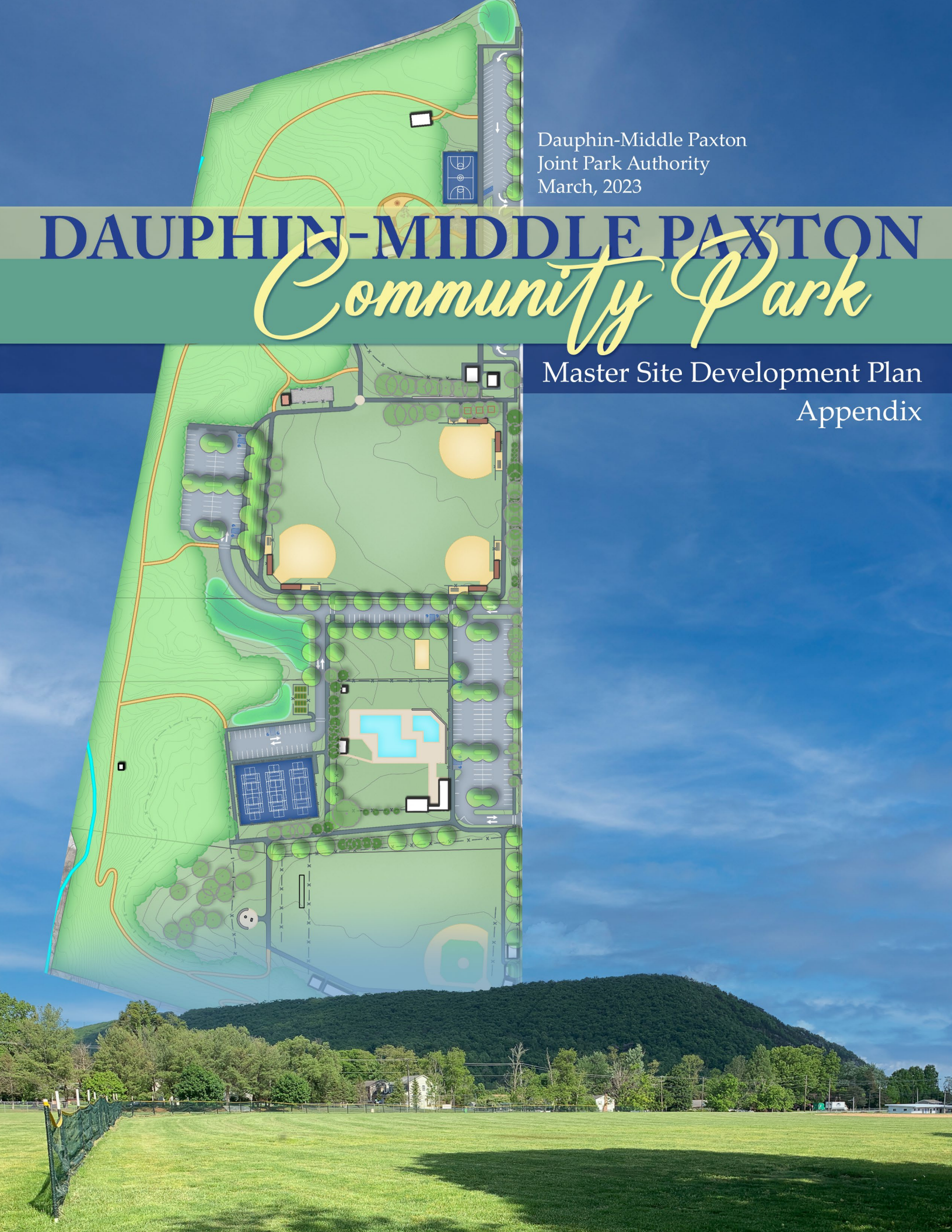
Dauphin-Middle Paxton
Joint Park Authority
March, 2023

DAUPHIN-MIDDLE PAXTON Community Park

Master Site Development Plan
Appendix



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pennsylvania
DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT

Project Consultants:

SIMONE LANDSCAPE ARCHITECTURE COLLINS

AEG
American Engineers Group

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Exhibit A:
Dauphin-Middle Paxton Community Park
Natural Resource Management Plan

Natural Resource Management Plan

Dauphin-Middle Paxton Community Park

Located In

Dauphin Borough, Dauphin County, PA

For

Dauphin-Middle Paxton Joint Park Authority

Prepared By:

American Engineers Group

Engineers • Geologists • Surveyors • Environmental Consultants
Water Resources • Construction Services
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In Association with
Simone-Collins Landscape Architecture

SIMONE LANDSCAPE ARCHITECTURE COLLINS

January 2023

Table of Contents

1.0 Introduction

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are two adjacent park facilities. For the purpose of this plan, they will be considered as one single unit. Figure 1 in Appendix A shows the location of the park. Figure 2 shows the existing conditions and Figure 3 shows the proposed park improvements.

The purpose of this Natural Resource Management Plan is to provide Dauphin-Middle Paxton Community Park Joint Authority board members, staff, volunteers, and residents with the knowledge, methods, and tools to steward the unimproved areas of the park and maximize the value realized by the community.

2.0 Park Description

Dauphin-Middle Paxton Community Park is located on Claster Boulevard on the boundary of Dauphin Borough and Middle Paxton Township. The park is managed by the Dauphin-Middle Paxton Joint Park Authority (DMPJPA) and is funded by contributions from residents, along with Township and Borough funds. The park features six baseball/softball fields, two playgrounds, a basketball court, volleyball court, walking track, two pavilions and a community pool.

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are a combined 34.2 acres in size. Approximately 13.8 acres (~40 %) of that area is currently in a natural wooded state, primarily along the southern, western, and northern boundary of the parks. The wooded area is part of a larger contiguous approximately 30-acre woodland including the adjacent 26.9-acre residential parcels owned by George Lesh.

The existing woodland at the northern end of the park has been largely cleared of invasive species through the active management of a few volunteers. This results in fairly open woods with an opportunity for further enhancement of understory layers with native plants. However, approximately three quarters of the woodlands on site are not managed and have a substantial presence of invasive species. In particular, the middle portion of the park has a dominance of tree of heaven which is a preferred host plant for the spotted lanternfly, a very damaging invasive insect. The control of these invasive species would clear the slate for the establishment of more native species with higher value for wildlife.

A Boy Scout Eagle project has established a number of rustic trails through the wooded areas of the park. These trails provide a significant opportunity to enhance the use of the woodland portion of the park. There is substantial public interest in this currently under-utilized portion of the park. In contrast to the active use areas of the park such as the ball fields and swimming pool, the natural areas can open the park up to a wider range of users. Improvement to the trails and interpretive signage can enhance that experience. Consideration of upgrading some of these trails for American with Disabilities Act (ADA) accessibility, would further open the park's recreational opportunities.

3.0 Plan Goals and Objectives

The primary objective of the Natural Resource Management Plan is to develop a baseline of natural resources within Dauphin-Middle Paxton Community Park and identify steps to maximize community value of these resources. Based on community input, the multiple goals of the Natural Resources Management Plan include:

- Improve Habitat Quality - Forests provide food and shelter for numerous wildlife species. In return, many of these species' aid in seed dispersal, forest pest control, and many other ecological tasks that perpetuate healthy forests.
- Improve Recreational Access - Forest surroundings provide a setting that is widely desired for many recreational activities. Hiking, picnicking, and bird watching are only a few of the recreational activities that are more possible and more fun in forests than in barren surroundings.
- Improve Scenic Beauty - A forest's scenic value can provide many benefits. Simply being outdoors in the open air, in a natural setting can be relaxing, meditative, invigorating, or even spiritual. The emotional and physical well-being that forests afford has some scientific basis.
- Protect Water Quality - Forests help control the water cycle by regulating precipitation, evaporation and flows. Layers of forest canopy, branches and roots can store and release water vapor, which controls rainfall. Forests can also help reduce the impacts of floods from storms by blocking and slowing down the flow of runoff.
- Provide Other Resource Benefits Including Soil Conservation, Air Quality Improvement, Carbon Sequestration - Forest cover protects the soil from extreme heat and cold while slowing the natural forces of erosion including water, wind, and gravity. In turn, soil sustains the forest and provides raw materials for its life: fallen leaves, woody debris, and dead animals recycle through the soil. Trees remove air pollution by the interception of particulate matter on plant surfaces and the absorption of gaseous pollutants through the leaf stomata. Forests and forest soils are also important carbon sinks. Carbon is sequestered in wood as a product of photosynthesis. Forests play a critical role in mitigating the effects of climate change. Global climate change is beyond the scope of this plan but, even small stands of trees can play a beneficial role in sequestering carbon and moderating local temperatures.

4.0 Natural Resource Inventory

Terrestrial Plant Community

Based on the Terrestrial & Palustrine Plant Communities of Pennsylvania the dominant plant community of Dauphin-Middle Paxton Community Park is identified as a Red oak – mixed hardwood forest. This broadly defined community type is common in Pennsylvania occurring on fairly mesic sites and is quite variable in composition. Northern red oak is usually present and often dominant/co dominant. Associated trees include red maple, black oak, white oak, mockernut hickory, shagbark hickory, sweet birch, yellow birch, white ash, American beech, and

yellow poplar. Shrubs and understory trees associated with this forest type include northern arrowwood, southern arrowwood, maple-leafed viburnum, smooth serviceberry, shadbush, mountain laurel, hornbeam, hop-hornbeam, witch-hazel, and spicebush. The herbaceous layer can be quite variable and may include wild oats, false Solomon's seal, may-apple, pipissewa, teaberry, Indian cucumber-root, blue cohosh, wood ferns, and hay scented fern.

Table 1 in Appendix E provides a list of plant species observed in Dauphin-Middle Paxton Community Park. A breakdown of native and non-native status is included in Table 2 in Appendix E.

Aquatic and Wetland Plant Community

Aquatic resources in the park are limited. There is a small first order stream adjacent to the western boundary of the park. There are also small fringe wetlands associated with the stream. Dominant vegetation includes spotted touch-me-not, spotted joe-pye, and lizard tail. An existing stormwater pond is located in the northwest corner of the park associated with State Route 225. This stormwater facility has similar wetland vegetation.

Geology

The United States Geological Survey identifies the surficial bedrock of the Dauphin-Middle Paxton Community Park as the Mauch Chunk Red Shale. This formation includes sandstone, siltstone, shale, and some conglomerate. Some non-red rocks may be included. The Mauch Chunk Formation includes Loyalhanna Member (cross-bedded, sandy limestone) at base; and also includes Greenbrier Limestone Member, and Wymps Gap and Deer Valley Limestones, which are tongues of the Greenbrier. Bedrock is not exposed within the park.

Soils

Based on the Natural Resource Conservation Service Custom Soil Resource Report, the soils of Dauphin-Middle Paxton Community Park include the Calvin-Leck Kill shaly silt loam and Klinesville shaly silt loam (NRCS, 2022). The Klinesville unit is found on the steeper slopes of the park. The Calvin-Leck Kill soils are broken into two mapping units based on slope. All of these soils are deep and well drained. These soils have no significant limitations except for slope. The Natural Resource Conservation Service soil report is included in Appendix C.

Wildlife

A comprehensive inventory of wildlife species in the park has not been completed. Casual observations made by park users and county-wide inventories indicate a variety of species that may be encountered.

A review of the Pennsylvania Natural Diversity Inventory (PNDI) did not identify any fish, wildlife, insect, or plant species known to be endangered, threatened, or of special concern known to be present in or around Dauphin-Middle Paxton Community Park. The PNDI receipt is included in Appendix D.

eBird is an online database (www.ebird.org) of bird observations providing scientists, researchers and amateur naturalists with real-time data about bird distribution and abundance. An eBird checklist of birds that may be found in or around the Dauphin-Middle Paxton Community Park is provided in Table 3 in Appendix E.

Observers using the iNaturalist application have reported numerous identifications of wildlife in the Dauphin County Pennsylvania area. iNaturalist is a social network of naturalists, citizen scientists, and biologists built on the concept of mapping and sharing observations of biodiversity across the globe. iNaturalist may be accessed via its website (www.inaturalist.org) or from its mobile applications.

iNaturalist users have identified 156 bird species, 32 mammal species, 21 reptile species, 18 amphibian species, 1,232 insect species, 108 arachnid species, and 26 species of other invertebrates in the vicinity of Dauphin County. A further breakdown of these observations can be found in Table 4 in Appendix E. Bird, mammal, reptile, and amphibian species of the Dauphin County area are listed in Tables 5 through 8 in Appendix E.

5.0 Recommendations

The management of the natural resources of the Dauphin-Middle Paxton Community Park is closely tied to the management of the forest resource and the control of invasive species. These subjects are addressed in separate plans. Recommendations to meet the goals of this Natural Resources Management Plan include:

Improvement Habitat Quality
Native wildlife is recognized as an important local natural resource and has an interdependent relationship with the other resources that combine to form habitat. The term "habitat improvement" means restoring, enhancing, or establishing physiographic, hydrological, or disturbance conditions necessary to establish or maintain native plant and animal communities, including periodic manipulations to maintain intended habitat conditions. Essential elements must be present to provide a viable habitat: food, water, cover, and space. The Forest Stewardship Plan provides details for the management of forest resources in Dauphin-Middle Paxton Community Park.

Invasive species are often non-native species that overtake habitats, reducing the overall biological diversity and causing ecological damage to our native communities. Non-native, invasive species do not support native insects and wildlife. The control of invasive species is critical to improving habitat quality. The Invasive Species Management Plan provides details for the control of invasive species in Dauphin-Middle Paxton Community Park.

The diversity of wildlife is significantly increased with native plant diversity. Native plants and native animals have evolved together over thousands of years, supporting one another to

survive. A variety of native plants provide different food sources. Native plants also provide animals with shelter and protection from predators.

Providing nest boxes, platforms or structures where natural nesting sites are absent or in low numbers is another way to improve habitat. Trimming trees and shrubs to enhance the growth of species that produce more food and cover for wildlife is called releasing.

Habitat for specific species can also be enhanced through directed plantings and other habitat manipulations based on the life requisites of an identified species including food, water, cover, and reproductive needs. For instance, habitat improvement for the identified box turtle population may include the planting of berry producing plants which are a primary food source and creation of muddy or moist areas for burrowing during hot summer months.

Improve Recreational Access

Trails and wildlife viewing areas are vital for educational and passive recreation activities such as nature study, photography, birdwatching, etc. When updating and managing the park property, care and consideration should go into access to trails, viewing areas, and other infrastructure supporting passive recreation. Likewise, trail design and maintenance should always take into account sensitive habitats and other ecological considerations.

The existing network of rustic woodland trails should be refined and improved to provide better public access to the natural areas of the park. The addition of interpretive signage can provide educational opportunities for park users and school students and further enhance the nature experience.

Improve Scenic Beauty

Enhancing the aesthetic value of the park's natural areas can have a myriad of benefits that increase value for the community. Planting a mix of wildflowers, flowering shrubs and trees, and plants with seasonal interest such as fall color or winter texture will encourage use of these natural areas. The American Psychological Association has recognized that exposure to nature has been linked to a host of benefits including improved attention, lower stress, and improvements in mood, mental health, and emotional well-being. The diversity of flowering plants will also support native pollinators, which in turn, support wildlife up the food web.

Protect Water Quality

Natural vegetation buffers act to stabilize soil and prevent erosion. They also filter contaminants before they enter waterways, and they provide microhabitats and habitat corridors for the benefit of native plants and animals. Systems without adequate riparian vegetation are susceptible to degradation via increased sedimentation, non- point source pollution, increased solar exposure, and subsequent thermal stress. The restoration and maintenance of the natural forest buffer will facilitate the goal of aquatic resources and water quality protection.

The unnamed tributary exhibits severe bank erosion in a number of areas. Although much of this stream is located on the adjacent private property, the implementation of stream bank stabilization techniques would reduce sediment loads and improve water quality. This could possibly be done under the township and/or borough's Municipal Separate Storm Sewer (MS4) program and potential credit taken for sediment reduction.

Provide Other Resource Benefits Including Soil Conservation, Air Quality Improvement, Carbon Sequestration

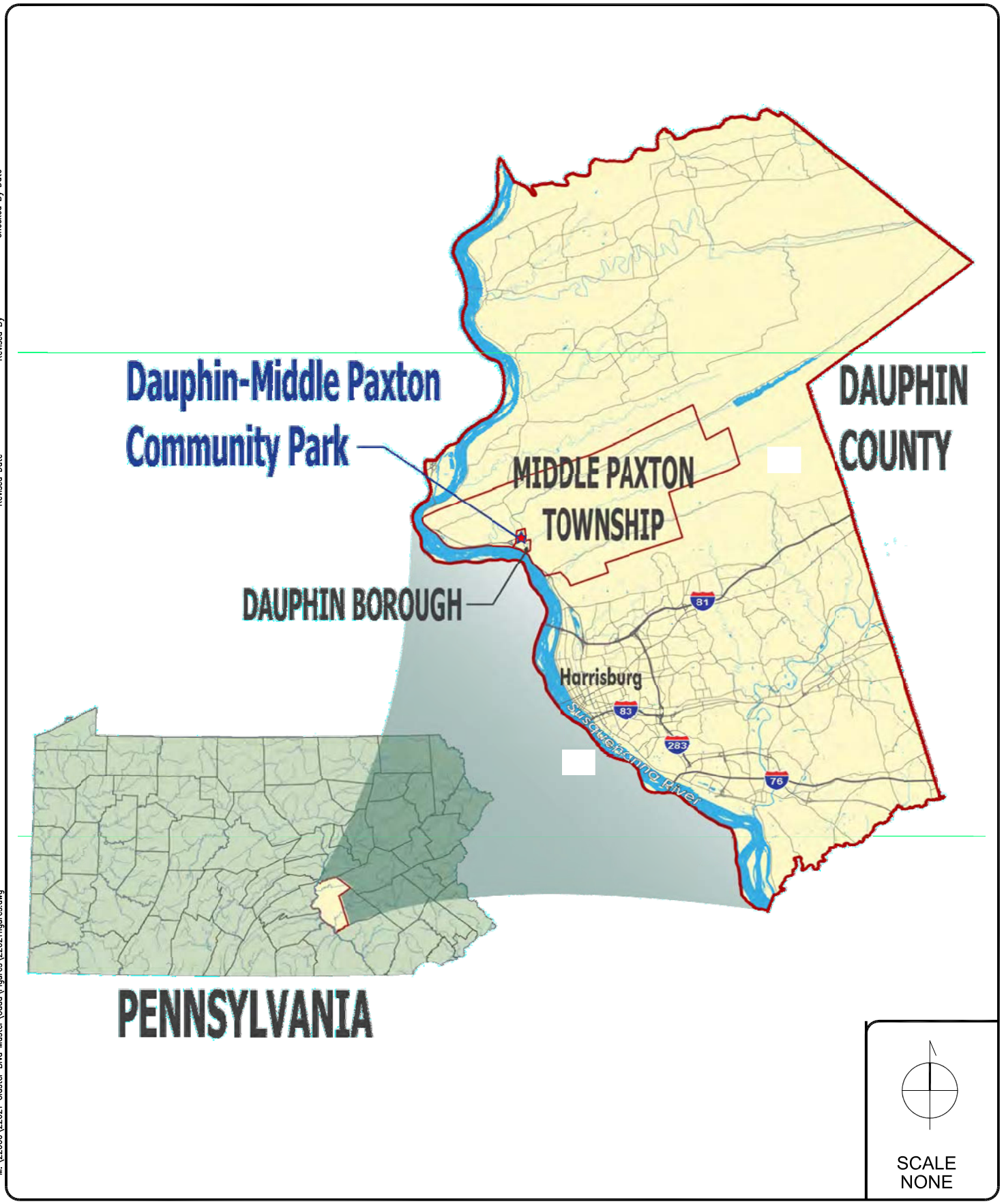
Construction activities and invasive vegetation management on slopes can potentially result in degradation and erosion. Therefore, any such activities that threaten slope stability or have a potential for soil runoff should also include a strategy for preserving the integrity of the slopes. An erosion and sedimentation control plan will be required for any earth disturbance activities that are undertaken.

