
sensitive fern	*Onoclea sensibilis*
common reed	***Phragmites australis***
grasses	*Poaceae* sp.
multiflora rose	***Rosa multiflora***
goldenrod	*Solidago* sp.
poison-ivy	*Toxicodendron radicans*

SHRUBLAND / WOODLAND	
trees	
birch	*Betula* sp.
Eastern red-cedar	*Juniperus virgniana*
sweetgum	*Liquidambar styraciflua*
tuliptree	*Liriodendron tulipifera*
Eastern white pine	*Pinus strobus*
black cherry	*Prunus serotina*
douglas fir	*Pseudotsuga menziesii*
bradford pear	***Pyrus calleryana***
pin oak	*Quercus palustris*
willow oak	*Quercus phellos*
shrubs & vines	
autumn-olive	***Elaeagnus umbellata***
Japanese honeysuckle	***Lonicera japonica***
multiflora rose	***Rosa multiflora***
herbaceous	
Indian hemp	*Apocynum* sp.
common reed	***Phragmites australis***
grasses	*Poaceae* sp.
goldenrod	*Solidago* sp.
poison-ivy	*Toxicodendron radicans*

FOREST	
canopy	
balsam fir	*Abies balsamea*
fir	*Abies* sp.
white birch	*Betula* sp.
ash	*Fraxinus* sp.
black walnut	*Juglans nigra*
tuliptree	*Liriodendron tulipifera*
Norway spruce	*Picea abies*
Eastern white pine	*Pinus strobus*
bradford pear	***Pyrus calleryana***
pin oak	*Quercus palustris*
black locust	*Robinia psuedoacacia*
understory	
tree-of-heaven	***Ailanthus altissima***
American holly	*Ilex opaca*
Eastern red-cedar	*Juniperus virgniana*
crabapple	*Malus* sp.
black cherry	*Prunus serotina*
bradford pear	***Pyrus calleryana***
pin oak	*Quercus palustris*
willow oak	*Quercus phellos*
common buckthorn	***Rhamnus cathartica***
shrub & vine	
barberry	***Berberis thunbergii***
oriental bittersweet	***Celastrus orbiculatus***
autumn-olive	***Elaeagnus umbellata***
spicebush	*Lindera benzoin*
Japanese honeysuckle	***Lonicera japonica***
multiflora rose	***Rosa multiflora***
wineberry	***Rubus phoenicolasius***
poison-ivy	*Toxicodendron radicans*
grape	*Vitis* sp.
herbaceous	
white snakeroot	*Ageratina altissima*
garlic-mustard	***Alliaria petiolata***
mugwort	***Artemisia vulgaris***
Japanese stiltgrass	***Microstegium vimineum***
Chinese silvergrass	***Miscanthus sinensis***
sensitive fern	*Onoclea sensibilis*
common reed	***Phragmites australis***
grasses	*Poaceae* sp.
goldenrod	*Solidago* sp.

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