Maintaining a healthy forest buffer will also play a significant role in improving and maintaining air quality. Trees remove air pollution by the interception of particulate matter on plant surfaces and the absorption of gaseous pollutants through the leaves. It is estimated that one large tree can provide a day's supply of oxygen for up to four people. Trees also store carbon dioxide in their fibers, helping to clean the air and reduce the negative effects that this CO2 could have had on our environment.

According to the US forest Service, forests sequester (or absorb) and store carbon dioxide from the atmosphere, helping to offset greenhouse gas emissions. Carbon is absorbed from the atmosphere through photosynthesis. It then becomes deposited in forest biomass (trunks, branches, roots and leaves), in dead organic matter (fallen leaves and dead wood) and in soils. A forest is considered to be a carbon sink if it absorbs more carbon from the atmosphere than it releases.

Appendices

Appendix A - Maps



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Revised By
Checked By
Checked By Date

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REGIONAL LOCATION MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK
MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

FIGURE
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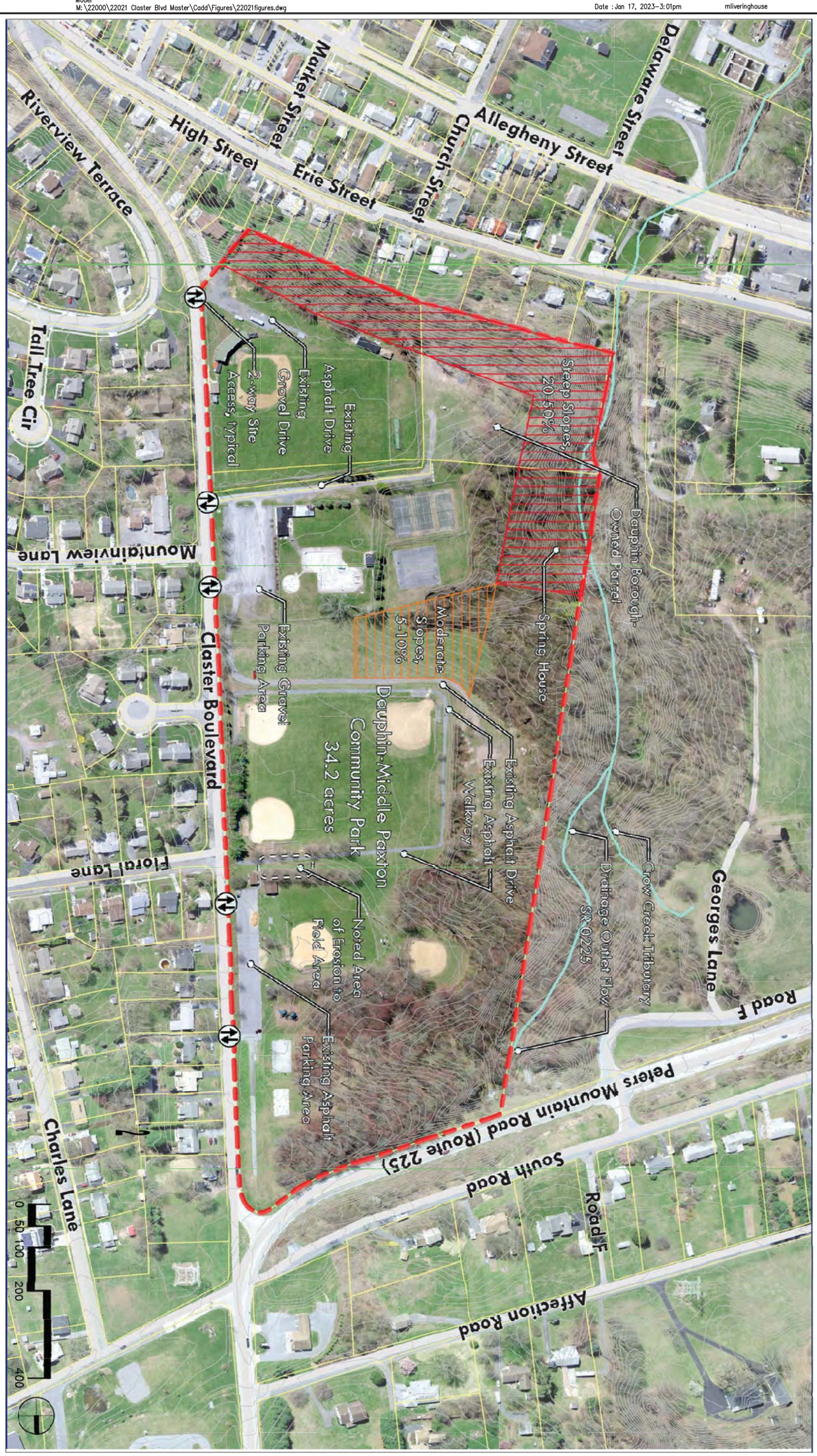

FIGURE 2

SCALE AS SHOWN

EXISTING CONDITIONS MAP

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MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

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CHECKED BY:	AP
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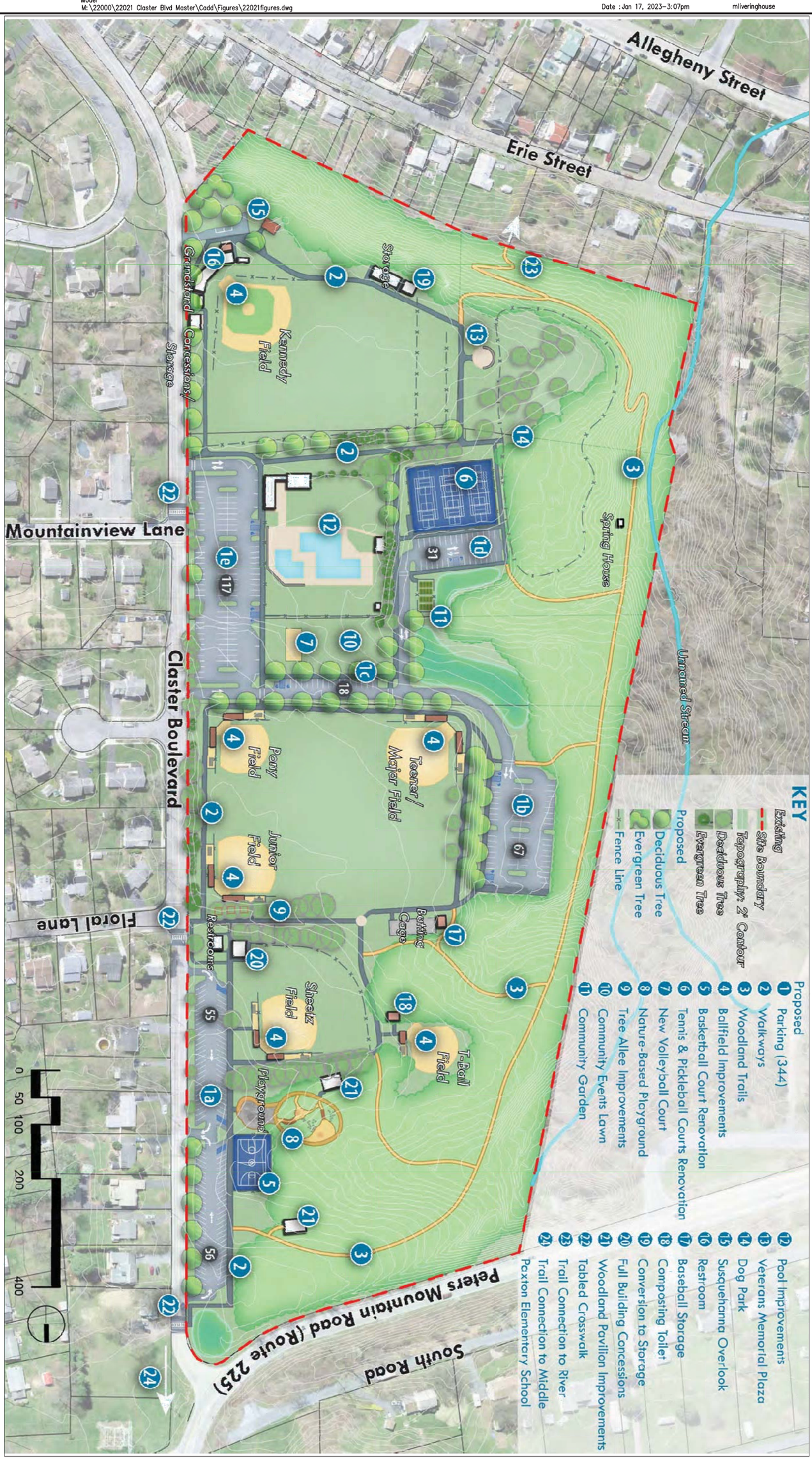

FIGURE 3

SCALE AS SHOWN

PROPOSED CONDITIONS MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK

MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

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DRAWN BY:	MEL
CHECKED BY:	AP
DATE:	1/17/2023
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Appendix B - Site Photos

Bank erosion on the unnamed tributary on the western border of the park.

A stand of lizard's tail (*Saururus cernuus*) along the small tributary. This species is much more common along larger stream/river systems.

A slope in the park vegetated with mostly invasive species including bush honeysuckle in the foreground and Norway maple in the background of the photo.

Woodland habitat with sparse understory, cleared of most of the invasive species.

Wetlands along the unnamed tributary containing both native and non-native species.

A gas line right-of-way offering opportunity of enhancement planting with species with higher wildlife values.

Appendix C - NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Dauphin County, Pennsylvania

Dauphin Middle Paxton Park

January 3, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

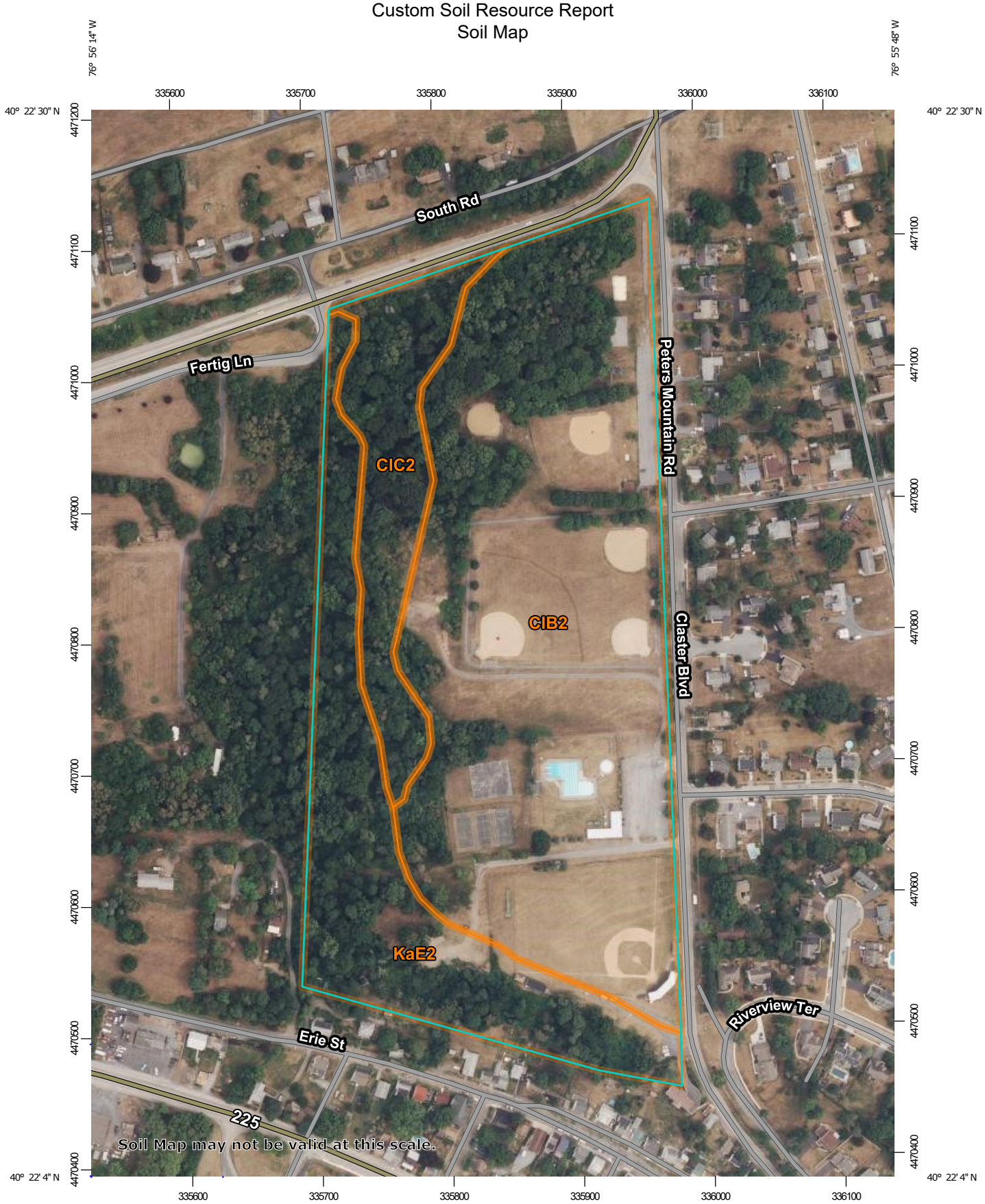
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



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N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dauphin County, Pennsylvania
Survey Area Data: Version 19, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 6, 2020—Nov 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ClB2	Calvin-Leck Kill shaly silt loams, 3 to 8 percent slopes, moderately eroded	25.8	64.6%
ClC2	Calvin-Leck Kill shaly silt loams, 8 to 15 percent slopes, moderately eroded	4.9	12.2%
KaE2	Klinesville shaly silt loam, 25 to 50 percent slopes, moderately eroded	9.2	23.1%
Totals for Area of Interest		**39.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dauphin County, Pennsylvania

ClB2—Calvin-Leck Kill shaly silt loams, 3 to 8 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4nh
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Calvin and similar soils: 50 percent
Leck kill and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calvin

Setting

Landform: Hillslopes
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 30 inches: channery silt loam
H3 - 30 to 35 inches: extremely channery silt loam
H4 - 35 to 45 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Description of Leck Kill

Setting

Landform: Valleys, ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 45 inches: channery silt loam
H3 - 45 to 60 inches: very channery silt loam
H4 - 60 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Klinesville

Percent of map unit: 6 percent
Hydric soil rating: No

Bedington

Percent of map unit: 3 percent
Hydric soil rating: No

Blairton

Percent of map unit: 3 percent
Hydric soil rating: No

Hustontown

Percent of map unit: 3 percent
Hydric soil rating: No

CIC2—Calvin-Leck Kill shaly silt loams, 8 to 15 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4nj
Elevation: 300 to 1,500 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Calvin and similar soils: 50 percent
Leck kill and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calvin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 27 inches: channery silt loam
H3 - 27 to 31 inches: very channery silt loam
H4 - 31 to 38 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Description of Leck Kill

Setting

Landform: Valleys, ridges
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 25 inches: channery silt loam
H3 - 25 to 42 inches: very channery silt loam
H4 - 42 to 46 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Albrights

Percent of map unit: 5 percent
Hydric soil rating: No

Klinesville

Percent of map unit: 5 percent
Hydric soil rating: No

KaE2—Klinesville shaly silt loam, 25 to 50 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4p7
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Klinesville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klinesville

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Shale and siltstone residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 12 inches: very channery silt loam
H3 - 12 to 19 inches: very channery silt loam
H4 - 19 to 23 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Calvin
Percent of map unit: 10 percent
Hydric soil rating: No

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Appendix D - Pennsylvania Natural Diversity Index (PNDI) Environmental Review

1. PROJECT INFORMATION

Project Name: **Dauphin-Middle Paxton Community Park**
Date of Review: **12/9/2022 01:49:09 PM**
Project Category: **Recreation, Campgrounds/parking lots, playgrounds**
Project Area: **35.88 acres**
County(s): **Dauphin**
Township/Municipality(s): **DAUPHIN; MIDDLE PAXTON TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **HARRISBURG WEST**
Watersheds HUC 8: **Lower Susquehanna-Swatara**
Watersheds HUC 12: **Cove Creek-Susquehanna River**
Decimal Degrees: **40.371569, -76.933403**
Degrees Minutes Seconds: **40° 22' 17.6485" N, 76° 56' 0.2502" W**

2. SEARCH RESULTS

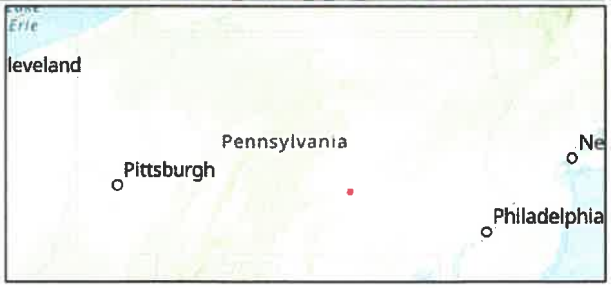
Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

Dauphin-Middle Paxton Community Park

Buffered Project Boundary

Project Boundary



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Dauphin-Middle Paxton Community Park

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

RESPONSE TO QUESTION(S) ASKED

Q1: The proposed project is in the range of the Indiana bat. Describe how the project will affect bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this. Round acreages up to the nearest acre (e.g., 0.2 acres = 1 acre).
Your answer is: No forests, woodlots or trees will be affected by the project.

Q2: Is tree removal, tree cutting or forest clearing of 40 acres or more necessary to implement all aspects of this project?
Your answer is: No

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Management
Division of Environmental Review
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Logan Gabler
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Address: 5095 Ritter Road, Suite 110
City, State, Zip: Mechanicsburg, PA 17055
Phone: (717) 920-7055 Fax: (717) 233-0994
Email: lgabler@aegroup-llc.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

Logan Gabler — applicant/project proponent signature

12/9/22 — date

Appendix E - Plant and Wildlife Inventory

Table 1 - Dauphin-Middle Paxton Community Park – Natural Areas Plant List (As observed on August 19, 2022)

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Trees/saplings/seedlings				
Red maple	*Acer rubrum*	N		
Norway maple	*A. platanoides*	I	2/RA	
Box elder	*A. negundo*	N		
Silver maple	*A. saccarinum*	N		
Red oak	*Quercus rubra*	N		
Black oak	*Q. velutina*	N		
Chinkapin oak	*Q. prinoides*	N		Small seedling
Black locust	*Robinia pseudoacacia*	N		
Bitternut hickory	*Carya cordiformis*	N		
American holly	*Ilex opaca*	N		Not common in ridge and valley
Black walnut	*Juglans nigra*	N		
Staghorn Sumac	*Rhus typhina*	N		
Paw paw	*Asimina triloba*	N		More common in bottomlands
Empress tree	*Paulownia tomentosa*	I	2/RA	
Tree of heaven	*Ailanthus altissima*	I	1/B	
Black cherry	*Prunus serotina*	N		
Hackberry	*Celtis occidentalis*	N		
Yellow poplar	*Liriodendron tulipfera*	N		
American sycamore	*Platanus occidentalis*	N		
Red cedar	*Juniperus virginiana*	N		
Common buckthorn	*Rhamnus cathartica*	I	1/RA	
Redbud	*Cercis canadensis*	N		
American hornbeam	*Carpinus caroliniana*	N		
Siberian elm	*Ulmus pumila*	I	WL	
White mulberry	*Morus alba*	I	3	
Red mulberry	*M. rubra*	N		
Mimosa	*Mimosa quadrivalis*	I	2	
Golden rain tree	*Koelreuteria paniculata*	I	WL	

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Shrubs				
Elderberry	*Sambucus canadensis (nigra)*	N		
Black haw viburnum	*Viburnum prunifolium*	N		
Witch hazel	*Hamamelis virginiana*	N		
Bush Honeysuckle	*Lonicera sp.*	I	1/RA	
Spicebush	*Lindera benzoin*	N		
Autumn olive	*Elaeagnus umbellata*	I	2/RA	
Multiflora rose	*Rosa multiflora*	I	1/B	
Chinese privet	*Ligustrum velgare*	I	2/RA	
Buttonbush	*Cephalanthus occidentalis*	N		
Wineberry	*Rubus phoenicolasius*	I	2	
Blackberry sp.	*Rubus sp.*	N		
Burning bush	*Euonymus alatus*	I	2/RA	
Woody Vines				
English ivy	*Hedera helix*	I	3/RA	
Oriental bittersweet	*Celastrus orbiculatus*	I	1/B	
Catbrier	*Smilax glauca*	N		Not common
Common greenbrier	*S. rotundifolia*	N		
Dewberry	*Rubus flagellaris*	N		
Virginia creeper	*Parthenocissus quinquefolia*	N		
Poison ivy	*Toxicodendron pubescens*	N		
Summer grape	*Vitis aestivalis*	N		
Fox grape	*V. labrusca*	N		
Sweet autumn clematis	*Clematis terniflora*	I		
Herbs				
False Solomon's seal	*Maianthemum racemosum*	N		
Goldenrod sp.	*Solidago sp.*	--		
Early goldenrod	*S. juncea*	N		
Zig zag goldenrod	*S. flexicaulis*	N		

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Grass-leaved goldenrod	*Euthamia graminiflora*	N		
Rough avens	*Geum lacinatum*	N		
Pokeweed	*Phytolacca americana*	N		
Queen Ann's lace	*Daucus carota*	I		
Chicory	*Cichorium intybus*	I		
Burdock	*Arctium lappa*	I		
Late boneset	*Eupatorium serotinum*	N		
Upland boneset	*E. seessilofolium*	N		
Yellow vetchling	*Lathyrus aphaca*	I		
Ragweed	*Ambrosia artemisiifolia*	I		
Hay scented fern	*Dennstaedtia punctilobula*	N		
Sensitive fern	*Ococlea sensibilis*	N		
Lady fern	*Athyrium filix-femina*	N		
Christmas fern	*Polystichum acrostichoides*	N		
Common cinquefoil	*Potentilla simplex*	N		
Water pepper	*Polygonum hydropeperoides*	N		
Lady's thumb	*P. persicaria*	I		
Virginia stickseed	*Hechelia virginicana*	N		
Garlic mustard	*Alliaria petiolate*	I	1/B	
Violet sp.	*Viola sp.*	--		
Virginia Jumpseed	*Persicaria virginiana*	N		
Aster sp.	*Aster sp.*	--		
Creeping Charlie	*Glechoma hederacea*	I		
Asiatic dayflower	*Commelina communis*	I		
Stonecrop	*Sedum ternatum*	N		
Mayapple	*Podophyllum peltatum*			
Bladder campion	*Silene vulgaris*	I		
Jack in the pulpit	*Arisaema triphyllum*	N		
Lizard's tail	*Sauruus cernuus*	N		Not common on small streams
Beebalm	*Monarda didyma*	N		
Beggar-ticks	*Bidens frondosa*	N		

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Asiatic tearthumb	*Persicaria perfoliatum*	I	1/B	
Spotted inpatients	*Inpatients capensis*	N		
Spotted Joe-pye wed	*Eutrochium maculatum*	N		
Horse nettle	*Solanum carolinense*	N		
English plantain	*Plantago lanceolata*	I		
Black bindweed	*Fallopia convolvulus*	I		
Common fleabane	*Erigeron philidephicus*	N		
Crown vetch	*Securigera varia*	I	2/RA	
Red clover	*Trifolium pretennse*	I		
Yellow wood sorrel	*Oxalis stricta*	N		
Ground cherry	*Physalis subglabrata*	N		
Wild yam	*Dioscorea villosa*	N		Not common
Clear weed	*Pilea pumila*	N		
Curly dock	*Rumex crispus*	I		
Yarrow	*Achillia millefolium*	I		
Yucca	*Yucca flaccida*	I		
Hairy Bittercress	*Cardamine hirsute*	I		
Japanese knotweed	*Fallopia japonica*	I	1/B	
Yellow archangel	*Lamium galeobdolon*	I		
Ivy-leaved speedwell	*Veronica hederifolia*	I		
Lily of the valley	*Convallaria majalis*	I		
Mugwort	*Artemisia vulgaris*	I	3/B	
Canada thistle	*Cirsium arvense*	I	2/B	
Bull thistle	*C. vulgare*	I	2/B	
Common groundsel	*Senecio vulgaris*	I		
Path rush	*Juncus tenuis*	N		
Deer tongue grass	*Dicanthelium clandestinum*	N		
Nimblewill	*Muhlenberia schreberi*	N		
Broomsedge	*Andropogon virginicus*	N		
Yellow foxtail	*Setaria pumila*	I		
Japanese stiltgrass	*Microstegium vimineum*	I	1/B	

Footnotes

[1] The Vascular Flora of Pennsylvania, Rhoads and Klein (N- native; I- introduced)

[2] Pennsylvania Department of Conservation and Natural Resources, Invasive Plants in Pennsylvania

1 – Severe Threat (spreads aggressively) 2 – Significant Threat (spreads easily) 3 – Lesser Threat (spreads in disturbed areas) WL – Watch List

[3] Pennsylvania State Noxious Weed List

A – Class A (established, intended to be eradicated) B – Class B (widespread, cannot feasibly be eradicated) C – Class C (not known in PA, listed on the Federal List) RA – Recommended Additions to the List

Table 2 – Native/Non-native Status of Observed Plants

	Native	Non-native	Total	Percent Native
Trees	20	8	28	71%
Shrubs	6	6	12	50%
Vines	7	3	10	70%
Herbs	37	31	68	54%
TOTAL	**70**	**48**	**118**	**59%**

Table 3 - eBird Field Checklist of Birds of Dauphin-Middle Paxton Community Park

Pigeons and Doves	
Mourning Dove	
Swifts	
Chimney Swift	
Vultures, Hawks, and Allies	
Black Vulture	
Turkey Vulture	
Woodpeckers	
Red-bellied Woodpecker	
Downy Woodpecker	
Pileated Woodpecker	
Northern Flicker	
Falcons and Caracaras	
Merlin	
Tyrant Flycatchers: Pewees, Kingbirds, and Allies	
Eastern Phoebe	
Jays, Magpies, Crows, and Ravens	
Blue Jay	
American Crow	
Tits, Chickadees, and Titmice	
Carolina/Black-capped Chickadee	
Tufted Titmouse	
Martins and Swallows	
Tree Swallow	
Gnatcatchers	
Blue-gray Gnatcatcher	
Wrens	
Carolina Wren	
Starlings and Mynas	
European Starling	
Catbirds, Mockingbirds, and Thrashers	
Gray Catbird	
Thrushes	
American Robin	
Waxwings	
Cedar Waxwing	
Old World Sparrows	
House Sparrow	
Finches, Euphonias, and Allies	
House Finch	
American Goldfinch	
New World Sparrows	
White-throated Sparrow	
Song Sparrow	
Blackbirds	
Red-winged Blackbird	
Common Grackle	
Wood-Warblers	
Blue-winged Warbler	
Black-and-white Warbler	
American Redstart	
Chestnut-sided Warbler	
Yellow-rumped Warbler	
Canada Warbler	
Cardinals, Grosbeaks, and Allies	
Scarlet Tanager	
Northern Cardinal	
Indigo Bunting	

* This checklist is generated with data from eBird (ebird.org), a global database of bird sightings from birders like you. If you enjoy this checklist, please consider contributing your sightings to eBird. It is 100% free to take part, and your observations will help support birders, researchers, and conservationists worldwide.

Table 4 – iNaturalist Recorded Observations in the Dauphin County Pennsylvania Area

Taxa	Total Species	Rare Species	Introduced Species
Birds	156	23	9
Mammals	32	3	2
Reptiles	21	4	2
Amphibians	18	4	0
Insects	1,232	12	71
Arachnids (spiders, mites, etc.)	108	0	7
Other Invertebrates	26	1	7
Plants	1,214	29	358
Fungi	537	5	1

Table 5 – iNaturalist Bird Observations in the Dauphin County Pennsylvania Area

Common Name	Scientific Name	Number of Observations
Canada Goose	*Branta canadensis*	78
Mallard	*Anas platyrhynchos*	66
Great Egret	*Ardea alba*	64
Great Blue Heron	*Ardea herodias*	53
American Robin	*Turdus migratorius*	47
Red-winged Blackbird	*Agelaius phoeniceus*	43
Gray Catbird	*Dumetella carolinensis*	41
Green Heron	*Butorides virescens*	36
Wood Duck	*Aix sponsa*	35
Song Sparrow	*Melospiza melodia*	31
Northern Cardinal	*Cardinalis cardinalis*	30
Carolina Wren	*Thryothorus ludovicianus*	29
Mourning Dove	*Zenaida macroura*	27
Red-tailed Hawk	*Buteo jamaicensis*	27
White-throated Sparrow	*Zonotrichia albicollis*	26
Downy Woodpecker	*Dryobates pubescens*	25
Wild Turkey	*Meleagris gallopavo*	23
American Goldfinch	*Spinus tristis*	23
Tree Swallow	*Tachycineta bicolor*	22
House Finch	*Haemorhous mexicanus*	22
Black Vulture	*Coragyps atratus*	20
Eastern Bluebird	*Sialia sialis*	20
Turkey Vulture	*Cathartes aura*	17
Yellow-crowned Night-Heron	*Nyctanassa violacea*	17
Blue Jay	*Cyanocitta cristata*	17
Common Grackle	*Quiscalus quiscula*	17
House Sparrow	*Passer domesticus*	17
Bald Eagle	*Haliaeetus leucocephalus*	16
Black-crowned Night-Heron	*Nycticorax nycticorax*	15
Red-bellied Woodpecker	*Melanerpes carolinus*	15
Cooper's Hawk	*Accipiter cooperii*	14
Green-winged Teal	*Anas crecca*	13
White-breasted Nuthatch	*Sitta carolinensis*	12
European Starling	*Sturnus vulgaris*	12
Ruby-throated Hummingbird	*Archilochus colubris*	11
American Black Duck	*Anas rubripes*	11
Dark-eyed Junco	*Junco hyemalis*	11
Tufted Titmouse	*Baeolophus bicolor*	11
Northern Mockingbird	*Mimus polyglottos*	11
Eastern Phoebe	*Sayornis phoebe*	11
Killdeer	*Charadrius vociferus*	10
Northern Flicker	*Colaptes auratus*	10
Northern Pintail	*Anas acuta*	9

Common Name	Scientific Name	Number of Observations
Carolina Chickadee	*Poecile carolinensis*	8
Black-capped Chickadee	*Poecile atricapillus*	8
Gadwall	*Mareca strepera*	8
American Coot	*Fulica americana*	7
Double-crested Cormorant	*Phalacrocorax auritus*	7
Cedar Waxwing	*Bombycilla cedrorum*	7
Baltimore Oriole	*Icterus galbula*	7
Eastern Towhee	*Pipilo erythrophthalmus*	7
Indigo Bunting	*Passerina cyanea*	7
Yellow-bellied Sapsucker	*Sphyrapicus varius*	7
MacGillivray's Warbler	*Geothlypis tolmiei*	7
Yellow-rumped Warbler	*Setophaga coronata*	7
Blue-winged Teal	*Spatula discors*	7
Belted Kingfisher	*Megaceryle alcyon*	6
Peregrine Falcon	*Falco peregrinus*	6
American Crow	*Corvus brachyrhynchos*	6
Brown-headed Cowbird	*Molothrus ater*	6
Wood Thrush	*Hylocichla mustelina*	6
Pileated Woodpecker	*Dryocopus pileatus*	6
Ring-billed Gull	*Larus delawarensis*	5
Snowy Egret	*Egretta thula*	5
Broad-winged Hawk	*Buteo platypterus*	5
Scarlet Tanager	*Piranga olivacea*	5
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	5
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	5
Great Crested Flycatcher	*Myiarchus crinitus*	5
Ovenbird	*Seiurus aurocapilla*	5
Northern Shoveler	*Spatula clypeata*	5
Hairy Woodpecker	*Dryobates villosus*	5
Red-eyed Vireo	*Vireo olivaceus*	5
Red-shouldered Hawk	*Buteo lineatus*	4
Common Merganser	*Mergus merganser*	4
House Wren	*Troglodytes aedon*	4
Hermit Thrush	*Catharus guttatus*	4
Brown Thrasher	*Toxostoma rufum*	4
Palm Warbler	*Setophaga palmarum*	4
Greater Yellowlegs	*Tringa melanoleuca*	3
Tufted Duck	*Aythya fuligula*	3
Muscovy Duck	*Cairina moschata*	3
Brown Creeper	*Certhia americana*	3
Fish Crow	*Corvus ossifragus*	3
Common Raven	*Corvus corax*	3
Chipping Sparrow	*Spizella passerina*	3
Common Yellowthroat	*Geothlypis trichas*	3

Common Name	Scientific Name	Number of Observations
American Redstart	*Setophaga ruticilla*	3
Black-and-white Warbler	*Mniotilta varia*	3
Eastern Wood-Pewee	*Contopus virens*	3
Eastern Kingbird	*Tyrannus tyrannus*	3
Yellow-throated Vireo	*Vireo flavifrons*	3
Great Horned Owl	*Bubo virginianus*	3
Yellow Warbler	*Setophaga petechia*	3
Prairie Warbler	*Setophaga discolor*	3
American Wigeon	*Mareca americana*	3
Ring-necked Pheasant	*Phasianus colchicus*	2
Solitary Sandpiper	*Tringa solitaria*	2
Horned Grebe	*Podiceps auritus*	2
Pied-billed Grebe	*Podilymbus podiceps*	2
American Kestrel	*Falco sparverius*	2
Chimney Swift	*Chaetura pelagica*	2
Bufflehead	*Bucephala albeola*	2
Rusty Blackbird	*Euphagus carolinus*	2
Warbling Vireo	*Vireo gilvus*	2
Red-headed Woodpecker	*Melanerpes erythrocephalus*	2
Eastern Screech-Owl	*Megascops asio*	2
Blue-winged Warbler	*Vermivora cyanoptera*	2
Osprey	*Pandion haliaetus*	2
Ruby-crowned Kinglet	*Regulus calendula*	2
Black Scoter	*Melanitta americana*	2
Northern Parula	*Setophaga americana*	2
Black-throated Green Warbler	*Setophaga virens*	2
Black-throated Blue Warbler	*Setophaga caerulescens*	2
Sora	*Porzana carolina*	1
Helmeted Guineafowl	*Numida meleagris*	1
Yellow-billed Cuckoo	*Coccyzus americanus*	1
Rock Pigeon	*Columba livia*	1
White Ibis	*Eudocimus albus*	1
Pectoral Sandpiper	*Calidris melanotos*	1
Lesser Yellowlegs	*Tringa flavipes*	1
Yellow-billed Loon	*Gavia adamsii*	1
Black-necked Stilt	*Himantopus mexicanus*	1
Little Blue Heron	*Egretta caerulea*	1
Sharp-shinned Hawk	*Accipiter striatus*	1
Red-breasted Merganser	*Mergus serrator*	1
Ring-necked Duck	*Aythya collaris*	1
Lesser Scaup	*Aythya affinis*	1
Redhead	*Aythya americana*	1
Mandarin Duck	*Aix galericulata*	1
Hooded Merganser	*Lophodytes cucullatus*	1

Common Name	Scientific Name	Number of Observations
Blue-gray Gnatcatcher	*Polioptila caerulea*	1
Field Sparrow	*Spizella pusilla*	1
White-crowned Sparrow	*Zonotrichia leucophrys*	1
Harris's Sparrow	*Zonotrichia querula*	1
Orchard Oriole	*Icterus spurius*	1
Connecticut Warbler	*Oporornis agilis*	1
Dickcissel	*Spiza americana*	1
Barn Swallow	*Hirundo rustica*	1
Red-breasted Nuthatch	*Sitta canadensis*	1
Willow Flycatcher	*Empidonax traillii*	1
Barred Owl	*Strix varia*	1
Roseate Spoonbill	*Platalea ajaja*	1
Spotted Sandpiper	*Actitis macularius*	1
Louisiana Waterthrush	*Parkesia motacilla*	1
Golden-crowned Kinglet	*Regulus satrapa*	1
Wilson's Snipe	*Gallinago delicata*	1
Bonaparte's Gull	*Chroicocephalus philadelphia*	1
Black-headed Gull	*Chroicocephalus ridibundus*	1
Winter Wren	*Troglodytes hiemalis*	1
Hooded Warbler	*Setophaga citrina*	1
Cerulean Warbler	*Setophaga cerulea*	1
Magnolia Warbler	*Setophaga magnolia*	1
Blackpoll Warbler	*Setophaga striata*	1
Herring Gull	*Larus argentatus*	1
Snow Goose	*Anser caerulescens*	1

Table 6 – iNaturalist Mammal Observations in the Dauphin County Pennsylvania Area

Common Name	Scientific Name	Number of Observations
White-tailed Deer	*Odocoileus virginianus*	68
Eastern Gray Squirrel	*Sciurus carolinensis*	51
Eastern Cottontail	*Sylvilagus floridanus*	44
Groundhog	*Marmota monax*	44
Eastern Chipmunk	*Tamias striatus*	44
Red Fox	*Vulpes vulpes*	17
Muskrat	*Ondatra zibethicus*	13
Virginia Opossum	*Didelphis virginiana*	7
American Black Bear	*Ursus americanus*	6
Common Raccoon	*Procyon lotor*	6
Striped Skunk	*Mephitis mephitis*	5
North American Porcupine	*Erethizon dorsatum*	4
Northern Short-tailed Shrew	*Blarina brevicauda*	4
Meadow Vole	*Microtus pennsylvanicus*	3
American Red Squirrel	*Tamiasciurus hudsonicus*	3
American Mink	*Neogale vison*	3
Coyote	*Canis latrans*	2
Gray Fox	*Urocyon cinereoargenteus*	2
White-footed Mouse	*Peromyscus leucopus*	2
Big Brown Bat	*Eptesicus fuscus*	1
Eastern Red Bat	*Lasiurus borealis*	1
Silver-haired Bat	*Lasionycteris noctivagans*	1
North American River Otter	*Lontra canadensis*	1
Bobcat	*Lynx rufus*	1
American Beaver	*Castor canadensis*	1
Woodland Vole	*Microtus pinetorum*	1
House Mouse	*Mus musculus*	1
Southern Flying Squirrel	*Glaucomys volans*	1
Eastern Mole	*Scalopus aquaticus*	1
Star-nosed Mole	*Condylura cristata*	1
Domestic Cat	*Felis catus*	1

Table 7 – iNaturalist Reptile Observations in the Dauphin County Pennsylvania Area

Common Name	Scientific Name	Number of Observations
Common Garter Snake	*Thamnophis sirtalis*	89
Painted Turtle	*Chrysemys picta*	44
Common Box Turtle	*Terrapene carolina*	39
Common Watersnake	*Nerodia sipedon*	35
Common Snapping Turtle	*Chelydra serpentina*	31
Eastern Ratsnake	*Pantherophis alleghaniensis*	31
Dekay's Brownsnake	*Storeria dekayi*	18
Pond Slider	*Trachemys scripta*	16
Common Five-lined Skink	*Plestiodon fasciatus*	13
Eastern Milksnake	*Lampropeltis triangulum*	12
Northern Map Turtle	*Graptemys geographica*	11
Timber Rattlesnake	*Crotalus horridus*	10
Wood Turtle	*Glyptemys insculpta*	10
Diadophis punctatus	*Ring-necked Snake*	7
Eastern Musk Turtle	*Sternotherus odoratus*	5
Eastern Copperhead	*Agkistrodon contortrix*	5
Eastern Hognose Snake	*Heterodon platirhinos*	4
North American Racer	*Coluber constrictor*	2
Red-bellied Snake	*Storeria occipitomaculata*	1
Mediterranean House Gecko	*Hemidactylus turcicus*	1
Gray Ratsnake	*Pantherophis spiloides*	1

Table 8 – iNaturalist Amphibian Observations in the Dauphin County Pennsylvania Area

Common Name	Scientific Name	Number of Observations
American Toad	*Anaxyrus americanus*	60
Green Frog	*Lithobates clamitans*	53
American Bullfrog	*Lithobates catesbeianus*	52
Eastern Red-backed Salamander	*Plethodon cinereus*	51
Pickerel Frog	*Lithobates palustris*	29
Eastern Newt	*Notophthalmus viridescens*	28
Wood Frog	*Lithobates sylvaticus*	11
Gray Treefrog	*Hyla versicolor*	10
Northern Two-lined Salamander	*Eurycea bislineata*	10
Spotted Salamander	*Ambystoma maculatum*	5
Northern Slimy Salamander	*Plethodon glutinosus*	4
Northern Dusky Salamander	*Desmognathus fuscus*	4
Spring Peeper	*Pseudacris crucifer*	3
Long-tailed Salamander	*Eurycea longicauda*	3
Spring Salamander	*Gyrinophilus porphyriticus*	2
Fowler's Toad	*Anaxyrus fowleri*	2
Red Salamander	*Pseudotriton ruber*	1
Northern Leopard Frog	*Lithobates pipiens*	1

Exhibit B:
Dauphin-Middle Paxton Community Park Forest Stewardship Plan

Forest Stewardship Plan

Dauphin-Middle Paxton Community Park

Located In

Dauphin Borough, Dauphin County, PA

For

Dauphin-Middle Paxton Joint Park Authority

Prepared By:

American Engineers Group

Engineers • Geologists • Surveyors • Environmental Consultants
Water Resources • Construction Services
5095 Ritter Road, Suite 110,
Mechanicsburg, Pennsylvania 17055

In Association with
Simone-Collins Landscape Architecture

SIMONE LANDSCAPE ARCHITECTURE COLLINS

January 2023

Table of Contents

Appendices

1.0 Introduction

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are two adjacent park facilities. For the purpose of this plan, they will be considered as one single unit. Figure 1 in Appendix A shows the location of the park. Figure 2 shows the existing conditions and Figure 3 shows the proposed park improvements.

The purpose of this Forest Stewardship Plan is to provide Dauphin-Middle Paxton Community Park Joint Authority board members, staff, volunteers, and residents with the knowledge, methods, and tools to steward the unimproved areas of the park and maximize the value realized by the community.

2.0 Park Description

Dauphin-Middle Paxton Community Park is located on Claster Boulevard on the boundary of Dauphin Borough and Middle Paxton Township. The park is managed by the Dauphin-Middle Paxton Joint Park Authority (DMPJPA) and is funded by contributions from residents, along with Township and Borough funds. The park features six baseball/softball fields, two playgrounds, a basketball court, volleyball court, walking track, two pavilions and a community pool.

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are a combined 34.2 acres in size. Approximately 13.8 acres (~40 %) of that area is currently in a natural wooded state, primarily along the southern, western, and northern boundary of the parks. The wooded area is part of a larger contiguous approximately 30-acre woodland including the adjacent 26.9-acre residential parcels owned by George Lesh.

The existing woodland at the northern end of the park has been largely cleared of invasive species through the active management of a few volunteers. This results in fairly open woods with an opportunity for further enhancement of understory layers with native plants. However, approximately three quarters of the woodlands on site are not managed and have a substantial presence of invasive species. In particular, the middle portion of the park has a dominance of tree of heaven which is a preferred host plant for the spotted lanternfly, a very damaging invasive insect. The control of these invasive species would clear the slate for the establishment of more native species with higher value for wildlife.

A Boy Scout Eagle project has established a number of rustic trails through the wooded areas of the park. These trails provide a significant opportunity to enhance the use of the woodland portion of the park. There is substantial public interest in this currently under-utilized portion of the park. In contrast to the active use areas of the park such as the ball fields and swimming pool, the natural areas can open the park up to a wider range of users. Improvement to the trails and interpretive signage can enhance that experience. Consideration of upgrading some of these

trails for American with Disabilities Act (ADA) accessibility, would further open the park's recreational opportunities.

3.0 Plan Goals and Objectives

The primary objective of the Forest Stewardship Plan is to protect and develop the forest resources within Dauphin-Middle Paxton Community Park in support of the Natural Resources Management Plan. Key components include ensuring the sustainability and recreational use of the forest land; sustaining non-commodity woodland values such as wildlife habitat, carbon sequestration, water conservation, soil protection, and air quality improvement; protecting the forest lands from threats such as fire, pests, and invasive plants; and maintaining forest health.

This plan has not been developed in coordination with adjacent property owners.

4.0 Forest Stand Inventory

The forested land within Dauphin-Middle Paxton Community Park lies primarily along the southern, western and northern boundaries of the park. The forested areas are relatively similar with the primary differentiator being the presence or absence and dominance of invasive species as a result of on-going volunteer management efforts.

Dominate overstory trees include black cherry, black locust, yellow poplar, red maple, red oak, Norway maple, and tree of heaven. Dominate understory shrubs include spice bush and bush honeysuckle. Regeneration of overstory trees includes red maple, hackberry, yellow poplar, box elder, Norway maple, and tree of heaven. The ground layer is generally sparse with dewberry, common cinquefoil, hay-scented fern, violets, rough avens, Japanese stiltgrass, and garlic mustard making up the dominate cover. Fallen leaves and debris cover much of the remaining ground surface.

The trees generally appear healthy with little mortality. In some areas, vines including common greenbrier, grape, English ivy, and oriental bittersweet are present at densities high enough to negatively impact the trees with their weight and competition for sunlight. Poison ivy and Virginia creeper are also present but generally at lower densities.

5.0 Recommendations

The general removal of invasive species and replacement with native plants is the primary recommendation to improve the overall health and function of the forest community and improve the habitat value. The methods for removal of invasive species will depend on the species, size, and availability of labor and professional oversight. The eradication of many invasive species can take diligence and multiple years to accomplish because the seed bank in the soil could take years to exhaust and wildlife, wind and other vectors can bring seeds in from

surrounding seed sources. The Invasive Species Management Plan contains additional information regarding the removal of invasive species.

In addition to the removal of invasive vines, native vines should be thinned to prevent inhibiting tree growth. However, some vine growth is important for biodiversity; for instance, grapes provide a valuable food source for a variety of wildlife and Virginia creeper is the host for several species of sphinx moths. Even poison ivy, although detrimental to most people who touch it, produces berries that are safely eaten by birds, squirrels, and other wildlife.

Standing dead (also known as snags) and downed trees are an integral component of forest ecosystems. Cavity-nesting birds use the standing trunks. Salamanders and other amphibians and invertebrates rely on downed trees for shelter, and many species of fungi and insects live in and feed on the decomposing wood which in-turn supports higher levels of the food web. Leaving standing and fallen trunks in place wherever possible and safe, particularly in ecologically sensitive areas can greatly enhance biological diversity. As long as they don't pose an immediate threat to trails or other infrastructure, mature invasive trees that have been killed with herbicide treatment can be left as snags. Those invasive trees that are cut down can be left to rot in place and improve the soil while also providing habitat and cover. Invasive shrubs that are killed or cut can be left to provide brush cover for birds and other wildlife.

As stated previously, when removing invasive species, it is important to re-establish a native plant community as quickly as possible to prevent re-colonization by invasive species. It is advantageous to develop several planting pallets to fit the specific conditions encountered.

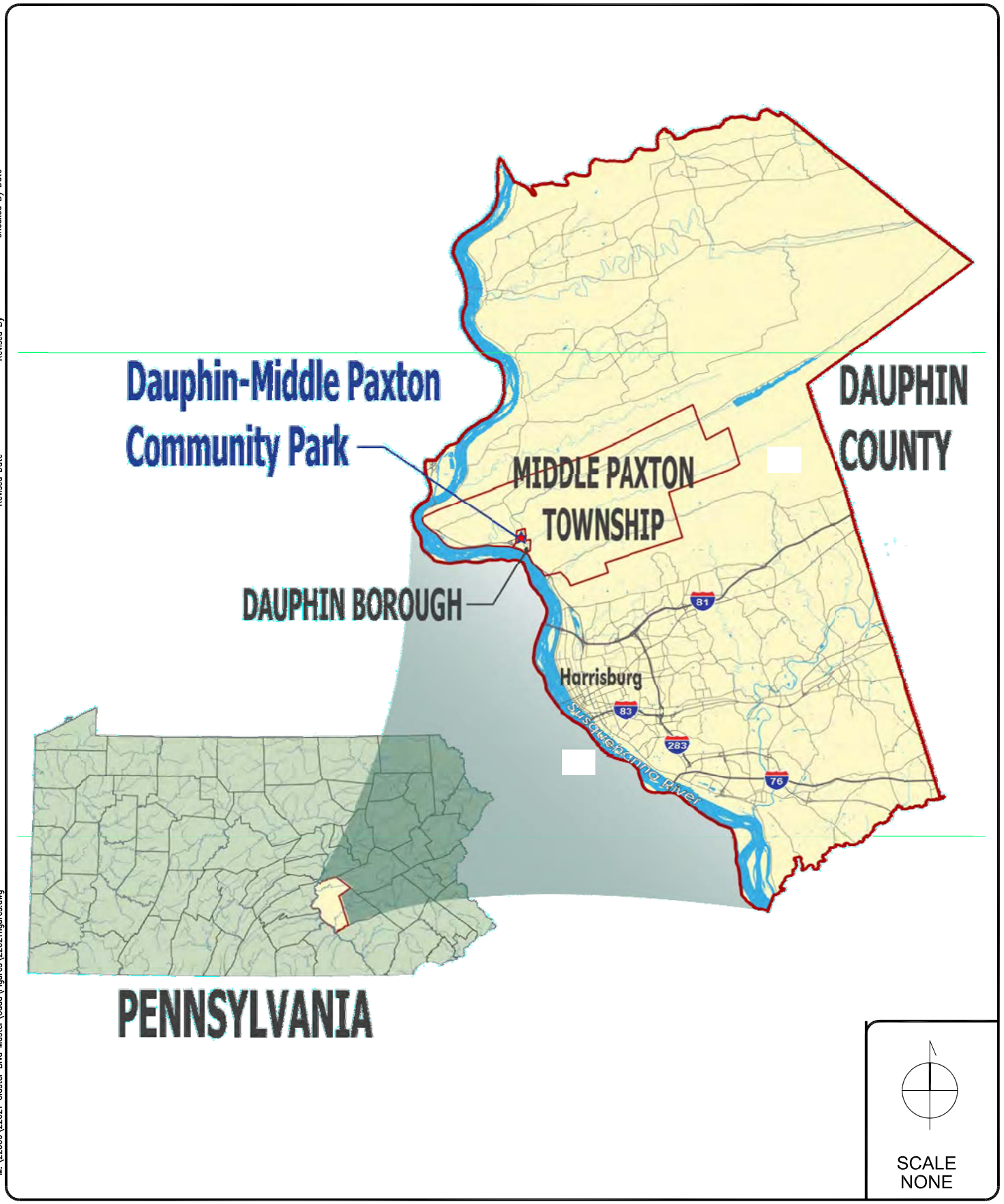
In areas where much of the overstory was dominated by invasive trees such as Norway maple and tree of heaven, the canopy will be much more open, and sunlight will be able to reach the ground. In these areas, early successional, sun tolerant trees and shrubs with high wildlife value such as black cherry and oaks along with elderberry and blackhaw viburnum can be selected. In these areas, seeding with a native herbaceous species may also be necessary to prevent invasive colonization and stabilize the soils, particularly on steeper slopes.

Where much of the native overstory remains following invasive species removal, re-establishing an understory would be the priority and shade tolerance should be a key factor in plant selection. High wildlife value, later successional trees such as oaks or hickories should also be included. Although the herbaceous ground cover is not always as important in these areas with canopy closure, shade tolerant ground covers such as ferns can be considered if economically available.

When conducting native re-establishment plantings, consideration should be given to protecting the new plantings from herbivory by deer, rabbits, groundhogs, voles and other wildlife. Protecting desirable, naturally regenerating seedlings may also be helpful. Tree tubes and fencing can protect new trees from herbivores but under canopy, tree tubes may not allow the trees to get enough sunlight. Chemical deterrent sprays are generally marginally effective and can be prohibitively expensive.

Appendices

Appendix A - Mapping



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Model
Jan 17, 2023–3:37pm
Revised Date
mliveringhouse
Revised By
Checked By
Checked By Date

5095 RITTER ROAD,
SUITE 110
MECHANICSBURG, PA 17055
1-800-733-1102
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REGIONAL LOCATION MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK
MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

FIGURE
1

Model
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Date : Jan 17, 2023-3:01pm

mliveringhouse

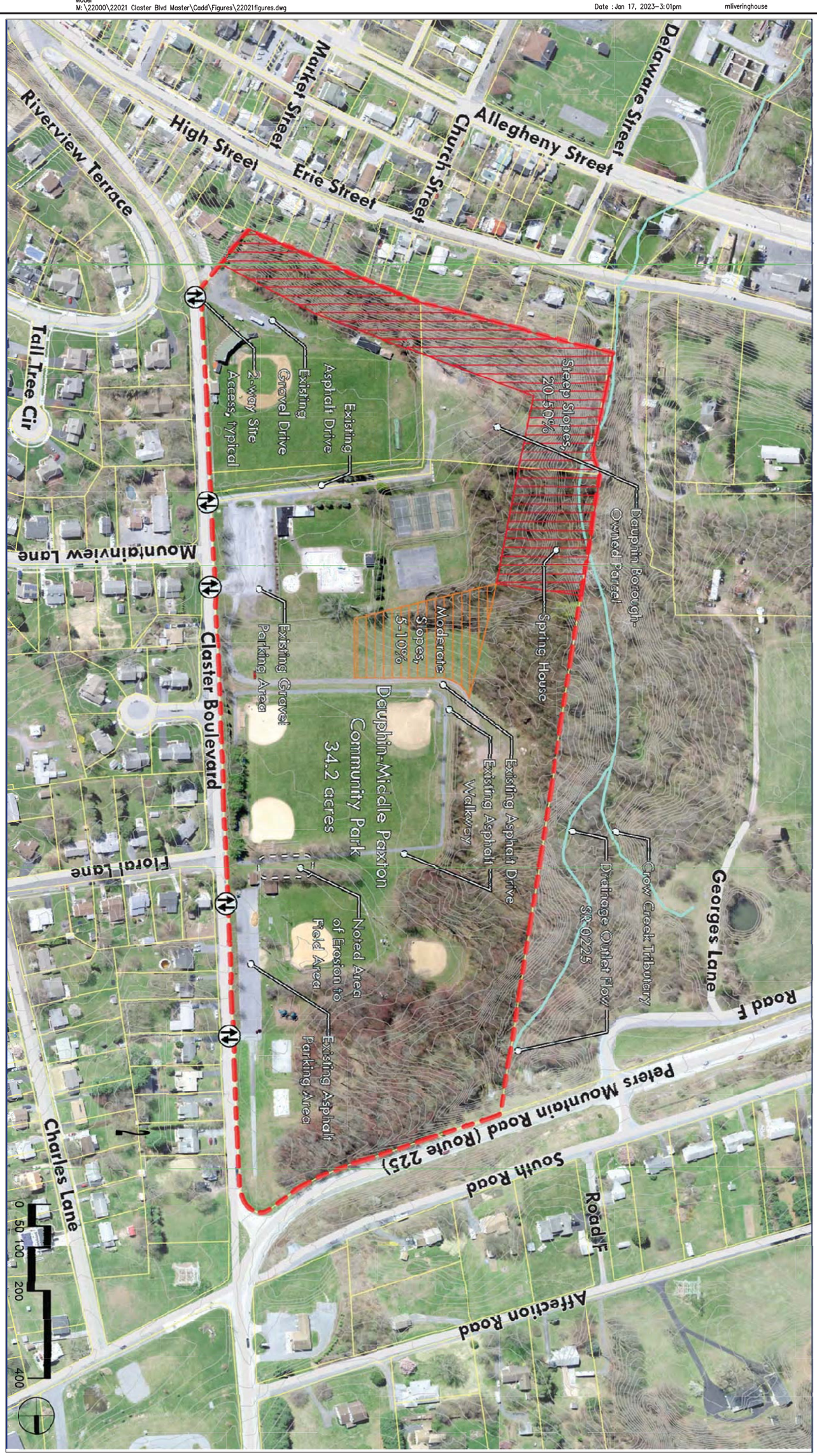

FIGURE 2

SCALE AS SHOWN

EXISTING CONDITIONS MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK

MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

JOB NUMBER:	22021
FILE NAME:	22021figures.dwg
DRAWN BY:	MEL
CHECKED BY:	AP
DATE:	1/17/2023
REVISED:	XX-XX-XXXX

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Date : Jan 17, 2023 - 3:07pm

mlveringhouse

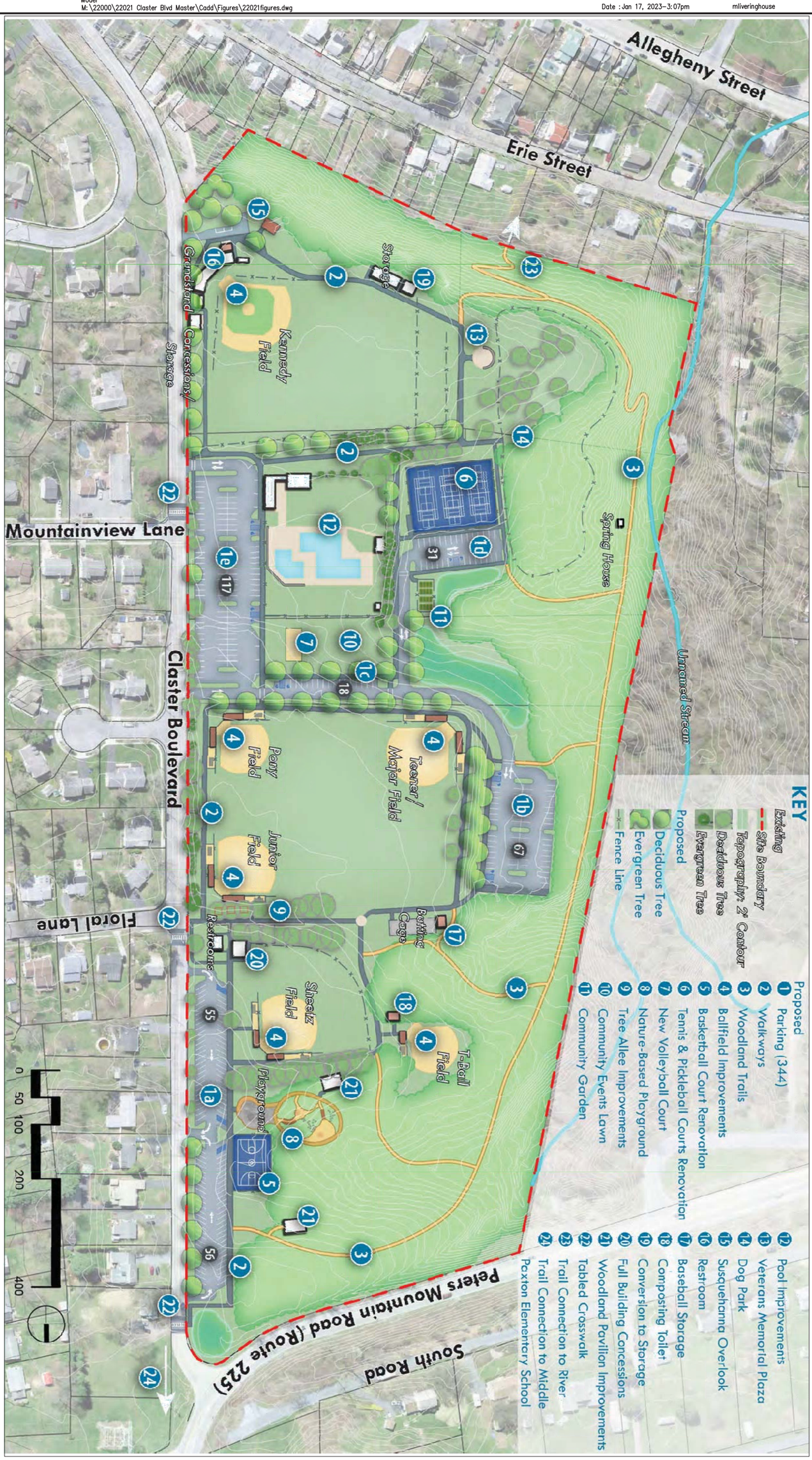

FIGURE 3

SCALE AS SHOWN

PROPOSED CONDITIONS MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK

MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

JOB NUMBER:	22021
FILE NAME:	22021figures.dwg
DRAWN BY:	MEL
CHECKED BY:	AP
DATE:	1/17/2023
REVISED:	XX-XX-XXXX

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Appendix B - Site Photos

Bank erosion on the unnamed tributary on the western border of the park.

A stand of lizard's tail (*Saururus cernuus*) along the small tributary. This species is much more common along larger stream/river systems.

A slope in the park vegetated with mostly invasive species including bush honeysuckle in the foreground and Norway maple in the background of the photo.

Woodland habitat with sparse understory, cleared of most of the invasive species.

Wetlands along the unnamed tributary containing both native and non-native species.

A gas line right-of-way offering opportunity of enhancement planting with species with higher wildlife values.

Appendix C - NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Dauphin County, Pennsylvania

Dauphin Middle Paxton Park

January 3, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

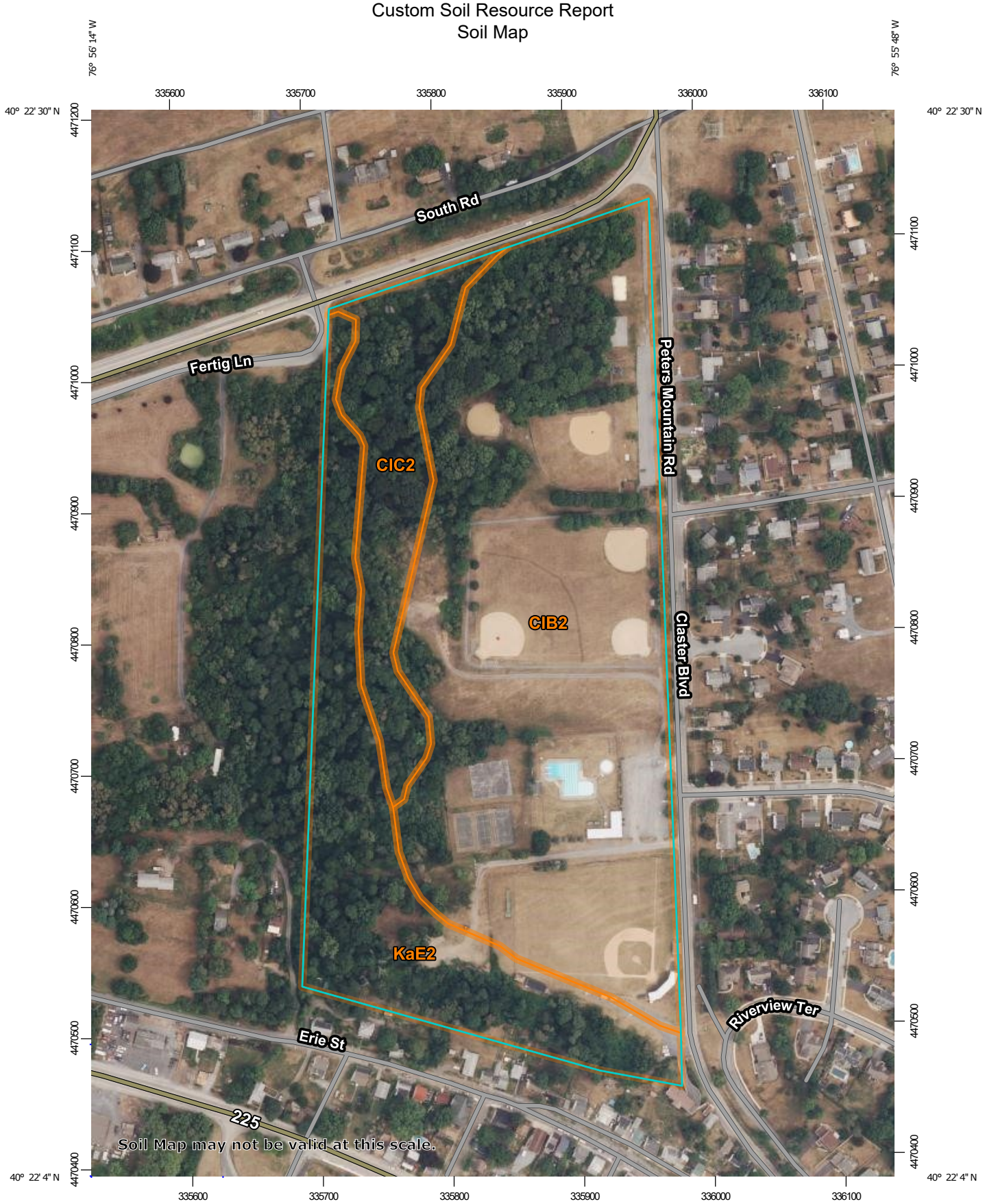
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,960 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dauphin County, Pennsylvania
Survey Area Data: Version 19, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 6, 2020—Nov 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ClB2	Calvin-Leck Kill shaly silt loams, 3 to 8 percent slopes, moderately eroded	25.8	64.6%
ClC2	Calvin-Leck Kill shaly silt loams, 8 to 15 percent slopes, moderately eroded	4.9	12.2%
KaE2	Klinesville shaly silt loam, 25 to 50 percent slopes, moderately eroded	9.2	23.1%
Totals for Area of Interest		**39.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dauphin County, Pennsylvania

ClB2—Calvin-Leck Kill shaly silt loams, 3 to 8 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4nh
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Calvin and similar soils: 50 percent
Leck kill and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calvin

Setting

Landform: Hillslopes
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 30 inches: channery silt loam
H3 - 30 to 35 inches: extremely channery silt loam
H4 - 35 to 45 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Description of Leck Kill

Setting

Landform: Valleys, ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 45 inches: channery silt loam
H3 - 45 to 60 inches: very channery silt loam
H4 - 60 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Klinesville

Percent of map unit: 6 percent
Hydric soil rating: No

Bedington

Percent of map unit: 3 percent
Hydric soil rating: No

Blairton

Percent of map unit: 3 percent
Hydric soil rating: No

Hustontown

Percent of map unit: 3 percent
Hydric soil rating: No

CIC2—Calvin-Leck Kill shaly silt loams, 8 to 15 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4nj
Elevation: 300 to 1,500 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Calvin and similar soils: 50 percent
Leck kill and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calvin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 27 inches: channery silt loam
H3 - 27 to 31 inches: very channery silt loam
H4 - 31 to 38 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Description of Leck Kill

Setting

Landform: Valleys, ridges
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 25 inches: channery silt loam
H3 - 25 to 42 inches: very channery silt loam
H4 - 42 to 46 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Albrights

Percent of map unit: 5 percent
Hydric soil rating: No

Klinesville

Percent of map unit: 5 percent
Hydric soil rating: No

KaE2—Klinesville shaly silt loam, 25 to 50 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4p7
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Klinesville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klinesville

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Shale and siltstone residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 12 inches: very channery silt loam
H3 - 12 to 19 inches: very channery silt loam
H4 - 19 to 23 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Ecological site: F147XY008PA - Shallow Mixed Sedimentary Upland
Hydric soil rating: No

Minor Components

Calvin
Percent of map unit: 10 percent
Hydric soil rating: No

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Exhibit C:
Dauphin-Middle Paxton Community Park
Invasive Species Management Plan

Invasive Species Management Plan

Dauphin-Middle Paxton Community Park

Located In

Dauphin Borough, Dauphin County, PA

For

Dauphin-Middle Paxton Joint Park Authority

Prepared By:

American Engineers Group

Engineers • Geologists • Surveyors • Environmental Consultants
Water Resources • Construction Services
5095 Ritter Road, Suite 110,
Mechanicsburg, Pennsylvania 17055

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January 2023

Table of Contents

1.0 Introduction

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are two adjacent park facilities. For the purpose of this plan, they will be considered as one single unit. Figure 1 in Appendix A shows the location of the park. Figure 2 shows the existing conditions and Figure 3 shows the proposed park improvements.

Invasive plant species represent the greatest and most immediate threat to the continued function of the Dauphin-Middle Paxton Community Park's natural areas and native plant communities. If left unmonitored, the spread and dominance of invasive plants will likely alter the structure and succession of the natural forested area. The threat has been well-documented by state agencies responsible for the management of natural resources. Future changes in the environment brought about by continued climate change could create even more ideal conditions for the establishment of new invasive species. While most non-native plants are considered benign, those classified as invasive are destructive to the natural environment. Invasive plants are generally aggressive; they compete with native species for space, nutrients, and water, are resistant to natural controls (disease and herbivores) and exhibit high reproductive rates. In areas of high invasiveness, native wildflowers, grasses, and ferns are supplanted and disappear. In addition, it has been documented that non-native species do not support native insect species and may favor non-native, often destructive species.

The presence of invasive plants is not a recent phenomenon. The current high distribution levels are the result of non-native plant establishment, growth and movement over the past 40 to 50 years. Distribution of seed and fruit is primarily by birds and mammals, but in some cases, invasive plant seeds have been introduced or spread by the use of construction and maintenance equipment (bush hogs), vehicle tires or shoes of hikers.

2.0 Park Description

Dauphin-Middle Paxton Community Park is located on Claster Boulevard on the boundary of Dauphin Borough and Middle Paxton Township. The park is managed by the Dauphin-Middle Paxton Joint Park Authority (DMPJPA) and is funded by contributions from residents, along with Township and Borough funds. The park features six baseball/softball fields, two playgrounds, a basketball court, volleyball court, walking track, two pavilions and a community pool.

Dauphin-Middle Paxton Community Park and Dauphin Borough Memorial Park are a combined 34.2 acres in size. Approximately 13.8 acres (~40 %) of that area is currently in a natural wooded state, primarily along the southern, western, and northern boundary of the parks. The wooded area is part of a larger contiguous approximately 30-acre woodland including the adjacent 26.9-acre residential parcels owned by George Lesh.

The existing woodland at the northern end of the park has been largely cleared of invasive species through the active management of a few volunteers. This results in fairly open woods with an

opportunity for further enhancement of understory layers with native plants. However, approximately three quarters of the woodlands on site are not managed and have a substantial presence of invasive species. In particular, the middle portion of the park has a dominance of tree of heaven which is a preferred host plant for the spotted lanternfly, a very damaging invasive insect. The control of these invasive species would clear the slate for the establishment of more native species with higher value for wildlife.

A Boy Scout Eagle project has established a number of rustic trails through the wooded areas of the park. These trails provide a significant opportunity to enhance the use of the woodland portion of the park. There is substantial public interest in this currently under-utilized portion of the park. In contrast to the active use areas of the park such as the ball fields and swimming pool, the natural areas can open the park up to a wider range of users. Improvement to the trails and interpretive signage can enhance that experience. Consideration of upgrading some of these trails for American with Disabilities Act (ADA) accessibility, would further open the park's recreational opportunities.

3.0 Plan Goals and Objectives

The primary objective of the Invasive Species Management Plan is to develop a baseline of invasive species currently found within Dauphin-Middle Paxton Community Park and identify steps to remove and manage these species to support habitat improvement goals identified in the Natural Resources Management Plan.

This plan has not been developed in coordination with adjacent property owners.

4.0 Invasive Species Inventory

An inventory of plant species found on the Dauphin-Middle Paxton Community Park property was conducted in August 2022. While this inventory is a "snapshot" of the species present and was not a comprehensive census of all plants present, it does represent the majority of the plants. The list of plants identified within the park is included in Table 1 in Appendix C.

5.0 Assessment of Invasive Species Threats

Invasive species are capable of causing displacement of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats. Invasive species are simply that—invasive. They are non-native species whose introduction causes or is likely to cause economic or environmental harm. If left to spread, invasive species can have devastating consequences on ecosystems. This can result in adverse impacts and fundamental disruptions of ecosystems.

The Pennsylvania Department of Conservation and Natural Resources has identified and ranked the invasive species that pose the highest threat to our natural habitats. Within Dauphin-Middle Paxton Community Park, 19 plant species are identified as posing severe or significant threat. A common trait of many of these invasive species is that they leaf out earlier in the spring and hold their leaves longer into the fall than many of our native species and are therefore able to in-part, out compete our native vegetation. However, this trait also makes them easier to identify. The plants that pose a severe or significant threat include:

Norway maple

Norway maple has high shade tolerance and a high reproductive and growth rate which allows it to penetrate deep into the forest and out compete native plants. It produces a deep shade that reduces the diversity of plants growing under it.

Empress tree

Empress tree invades disturbed areas such as roadsides, streambanks, and forest edges. Its aggressive growth displaces native vegetation. It tolerates infertile and acidic soils and drought.

Tree of heaven

Tree of heaven spreads readily by seed and by sprouting from its extensive root system. The roots also produce chemicals that inhibit the establishment of other plant species nearby. Its fast growth limits habitat for other species. Tree of heaven is a doubly damaging plant because it is the preferred host plant of the spotted lanternfly, a destructive invasive insect that is causing damage to commercial crops.

Common buckthorn

Common buckthorn forms dense thickets, which crowd out native shrubs and herbs and prevent woody plant regeneration. Invasive shrubs like common buckthorn are population sinks for nesting songbirds due to higher predation rates.

Mimosa

Mimosa has a high rate of seed production and sprouting ability which creates dense stands that shade out other vegetation on-site.

Bush honeysuckle

Bush honeysuckles leaf out early and compete with native plants for sunlight, moisture, and pollinators. They produce large numbers of small fruits which are eaten and spread by birds in

their droppings. While birds eat the fruit, it is poorer in fats and nutrients than fruits from native plants, so the birds do not get enough nutrients to help sustain long flights during migrations. Bush honeysuckles also spread vegetatively.

Autumn olive

Autumn olive is highly competitive, shading out shorter plants. Its nitrogen-fixing capabilities may adversely affect the nitrogen cycle of native communities. Although autumn olive provides a plentiful source of berries for birds, their fruits are actually quite low in nutrients.

Chinese privet

Privets form dense thickets, which reduce light and moisture availability for native shrubs and wildflowers, decreasing plant diversity. Once introduced to an area, privet can regenerate from root and stump sprouts, making it difficult to eradicate.

Wineberry

Wineberry spreads by seed and vegetatively through root nodes forming extensive, dense thickets that displace native vegetation and restrict light to lower growing vegetation. Wineberry is also host to several viruses that can affect raspberries, like raspberry yellow spot.

Burning bush

Burning bush is a prodigious seed producer that outcompetes native plants with its large, dense silhouette. It lacks pests and is tolerant of deep shade, creating large thickets that displace native herbs and shrubs. This displacement has negative consequences for both aquatic and terrestrial ecosystems. The seeds are carried by birds, allowing infestations to spread rapidly.

Oriental bittersweet

Bittersweet vines will girdle and kill trees or break their branches off from the weight of the vines. When it grows into the canopy it can shade out natives. Birds and other wildlife readily consume the large number of berries, spreading seeds. Humans also spread the seed through the use of bittersweet vines and berries for craft projects. The plant also spreads vegetatively through rhizomes and root suckers. Oriental bittersweet has also been shown to hybridize with the American bittersweet, leading to a loss of genetic identity.

Garlic mustard

Garlic mustard is highly shade-tolerant, and capable of invading high-quality, mature forests displacing spring wildflowers. Garlic mustard quickly forms monocultures by monopolizing

resources. It produces chemical compounds that inhibit seed germination of other species and disrupts the mycorrhizal relationships of trees.

Asiatic tearthumb

Growing up to six inches a day, Asiatic tearthumb can quickly smother native vegetation and climb into the tree canopy where it restricts light availability to plants below. Birds and other wildlife eat the fruits and spread the seeds in their droppings.

Crown vetch

Crown-vetch's main impact is the displacement of native plants. Crown-vetch spreads through both seeds and rhizomes. The rhizomes can extend up to 10 feet, and an individual plant can cover 70 to 100 square feet within four years.

Japanese knotweed

Japanese knotweed spreads by rhizomes and is capable of forming dense stands that crowd out native vegetation, clog small waterways, and displace streamside vegetation. This can increase bank erosion and lower riparian habitat quality. Once established, these stands are very difficult to eradicate.

Canada thistle

Canada thistle produces an abundance of feathery seeds, which are quickly dispersed in the wind. The seeds can remain viable in the soil for up to 20 years or more. The fibrous taproot is capable of sending out lateral roots, which sprout new shoots at frequent intervals. Canada thistle crowds out and replaces native plants, changing the structure and species composition of plant communities and reducing diversity. This thistle outcompetes native plants through shading, competition for soil resources and possibly through the release of toxic chemicals.

Bull thistle

Bull thistle spreads by seed producing 100 to 300 seeds per flower head, with up to 400 flower heads per plant. Bull thistle forms dense thickets that displace and prevent native vegetation from establishing. The spiny features of the plant also make it unpalatable to wildlife and livestock.

Japanese stiltgrass

Japanese stiltgrass invades and quickly crowds out native plant species. Invasions can also change soil nutrient cycling processes, inhibit tree survival and growth, and reduce light availability. After

it dies back in late fall, it forms a thick layer of smothering thatch that is slow to decompose. Because stilt grass is relatively unpalatable, it may encourage heavier deer browsing on native plant species.

6.0 Management Practices

There are three broad methods of invasive species control: manual, mechanical, and chemical. The most appropriate method depends on a number of factors including the species in question, the size of the population, labor force available, financial resources, etc. The Invasive Species Fact Sheets included in Appendix D provide information of effective control measures.

Prior to undertaking any control measure, care must be taken to ensure proper identification of the species because many of these invasive species have native look-a-likes. The Invasive Species Fact Sheets in Appendix D identify some of these look-a-likes. An identification field guide should also be used to confirm identification.

Manual Control

This includes digging, flooding, destruction and removal, hand-pulling, burning and general destruction of the invasive species by hand. This is most useful for small infestations and is the most environmentally friendly, yet is the most labor intensive and least effective for larger populations. With some species, incomplete removal can result in new plants sprouting from the roots and other plant parts left behind.

Mechanical Control

Mowing, hoeing, cutting, tilling, girdling, chopping and constructing barriers to the invasive species using tools and/or machines. This method is best for medium to large infestations in areas which pose a safety risk due to terrain, and when used in conjunction with chemical control it can be extremely effective, However, depending on the time spent and the size of the infestation, using mechanical means can get quite expensive as it needs to be done repeatedly, and it can cause some environmental damage. Mowing and cutting of some species can encourage resprouting of additional plants. However, repeated and persistent mowing can also exhaust energy stores and make the invasive plants more susceptible to eradication efforts.

Chemical Control

Involves the use of pesticides, including appropriate herbicides, fungicides and insecticides. This is the least labor-intensive option. Chemical control on its own is usually the most effective option, as it can target specific species and will kill them with a degree of certainty. However, this has the potential to be the most environmentally damaging option, as chemicals could attack other species and stay in the area long after the invasion has been dealt with. In Pennsylvania,

the application of pesticides on property not personally owned must conducted under the supervision of a licensed and bonded professional.

Prevention

Preventing the introduction and establishment of invasive species before they arrive and establish is the most cost-effective invasive species strategy. The species that pose the greatest risk should be identified through risk assessment and their pathways to introduction monitored and blocked.

Risk assessment is a tool used to identify species that pose the greatest risk as identified by the Pennsylvania Department of Conservation and Natural Resources (PADCNR). For those species that are on PADCNR's Invasive Species Plant List but not yet established at Dauphin-Middle Paxton Community Park, the most effective means is through interruption of their most likely pathways of introduction. Likely pathways for invasive species introduction include: habitat modification (land clearing and revegetation), landscaping (plant materials and mulch), and transportation ("hitch-hiking "on trail users and cars).

Invasive species are often introduced unintentionally through human-assisted means such as moving mulch materials, "hitchhikers" attached to clothing or boot soles, and hauling soil or fill materials from infested areas. Other invasive plants have been intentionally introduced as ornamentals or for some perceived benefit such as erosion control or as a resource for wildlife.

Prevention can occur by informing all stakeholders through updated watch lists and increasing public participation in cleaning vehicles and gear, buying local firewood, choosing noninvasive ornamental plants and not releasing pets.

Early Detection and Response

Preparation is the key to a successful early detection and response program. The PADCNR continually updates the invasive species watch list. While new occurrences are inevitable, preparation prior to an early detection will increase the probability of eradication.

Effective early detection of new occurrences followed by appropriate response efforts reduces the likelihood of establishment and the cost of long-term management. A system of on-the-ground continuous surveillance and reporting at the most high-risk pathways should be pursued using the best available technology. Such a system will require park users and the dedicated group of steward volunteers to recognize an introduction before they get out of hand. Once the presence of a watch list species or one that may be a potential threat has been verified by an expert, a response plan should be developed and implemented for the specific threat.

Control and Restoration

Invasive species that have become established or widespread at a scale in which the potential for eradication is severely diminished, effective control is more difficult and requires more resources. Invasions that are spreading or already causing significant impacts require different strategies than those for which early detection and eradication is still possible. The Joint Park Authority must have the necessary information to forecast long-term impacts and weigh the benefits and costs of various management alternatives.

Managing established invasive species requires employing additional technologies (e.g., manual, mechanical, and chemical) for best control practices and restoration techniques to mitigate negative impacts. It is recommended that the control and removal of established invasive species be pursued in smaller, more manageable sections with progress made over time. The process can be labor and capital intensive and pursuing large areas for restoration may result in insufficient labor and funding to make meaningful progress.

While volunteers are restricted to hand or mechanical plant removal with hand tools, professional plant control technicians are able to provide both independent and supportive chemical treatments. From a public relations, volunteer recruitment, and environmental education standpoint, an invasive plant control program can be very successful. However, without additional resources and the development of new strategies, it is difficult to achieve measurable environmental benefit to at-risk forests and natural lands.

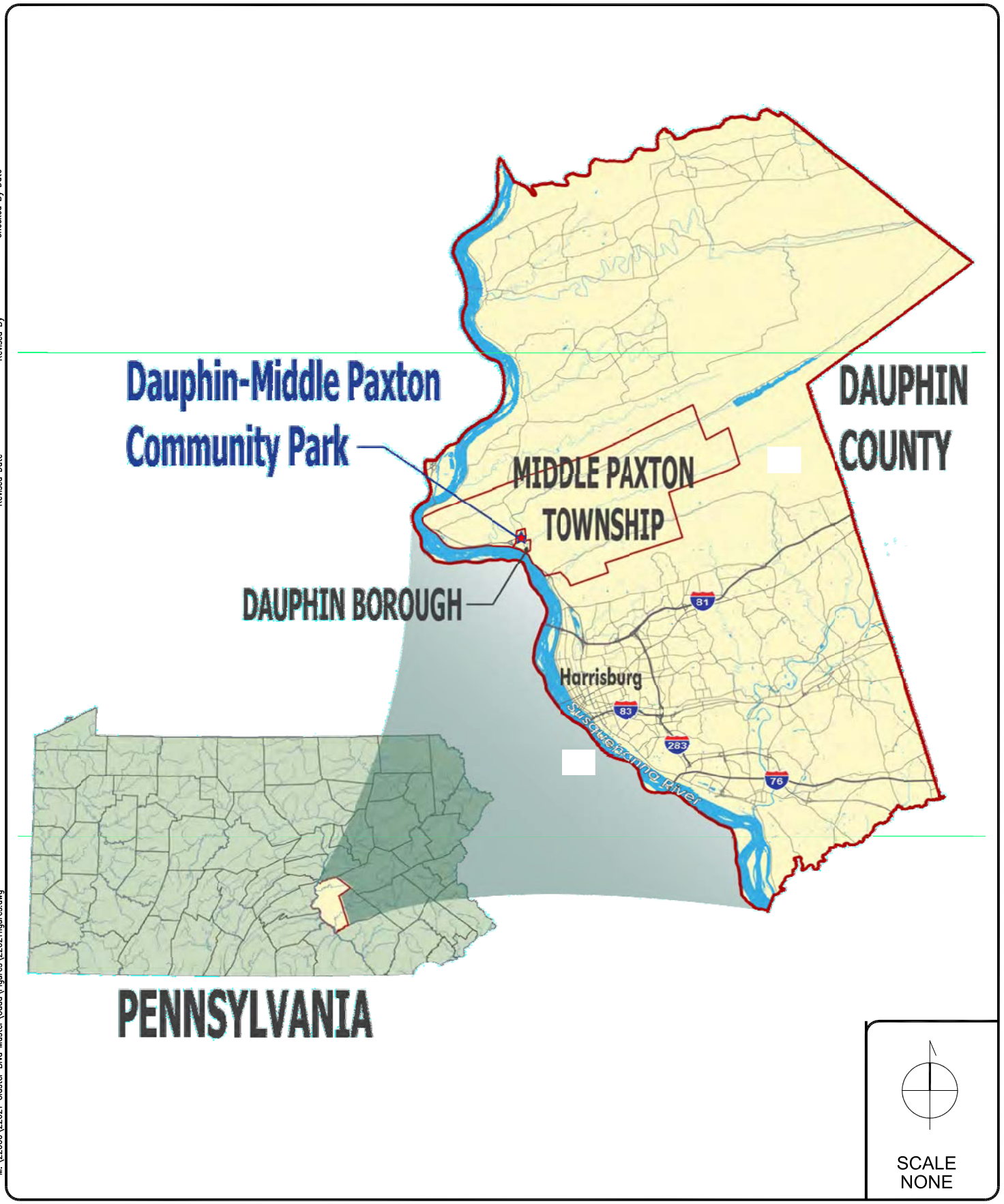
It is unrealistic to expect the removal of all invasive plants from Dauphin-Middle Paxton Community Park, just as it is unrealistic to believe desired environmental goals can be achieved relying solely on a volunteer workforce. However, a carefully managed combination of volunteers and contract services could preserve the most threatened high-value areas. Elements of a strategy should include a measured balance between aggressive treatment, maintenance and prevention.

It is also important to couple the control and removal of invasive species with the establishment of more desirable native species. The removal of the invasive species will create disturbances that will favor the re-establishment of invasive species unless that process is disrupted by the establishment of native vegetation. See the Forest Stewardship Plan for guidance on native plant restoration.

Seeking grant funding to support largescale invasive plant removal and natural land restoration and preservation efforts is recommended.

Appendices

Appendix A - Maps



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REGIONAL LOCATION MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK
MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

FIGURE
1

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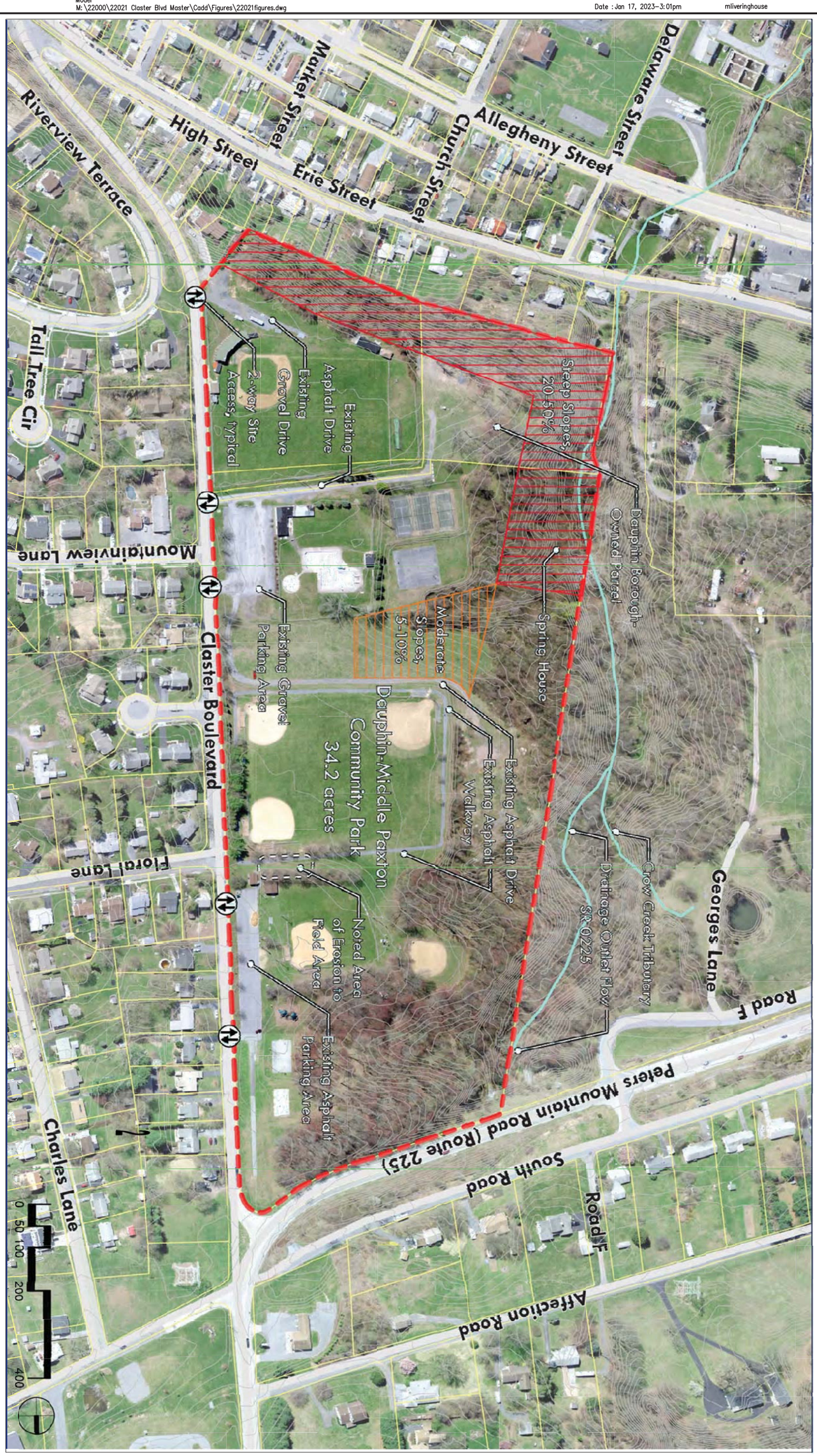

FIGURE 2

SCALE AS SHOWN

EXISTING CONDITIONS MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK

MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

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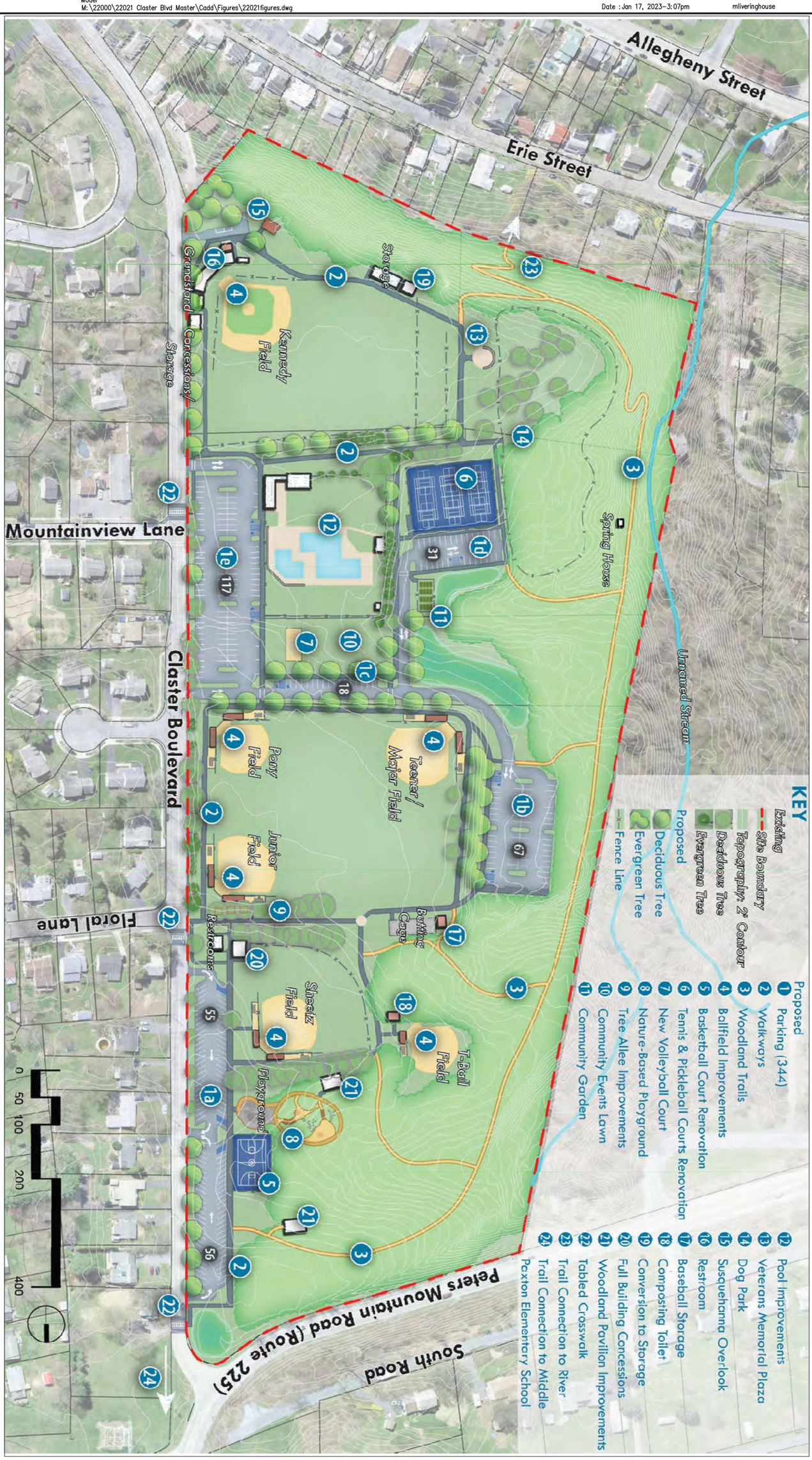

FIGURE 3

SCALE AS SHOWN

PROPOSED CONDITIONS MAP

DAUPHIN-MIDDLE PAXTON COMMUNITY PARK

MIDDLE-PAXTON TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA

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Appendix B - Site Photos

Bank erosion on the unnamed tributary on the western border of the park.

A stand of lizard's tail (*Saururus cernuus*) along the small tributary. This species is much more common along larger stream/river systems.

A slope in the park vegetated with mostly invasive species including bush honeysuckle in the foreground and Norway maple in the background of the photo.

Woodland habitat with sparse understory, cleared of most of the invasive species.

Wetlands along the unnamed tributary containing both native and non-native species.

A gas line right-of-way offering opportunity of enhancement planting with species with higher wildlife values.

Appendix C – Natural Areas Plant List

Table 1 - Dauphin-Middle Paxton Community Park – Natural Areas Plant List (As observed on August 19, 2022)

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Trees/saplings/seedlings				
Red maple	*Acer rubrum*	N		
Norway maple	*A. platanoides*	I	2/RA	
Box elder	*A. negundo*	N		
Silver maple	*A. saccarinum*	N		
Red oak	*Quercus rubra*	N		
Black oak	*Q. velutina*	N		
Chinkapin oak	*Q. prinoides*	N		Small seedling
Black locust	*Robinia pseudoacacia*	N		
Bitternut hickory	*Carya cordiformis*	N		
American holly	*Ilex opaca*	N		Not common in ridge and valley
Black walnut	*Juglans nigra*	N		
Staghorn Sumac	*Rhus typhina*	N		
Paw paw	*Asimina triloba*	N		More common in bottomlands
Empress tree	*Paulownia tomentosa*	I	2/RA	
Tree of heaven	*Ailanthus altissima*	I	1/B	
Black cherry	*Prunus serotina*	N		
Hackberry	*Celtis occidentalis*	N		
Yellow poplar	*Liriodendron tulipfera*	N		
American sycamore	*Platanus occidentalis*	N		
Red cedar	*Juniperus virginiana*	N		
Common buckthorn	*Rhamnus cathartica*	I	1/RA	
Redbud	*Cercis canadensis*	N		
American hornbeam	*Carpinus caroliniana*	N		
Siberian elm	*Ulmus pumila*	I	WL	
White mulberry	*Morus alba*	I	3	
Red mulberry	*M. rubra*	N		
Mimosa	*Mimosa quadrivalis*	I	2	
Golden rain tree	*Koelreuteria paniculata*	I	WL	

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Shrubs				
Elderberry	*Sambucus canadensis (nigra)*	N		
Black haw viburnum	*Viburnum prunifolium*	N		
Witch hazel	*Hamamelis virginiana*	N		
Bush Honeysuckle	*Lonicera sp.*	I	1/RA	
Spicebush	*Lindera benzoin*	N		
Autumn olive	*Elaeagnus umbellata*	I	2/RA	
Multiflora rose	*Rosa multiflora*	I	1/B	
Chinese privet	*Ligustrum velgare*	I	2/RA	
Buttonbush	*Cephalanthus occidentalis*	N		
Wineberry	*Rubus phoenicolasius*	I	2	
Blackberry sp.	*Rubus sp.*	N		
Burning bush	*Euonymus alatus*	I	2/RA	
Woody Vines				
English ivy	*Hedera helix*	I	3/RA	
Oriental bittersweet	*Celastrus orbiculatus*	I	1/B	
Catbrier	*Smilax glauca*	N		Not common
Common greenbrier	*S. rotundifolia*	N		
Dewberry	*Rubus flagellaris*	N		
Virginia creeper	*Parthenocissus quinquefolia*	N		
Poison ivy	*Toxicodendron pubescens*	N		
Summer grape	*Vitis aestivalis*	N		
Fox grape	*V. labrusca*	N		
Sweet autumn clematis	*Clematis terniflora*	I		
Herbs				
False Solomon's seal	*Maianthemum racemosum*	N		
Goldenrod sp.	*Solidago sp.*	--		
Early goldenrod	*S. juncea*	N		
Zig zag goldenrod	*S. flexicaulis*	N		

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Grass-leaved goldenrod	*Euthamia graminiflora*	N		
Rough avens	*Geum lacinatum*	N		
Pokeweed	*Phytolacca americana*	N		
Queen Ann's lace	*Daucus carota*	I		
Chicory	*Cichorium intybus*	I		
Burdock	*Arctium lappa*	I		
Late boneset	*Eupatorium serotinum*	N		
Upland boneset	*E. seessilofolium*	N		
Yellow vetchling	*Lathyrus aphaca*	I		
Ragweed	*Ambrosia artemisiifolia*	I		
Hay scented fern	*Dennstaedtia punctilobula*	N		
Sensitive fern	*Ococlea sensibilis*	N		
Lady fern	*Athyrium filix-femina*	N		
Christmas fern	*Polystichum acrostichoides*	N		
Common cinquefoil	*Potentilla simplex*	N		
Water pepper	*Polygonum hydropeperoides*	N		
Lady's thumb	*P. persicaria*	I		
Virginia stickseed	*Hechelia virginicana*	N		
Garlic mustard	*Alliaria petiolate*	I	1/B	
Violet sp.	*Viola sp.*	--		
Virginia Jumpseed	*Persicaria virginiana*	N		
Aster sp.	*Aster sp.*	--		
Creeping Charlie	*Glechoma hederacea*	I		
Asiatic dayflower	*Commelina communis*	I		
Stonecrop	*Sedum ternatum*	N		
Mayapple	*Podophyllum peltatum*			
Bladder campion	*Silene vulgaris*	I		
Jack in the pulpit	*Arisaema triphyllum*	N		
Lizard's tail	*Sauruus cernuus*	N		Not common on small streams
Beebalm	*Monarda didyma*	N		
Beggar-ticks	*Bidens frondosa*	N		

Common Name	Scientific Name[1]	Native Status[1]	High Priority[2]/ Noxious Weed[3]	Remarks
Asiatic tearthumb	*Persicaria perfoliatum*	I	1/B	
Spotted inpatients	*Inpatients capensis*	N		
Spotted Joe-pye wed	*Eutrochium maculatum*	N		
Horse nettle	*Solanum carolinense*	N		
English plantain	*Plantago lanceolata*	I		
Black bindweed	*Fallopia convolvulus*	I		
Common fleabane	*Erigeron philidephicus*	N		
Crown vetch	*Securigera varia*	I	2/RA	
Red clover	*Trifolium pretennse*	I		
Yellow wood sorrel	*Oxalis stricta*	N		
Ground cherry	*Physalis subglabrata*	N		
Wild yam	*Dioscorea villosa*	N		Not common
Clear weed	*Pilea pumila*	N		
Curly dock	*Rumex crispus*	I		
Yarrow	*Achillia millefolium*	I		
Yucca	*Yucca flaccida*	I		
Hairy Bittercress	*Cardamine hirsute*	I		
Japanese knotweed	*Fallopia japonica*	I	1/B	
Yellow archangel	*Lamium galeobdolon*	I		
Ivy-leaved speedwell	*Veronica hederifolia*	I		
Lily of the valley	*Convallaria majalis*	I		
Mugwort	*Artemisia vulgaris*	I	3/B	
Canada thistle	*Cirsium arvense*	I	2/B	
Bull thistle	*C. vulgare*	I	2/B	
Common groundsel	*Senecio vulgaris*	I		
Path rush	*Juncus tenuis*	N		
Deer tongue grass	*Dicanthelium clandestinum*	N		
Nimblewill	*Muhlenberia schreberi*	N		
Broomsedge	*Andropogon virginicus*	N		
Yellow foxtail	*Setaria pumila*	I		
Japanese stiltgrass	*Microstegium vimineum*	I	1/B	

Footnotes

[1] The Vascular Flora of Pennsylvania, Rhoads and Klein (N- native; I- introduced)

[2] Pennsylvania Department of Conservation and Natural Resources, Invasive Plants in Pennsylvania

1 – Severe Threat (spreads aggressively) 2 – Significant Threat (spreads easily) 3 – Lesser Threat (spreads in disturbed areas) WL – Watch List

[3] Pennsylvania State Noxious Weed List

A – Class A (established, intended to be eradicated) B – Class B (widespread, cannot feasibly be eradicated) C – Class C (not known in PA, listed on the Federal List) RA – Recommended Additions to the List

Appendix D - PADCNR Invasive Species Plant List and Fact Sheets

DCNR Invasive Plant List

DCNR defines invasive plants as those species that are not native to the state, grow aggressively, and spread and displace native vegetation. Invasive plants are generally undesirable because they are difficult and costly to control and can dominate whole habitats, making them environmentally destructive in certain situations. Not all non-native plants become invasive. In fact, very few actually do. The plants listed here have been determined by DCNR to be invasive on State Forest and State Park lands and may act aggressively in other parts of Pennsylvania. Some of the species listed below are only invasive in certain environmental conditions and there may be cases where they may be used with little environmental risk. This list was compiled through coordinated efforts between ecologists in Pennsylvania and other natural resource partners. New species cross state borders and some plants that have been here for decades may suddenly become invasive due to changing land uses, changes in weather or climate, or genetic reasons, so this list may change over time and will be updated periodically. **This list is not regulatory.** It is used to guide the management efforts of DCNR lands because of knowledge that these species can become invasive under the right environmental conditions. To learn more about invasive plants in Pennsylvania and how they can be controlled, visit www.dcnr.state.pa.us/forestry/plants/invasiveplants/index.htm.

Invasive plant species have been ranked in terms of the threat they pose to native plant communities. Each rank is defined below:

Rank 1- Severe Threat. Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation. Includes species that are or could become widespread in Pennsylvania.

Rank 2- Significant Threat. Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily and aggressively into native plant communities as those species listed as Rank 1.

Rank 3- Lesser Threat. Exotic plant species that spread in or near disturbed areas, and are not presently considered a major threat to undisturbed native plant communities.

Watch List- Exotic plant species that are severe problems in surrounding states but have not been widely reported in Pennsylvania, OR may naturalize and become a problem in the future and require more monitoring.

Vines

Scientific Name	Common Name	Rank
Ampelopsis glandulosa	Porcelain Berry	1
Celastrus orbiculatus	Oriental Bittersweet	1
Humulus japonicus	Japanese Hops	1
Lonicera japonica	Japanese Honeysuckle	1
Persicaria perfoliata	Mile-a-Minute	1
Pueraria montana var. lobata	Kudzu	1
Vincetoxicum nigrum	Black Swallow-Wort	1
Vincetoxicum rossicum	Pale Swallow-Wort	1
Euonymus fortunei	Wintercreeper	2
Wisteria floribunda	Japanese Wisteria	2
Wisteria sinensis	Chinese Wisteria	2
Hedera helix	English Ivy	3
Vinca major	Bigleaf Periwinkle	3
Vinca minor	Common Periwinkle	3
Akebia quinata	Chocolate Vine	Watch
Clematis terniflora	Japanese Clematis	Watch
Dioscorea polystacha	Chinese Yam	Watch

Herbs and Forbs

Scientific Name	Common Name	Rank
Alliaria petiolata	Garlic Mustard	1
Conium maculatum	Poison Hemlock	1
Fallopia japonica	Japanese Knotweed	1
Fallopia sachalinensis	Giant Knotweed	1
Fallopia X bohemica	Hybrid Knotweed	1
Ficaria verna	Lesser Celandine	1
Galega officinalis	Goatsrue	1
Heracleum mantegazzianum	Giant Hogweed	1
Lythrum salicaria	Purple Loosestrife	1
Centaurea jacea	Brown Knapweed	2
Centaurea nigra	Black Knapweed	2
Centaurea stoebe	Spotted Knapweed	2
Chelidonium majus	Greater Celandine	2
Cirsium arvense	Canada Thistle	2
Cirsium vulgare	Bull Thistle	2
Hesperis matronalis	Dames Rocket	2
Iris pseudacorus	Yellow Flag Iris	2
Lespedeza bicolor	Shrubby Bushclover	2
Lespedeza cuneata	Chinese Bushclover	2
Pastinaca sativa	Wild Parsnip	2
Perilla frutescens	Beefsteak Plant	2
Rubus phoenicolasius	Wineberry	2
Securigera varia	Crown-vetch	2
Aegopodium podagraria	Goutweed	3
Anthriscus sylvestris	Wild Chervil	3
Artemisia vulgaris	Mugwort	3
Butomus umbellatus	Flowering Rush	3
Cardamine impatiens	Narrowleaf Bittercress	3
Carduus acanthoides	Spiny Plumeless Thistle	3
Carduus nutans	Musk Thistle	3
Datura stramonium	Jimsonweed	3
Epilobium hirsutum	Hairy Willow Herb	3
Epilobium parviflorum	Smallflower Hairy Willow-Herb	3
Hemerocallis fulva	Orange Day-Lily	3
Lysimachia nummularia	Moneywort	3
Pachysandra terminalis	Japanese Pachysandra	3
Persicaria longiseta	Bristled Knotweed	3
Stellaria media	Common Chickweed	3
Amaranthus palmeri	Palmer Amaranth	Watch

Trees

Scientific Name	Common Name	Rank
Ailanthus altissima	Tree-of-Heaven	1
Aralia elata	Japanese Angelica Tree	1
Acer platanoides	Norway Maple	2
Albizia julibrissin	Mimosa	2
Alnus glutinosa	European Black Alder	2
Paulownia tomentosa	Empress Tree	2
Phellodendron amurense	Amur Corktree	2
Phellodendron japonicum	Japanese Corktree	2
Phellodendron lavallei	Lavella Corktree	2
Pyrus calleryana	Callery Pear	2
Tetradium daniellii	Bee-Bee Tree	2
Broussonetia papyrifera	Paper Mulberry	3
Morus alba	White Mulberry	3
Acer ginnala	Amur Maple	Watch
Acer palmatum	Japanese Maple	Watch
Koelreuteria paniculata	Golden Rain-Tree	Watch
Quercus acutissima	Sawtooth Oak	Watch
Ulmus pumila	Siberian Elm	Watch

Grasses

Scientific Name	Common Name	Rank
Microstegium vimineum	Japanese Stiltgrass	1
Oplismenus hirtellus	Wavyleaf Basketgrass	1
Phragmites australis ssp australis	Common Reed	1
Arthraxon hispidus	Small carpetgrass	2
Phalaris arundinacea	Reed Canary Grass	2
Phyllostachys aurea	Golden Bamboo	2
Phyllostachys aureosulcata	Yellow Groove Bamboo	2
Phyllostachys bambusoides	Giant Timber Bamboo	2
Poa trivialis	Rough Bluegrass	2
Bromus japonicus	Japanese brome	3
Bromus sterilis	Poverty Brome	3
Bromus tectorum	Cheatgrass	3
Holcus lanatus	Velvetgrass	3
Miscanthus sinensis	Chinese Silvergrass	3
Schedonorus arundinaceus	Tall Fescue	3
Sorghum bicolor ssp. x. drummondii	Shattercane	3
Sorghum halepense	Johnson Grass	Watch
Arundo donax	Giant Reed	Watch
Imperata cylindrica	Cogon Grass	Watch
Tripidium ravennae	Ravenna Grass	Watch

Shrubs

Scientific Name	Common Name	Rank
Berberis thunbergii	Japanese Barberry	1
Berberis vulgaris	European Barberry	1
Frangula alnus	Glossy Buckthorn	1
Lonicera fragrantissima	Sweet Breath Honeysuckle	1
Lonicera maackii	Amur Honeysuckle	1
Lonicera morrowii	Morrow's Honeysuckle	1
Lonicera morrowii x bella	Beautiful Honeysuckle	1
Lonicera standishii	Standish Honeysuckle	1
Lonicera tatarica	Tartarian Honeysuckle	1
Rhamnus cathartica	Common Buckthorn	1
Rhodotypos scandens	Jetbead	1
Rosa multiflora	Multiflora Rose	1
Spiraea japonica	Japanese Spiraea	1
Buddleja davidii	Butterfly Bush	2
Elaeagnus angustifolia	Russian Olive	2
Elaeagnus umbellata	Autumn Olive	2
Euonymus alatus	Winged Euonymus	2
Ligustrum japonicum	Japanese Privet	2
Ligustrum obtusifolium	Border Privet	2
Ligustrum sinense	Chinese Privet	2
Ligustrum vulgare	Common Privet	2
Viburnum dilatatum	Linden Viburnum	2
Viburnum plicatum	Doublefile Viburnum	2
Viburnum sieboldii	Siebold Viburnum	2
Viburnum opulus	Guelder Rose	3

Aquatic

Scientific Name	Common Name	Rank
Hydrilla verticillata	Hydrilla	1
Myriophyllum aquaticum	Parrot feather watermilfoil	1
Myriophyllum spicatum	Eurasian Watermilfoil	1
Potamogeton crispus	Curly Pondweed	1
Trapa natans	European Water Chestnut	1
Typha angustifolia	Narrow-Leaved Cattail	1
Typha x glauca	Hybrid Cattail	1
Cabomba caroliniana	Carolina Fanwort	3
Egeria densa	Brazilian Water-Weed	3
Najas minor	Brittle Waternymph	3
Nitellopsis obtusa	Starry Stonewort	3
Hydrocharis morsus-ranae	Common Frogbit	Watch
Ludwigia grandiflora ssp. Hexapetala	Large Flower Primrose Willow High	Watch
Nymphoides peltata	Yellow Floatingheart	Watch

A pressing problem

Recognition of the problem of invasive plants is growing, at the same time as threats to native ecosystems are mounting. Identifying invasive plants and understanding the potential damage they can cause is essential to limiting their spread and protecting native ecosystems. Recent publications discussing invasive plant control and a good field guide can help identify invasive plants. By increasing awareness invasive plants, they can be easily recognized and their spread across the Commonwealth can be slowed.

For more information

PA DCNR Invasive Plants Page, www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx

PA Department of Agriculture, www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/NIPPP/Pages/default.aspx

PA DCNR Invasive Plant Management for Land Managers, http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033074.pdf

Invasive Plant Identification, https://www.nybg.org/files/scientists/rnaczi/Mistaken_Identity_Final.pdf

Contact local experts

Penn State University Cooperative Extension Office Directory, www.extension.psu.edu/extmap.html

PA DCNR Service Foresters, http://www.dcnr.pa.gov/Conservation/ForestsAndTrees/ManagingYourWoods/Pages/default.aspx

Invasive plant maps

iMap Invasives: https://www.imapinvasives.org/

EDDMaps Mid-Atlantic Early Detection Network: http://www.eddmaps.org/midatlantic/

What is an invasive plant?

"**Invasive**" is a name for plant species that are not native to the state, grow aggressively, spread quickly, and displace native vegetation. Invasive plants are generally undesirable because they are difficult and costly to control and can dominate entire habitats, making them environmentally destructive in certain situations. Some invasive plants have been found to pose extremely high risk to ecosystems throughout the Commonwealth are deemed "noxious weeds" by the PA Department of Agriculture, whom can then mandate control of these particular species.

Most invasive plants were transported from other continents either intentionally or by accident and are often referred to as "exotic," "introduced," or "non-native" invasives. These non-native species typically have no co-adapted pests or diseases present in our ecosystems, further aiding their ability to out-compete native vegetation.

This brochure lists the most troublesome invasive plants that occur in Pennsylvania and impact native plant communities. These plants have been observed acting aggressively on DCNR lands or are classified as invasive in bordering states. DCNR has grouped these species in three categories based on their perceived ecological threat.

Characteristics of invasive plants

Invasive plants can be trees, shrubs, vines, grasses, or flowers. They typically can reproduce rapidly by roots, seeds, shoots, or all three.

Invasive plants tend to:

- not be native to North America
- mature quickly
- spread rapidly by roots or shoots
- produce seeds that disperse and sprout easily
- exploit and colonize disturbed ground
- be generalists that can grow in a variety of habitat conditions

www.dcnr.pa.gov

Invasive Plants

In Pennsylvania

Japanese stiltgrass spreading into the forest

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

Effects of Invasive Plants

Invasives out-compete native plants for growing space, light, and nutrients and are a major factor in the decline of native plant communities. Some invasive plants also secrete chemicals into the ground making soils inhospitable to native plants.

Endangered, rare and threatened native plants are especially at risk because they often occur in small populations making them particularly vulnerable to competition. Plants like kudzu, purple loosestrife, and garlic mustard are displacing native plants and degrading habitat for native insects, birds and animals. While wildlife often forage on invasive plant fruit and seed, it rarely provides adequate nutrition.

Avoid Using Invasive Plants

Some invasive plants came to our area by accident but others were brought here and planted in gardens or landscaping. Invasive plants, even when grown in a cultivated yard, can spread, escape into native ecosystems, and cause landscape maintenance weeding problems for years to come. In urban and suburban areas, there is a good chance that the worst weeds on your property are escaped invasives like Japanese honeysuckle, multiflora rose, Japanese knotweed, and oriental bittersweet. Even in yards, gardens, fields, and parks these plants are very expensive to control.

The best insurance against future problems is to avoid the use of known invasive plants and educate others about the use of invasive plants in landscaping. This brochure lists many of the plants that are invasive in Pennsylvania. Plants on this list should be avoided because they can escape cultivation and aggressively move into surrounding ecosystems.

What can I do?

Minimize landscape disturbance. Invasive plants thrive on bare soil and disturbed ground where the native plant community has been displaced. The key to controlling invasives is to protect and preserve healthy native plant communities.

Scout your property annually for invasives or other problems. Annual checkups on your own property help you recognize changes that make be taking place—such as the introduction of a new invasive plant— before they become problematic. Effective scouting or monitoring ensures problems are found while they are still small and easily controlled. Invasive plant populations can be reported to state-wide mapping services like EDDMaps and iMapInvasives.

Replace invasive plants with native species. One way to avoid invasive plants is to choose plants that are native to your area. Natives often are adapted to a specific ecological niche and have natural controls (pests, disease, climate) that keep them in balance.

Invasives exploit bare soil and empty niches. When you remove an invasive plant, unless there is another plant substituted, the invasive will tend to come back (either by seed or resprouting). What grows at a site in the future depends largely on what is planted there now. It is important to fill that niche with desirable plants.

Treatment Considerations

Early detection of invasive populations minimizes control cost and effort. Smaller populations of invasive plants can typically be hand-pulled or cut with minimal effort. Large, established populations typically take many years of concerted effort to achieve eradication.

Remove invasives first where their densities are low. Removing smaller, satellite populations reduces further spread of invasive plants across a landscape. Working from small populations towards the perceived highest density allows for more treatment success over time. Invasive plant control works best where there is a functioning native plant community still in place, which can recolonize the empty niche.

Have plan for maintenance over time. Monitoring and treatment can only be successful over the long term if plans are in place to ensure new populations don't become established after initial treatments are complete.

Clean all equipment thoroughly. Invasive plant materials and seeds can be spread on equipment. Thoroughly clean all lawn mowers and landscaping equipment to reduce new infestations.

Undertake invasive treatments carefully. Effective treatment options typically can include mechanical removal by hand pulling or cutting as well as the use of herbicides. Herbicide treatments must be carried out using label instructions. The appropriate personal, protective equipment should always be worn. Consider hiring certified, trained individuals to carry out large herbicide treatments. Appropriate timing, dosage, and chemical choice is necessary to ensure effective herbicide treatments. Consult the DCNR Invasives website and other appropriate resources to ensure the most effective herbicide treatment.

Rank 1- Severe Threat. Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation. Includes species that are or could become widespread in Pennsylvania.				
Severe Threat	*Ailanthus altissima*	Tree-of-Heaven	TREE	
	Alliaria petiolata	Garlic Mustard	FLOWER	
	Ampelopsis glandulosa	Porcelain Berry	VINE	
	Aralia elata	Japanese Angelica Tree	TREE	
	Berberis thunbergii & B. vulgaris	Japanese & European Barberrys	SHRUBS	
	Celastrus orbiculatus	Oriental Bittersweet	VINE	
	Conium maculatum	Poison Hemlock	FLOWER	PA Noxious Weed
	Fallopia japonica, F. sachalinensis & F. x bohemica	Japanese, Giant & Hybrid Knotweeds	FLOWER	
	Ficaria verna	Lesser Celandine	FLOWER	
	Frangula alnus	Glossy Buckthorn	TREE	
	Galega officinalis	Goatsrue	FLOWER	FEDERAL and PA Noxious Weed
	Heracleum mantegazzianum	Giant Hogweed	FLOWER	FEDERAL and PA Noxious Weed
	Humulus japonicus	Japanese Hops	VINE	
	Lonicera fragrantissima, L. maackii, L. morrowii, L. x bella, L. standishii & L. tatarica	Sweet Breath, Amur, Morrow's, Beautiful, Standish & Tartarian Honeysuckles	SHRUBS	
	Lonicera japonica	Japanese Honeysuckle	VINE	
	Lythrum salicaria	Purple Loosestrife	FLOWER	
	Microstegium vimineum	Japanese Stiltgrass	GRASS	
	Oplismenus hirtellus	Wavyleaf Basketgrass	GRASS	
	Persicaria perfoliata	Mile-a-Minute	VINE	PA Noxious Weed
	Phragmites australis ssp australis	Common Reed	GRASS	
	Pueraria montana var. lobata	Kudzu	VINE	PA Noxious Weed
	Rhamnus cathartica	Common Buckthorn	TREE	
	Rhodotypos scandens	Jetbead	SHRUB	
	Rosa multiflora	Multiflora Rose	SHRUB	PA Noxious Weed
	Spiraea japonica	Japanese Spiraea	SHRUB	
	Typha angustifolia & T. x glauca	Narrow-Leaved & Hybrid Cattails	GRASS	
	Vincetoxicum nigrum & V. rossicum	Black & Pale Swallow-Worts	VINE	
Rank 2- Significant Threat. Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily and aggressively into native plant communities as those species listed as Rank 1.				
Significant Threat	*Acer platanoides*	Norway Maple	TREE	
	Albizia julibrissin	Mimosa	TREE	
	Alnus glutinosa	European Black Alder	TREE	
	Arthraxon hispidus	Small carpetgrass	GRASS	
	Buddleja davidii	Butterfly Bush	SHRUB	
	Centaurea jacea, C. nigra & C. stoebe	Brown, Black & Spotted Knapweeds	FLOWER	
	Chelidonium majus	Greater Celandine	FLOWER	
	Cirsium arvense	Canada Thistle	FLOWER	PA Noxious Weed
	Cirsium vulgare	Bull Thistle	FLOWER	PA Noxious Weed
	Elaeagnus angustifolia & E. umbellata	Russian & Autumn Olives	SHRUB	
	Euonymus alatus	Winged Euonymus	SHRUB	
	Euonymus fortunei	Wintercreeper	VINE	
	Hesperis matronalis	Dames Rocket	FLOWER	
	Iris pseudacorus	Yellow Flag Iris	FLOWER	
	Lespedeza bicolor & L. cuneata	Shrubby & Chinese Bushclovers	SHRUBS	
	Ligustrum japonicum, L. obtusifolium, L. sinense & L. vulgare	Japanese, Border, Chinese & Common Privets	SHRUBS	
	Pastinaca sativa	Wild Parsnip	FLOWER	
	Paulownia tomentosa	Empress Tree	TREE	
	Perilla frutescens	Beefsteak Plant	FLOWER	
	Phalaris arundinacea	Reed Canary Grass	GRASS	
	Phellodendron amurense, P. japonicum & P. lavallei	Amur, Japanese & Lavella Corktrees	TREES	
	Phyllostachys aurea, P. aureosulcata & P. bambusoides	Golden, Yellow Groove & Giant Timber Bamboo	GRASS	
	Poa trivialis	Rough Bluegrass	GRASS	
	Pyrus calleryana	Callery Pear	TREE	
	Rubus phoenicolasius	Wineberry	SHRUB	
	Securigera varia	Crown-vetch	FLOWER	
	Tetradium daniellii	Bee-Bee Tree	TREE	
	Viburnum dilatatum, V. plicatum & V. sieboldii	Linden, Doublefile & Siebold Viburnums	SHRUBS	
	Wisteria floribunda & W. sinensis	Japanese & Chinese Wisterias	VINES	
Rank 3- Lesser Threat. Exotic plant species that spread in or near disturbed areas, and are not presently considered a major threat to undisturbed native plant communities.				
Lesser Threat	*Aegopodium podagraria*	Goutweed	FLOWER	
	Anthriscus sylvestris	Wild Chervil	FLOWER	
	Artemisia vulgaris	Mugwort	FLOWER	
	Bromus japonicus, B. sterilis & B. tectorum	Japanese, Poverty & Downy Bromes	GRASS	
	Broussonetia papyrifera	Paper Mulberry	TREE	
	Cardamine impatiens	Narrowleaf Bittercress	FLOWER	
	Carduus acanthoides & C. nutans	Spiny-Plumeless & Musk Thistles	FLOWER	PA Noxious Weed (Musk)
	Datura stramonium	Jimsonweed	FLOWER	
	Epilobium hirsutum & E. parviflorum	Hairy & Smallflower Willow-Herbs	FLOWER	
	Hedera helix	English Ivy	VINE	
	Hemerocallis fulva	Orange Day-Lily	FLOWER	
	Lysimachia nummularia	Moneywort	FLOWER	
	Miscanthus sinensis	Chinese Silvergrass	GRASS	
	Morus alba	White Mulberry	TREE	
	Pachysandra terminalis	Japanese Pachysandra	FLOWER	
	Persicaria longiseta	Bristled Knotweed	FLOWER	
	Schedonorus arundinaceus	Tall Fescue	GRASS	
	Sorghum bicolor ssp. x. drummondii	Shattercane	GRASS	PA Noxious Weed
	Sorghum halepense	Johnson Grass	GRASS	PA Noxious Weed
	Stellaria media	Common Chickweed	FLOWER	
	Viburnum opulus	Guelder Rose	SHRUB	
	Vinca major & V. minor	Bigleaf & Common Periwinkles	FLOWER	

This brochure lists plants that have been observed to be acting as invasive species on DCNR lands or are known to be invasive in nearby states.
Species are grouped into three categories based on their perceived threat to forest and wetland habitats.
This list is available for download at: http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033302.pdf

USDA
United States Department of Agriculture

Pest Alert

Animal and Plant Health Inspection Service
Plant Protection and Quarantine

Spotted Lanternfly *(Lycorma delicatula)*

The spotted lanternfly is an invasive pest, primarily known to feed on tree of heaven *(Ailanthus altissima)* but has many other host plants, including grape, hop, apple, stone fruit, maple, poplar, walnut, and willow. The insect changes hosts as it goes through its developmental stages. Nymphs feed on a wide range of plant species, while adults prefer to feed and lay eggs on tree of heaven *(A. altissima)*. Spotted lanternflies are invasive and can spread rapidly when introduced to new areas. While the insect can walk, jump, or fly short distances, its long-distance spread is facilitated by people who move infested material or items containing egg masses. If allowed to spread in the United States, this pest could damage the country's grape, orchard, and logging industries.

Distribution

The spotted lanternfly is present in China, Japan, South Korea, Taiwan, and Vietnam. In 2014, the insect was first detected in the United States in Pennsylvania. Since then, spotted lanternfly infestations have been detected in Delaware, Maryland, New Jersey, and Virginia.

Damage

Both nymphs and adults of spotted lanternfly cause damage when they feed, sucking sap from stems and branches. This can reduce photosynthesis, weaken the plant, and eventually contribute to the plant's death. In addition, feeding can cause the plant to ooze or weep, resulting in a fermented odor, and the insects themselves excrete large amounts of fluid (honeydew). These fluids promote mold growth and attract other insects.

Adult spotted lanternfly

Description

Adult spotted lanternflies are about 1 inch long and one-half inch wide, and they have large and visually striking wings. Their forewings are light brown with black spots at the front and a speckled band at the rear. Their hind wings are scarlet with black spots at the front and white and black bars at the rear. Their abdomen is yellow with black bars. Nymphs in their early stages of development appear black with white spots and turn to a red phase before becoming adults. Egg masses are yellowish-brown in color, and most are covered with a gray, waxy coating prior to hatching.

Life Cycle

The spotted lanternfly lays its eggs on smooth host plant surfaces and on non-host material, such as bricks, stones, and dead plants. Eggs hatch in the spring and early summer, and nymphs begin feeding on a wide range of host plants by sucking sap from young stems and branches. Adults appear in late July and tend to focus their feeding on tree of heaven *(A. altissima)* and grapevine *(Vitis vinifera)*. As the adults feed, they excrete sticky, sugar-rich fluid (honeydew). The fluid can build up on plants and on the ground underneath infested plants, causing sooty mold to form.

Where To Look

Spotted lanternfly adults and nymphs frequently gather in large numbers on host plants. They are easiest to spot at dusk or at night as they migrate up and down the trunk of the plant. During the day, they tend to cluster near the base of the plant if there is adequate cover or in the canopy, making them more difficult to see. Egg masses can be found on smooth surfaces on the trunks of host plants and on other smooth surfaces, including brick, stone, and dead plants.

Report Your Findings

If you find an insect that you suspect is the spotted lanternfly, please contact your local Extension office or State Plant Regulatory Official to have the specimen identified properly.

To locate an Extension specialist near you, go to the U.S. Department of Agriculture (USDA) website at **nifa.usda.gov/Extension.** A directory of State Plant Regulatory Officials is available on the National Plant Board website at **www.nationalplantboard.org/membership.**

Spotted lanternfly nymphs are black with white spots in early stages of development and turn red before becoming adults.

Covered and uncovered egg masses

Cluster of adults on the trunk of a tree at night

APHIS 81-35-024
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Invasive Plants in Pennsylvania

Japanese and European barberry

Berberis thunbergii and *B. vulgaris*

Leslie J. Mehrhoff, Univ. of Connecticut

Background:

Japanese barberry was introduced into the United States as an ornamental plant in 1875. It was promoted as a substitute for European barberry, the latter which was found to be a host for the black stem grain rust. European barberry was originally planted by settlers for hedge-rows, dye and jam-making. Japanese barberry is still widely planted for landscaping and hedges.

Range:

Japanese and European barberry, native to Japan and Europe respectively, can now be found throughout the northern half of the U.S., particularly the Northeast.

Description:

Both species are dense, spiny shrubs with oval leaves, which are serrate in European barberry and often red-tinged in Japanese barberry. The spines of European barberry are three-pronged. In mid-spring to early summer, drooping clusters of pale yellow flowers develop, turning into bright red berries.

Leslie J. Mehrhoff, Univ. of Connecticut

Habitat:

Barberry is shade tolerant, drought resistant and adaptable to a variety of wooded habitats, wetlands and disturbed areas. Japanese barberry is a more pressing problem than its European relative.

Biology and Spread:

Barberry produces a large number of seeds that have a high germination rate. Seeds are dispersed by birds and small mammals, which feed on the berries. Barberry can spread vegetatively by rooting from branches touching the ground.

Ecological Threat:

Barberry forms dense stands in natural habitats including forests, open woodlands, wetlands and meadows. Once established, it displaces native plants and reduces wildlife habitat and forage, increasing pressure on natives by white-tailed deer. It has been found to alter the pH and biological activity of soil. Barberry is also a human health hazard, not only because it has sharp spines, but also because it acts as a nursery for deer ticks, which can transmit Lyme disease.

Leslie J. Mehrhoff, Univ. of Connecticut

How to Control this Species:

Physical

Barberry is easy to identify in spring because it is one of the first shrubs to leaf out.

Using thick gloves, small plants can be pulled by hand, while larger plants should be dug up. Be sure to remove the entire root system and to bag and dispose of any plant material, including fallen fruits.

Mowing or cutting is not advisable except to make removal easier.

This plant is sensitive to fire; prescribed burns and weed torches are good options.

Chemical

Systemic herbicides, such as glyphosate and triclopyr, are effective in managing barberry.

Herbicide can be applied as a basal bark or cut stump application. Late summer during fruiting may be the best time to apply herbicide, but early spring applications may avoid non-target impacts.

Large thickets of barberry can be controlled with foliar spray applications. Triclopyr only targets broadleaf species, but glyphosate is non-selective.

B. thunbergii seedling- Deric Case, DCNR - BOF

Look-A-Likes:

American barberry (*Berberis canadensis*), an uncommon plant of open hillside slopes thought to be extirpated from Pennsylvania, could be mistaken for an invasive barberry.

Will Cook, Duke Univ.

Invasive Plants in Pennsylvania

Bull thistle

PA Noxious Weed

Cirsium vulgare (Savi) *Ten.*

Deric Case, DCNR-BOF

Background:

Thought to have been introduced to eastern North America during colonial times and western North America during late 1800s.

Range:

This plant is native to Europe, western Asia and northern Africa. It can now be found on every continent except Antarctica, and it is present in all 50 states in the U.S., although it is not as common in the southern states as it is in the north.

Habitat:

This plant has the ability to become established in a wide variety of areas, especially ones that have been disturbed, like clearcuts, riparian areas and pastures.

Description:

Stems grow up to seven feet tall and have lance shaped, hairy leaves that are three to 12 inches long. There are lobes on each leaf, and they are tipped with stout spines. Flower heads are purple and one to two inches across. They appear from June to September.

Biology and Spread:

Bull thistle reproduces and spreads exclusively by seed. Plants produce 100 to 300 seeds per flower head, with up to 400 flower heads per plant. Seeds exhibit features that are suited for wind dispersal. Roughly 90 percent of seeds land within a distance of 1.5 times the height of the parent plant, however up to 10 percent of seeds produced do travel over 80 feet.

Steve Dewey, Utah State Univ.

Ecological Threat

Bull thistle has the potential to form dense thickets that displace and prevent native vegetation from establishing. The spiny features of the plant also make it unpalatable to wildlife and livestock, reducing forage land available.

How to Control this Species:

Prevention should be the first goal in any control efforts for this plant. Equipment and gear need to be extensively cleaned after use in an infested area, to prevent seed transport. Use of weed-free seed should also be conducted.

Manual removal of plants via hand pulling, tilling and hoeing can be effective, but care should be taken to conduct these measures before flowering, in order to prevent seed production and spread. Slicing off the root crown has proven to be very effective at controlling this plant.

Herbicides are most effective at controlling infestations when incorporated as part of a long-term, multifaceted control effort.

Deric Case, DCNR-BOF

If You Find This Plant

Bull thistle is on the **Pennsylvania Noxious Weed Control List**. It is illegal to sell, transport, plant or otherwise propogate this species. If you believe that you have found a new population of this plant, please contact:

Botany/Weed Specialist
Pennsylvania Dept of Agriculture
Phone 717-787-7204

Invasive Plants in Pennsylvania

Burning Bush

Euonymus alatus

Leslie J. Mehrhoff, UConn
www.forestryimages.org

Background:

Burning bush, also commonly known as winged euonymus, was introduced into the United States in 1860 for use as an ornamental shrub. Its attractive, bright red fall foliage and desirable form has made this shrub a popular ornamental and an easy go-to plant used by landscape designers. As a result, it is commonly planted along interstate highways, as hedges and in foundation plantings.

Range:

Native to northeastern Asia, winged euonymus has escaped throughout the Northeast and Midwestern United States.

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
www.dcnr.state.pa.us

Description:

Burning bush is a fast-growing, deciduous shrub that may reach five to 15 feet in height. Its green stems usually have prominent, corky wings. Elliptic leaves with finely serrated margins are arranged in opposite formation and turn a brilliant purplish-red to scarlet in the fall. Flowers are small and yellowish-green, becoming fruits that split to expose four red-orange seeds in late fall.

Barry Rice, Sarracenia,
James H. Miller, USDA Forest Service
www.forestryimages.org

Habitat:

Winged euonymus quickly escapes into woodlands, mature forests and open fields. It is highly adaptable to a variety of soil types and pH levels, although it generally doesn't do well in dry areas. It is tolerant of full shade.

Biology and Spread:

This shrub is a prodigious seed producer. Many germinate where they fall, close to the mother plant, creating a dense bed of seedlings. Others are carried by birds, allowing infestations to spread rapidly.

Ecological Threat:

Winged euonymus easily outcompetes native plants with its large, dense silhouette. Lacking pests and tolerant of deep shade, this shrub can force itself into moist forested sites, creating large thickets that displace native herbs and shrubs. This displacement has negative consequences for both aquatic and terrestrial ecosystems.

Leslie J. Mehrhoff, UConn
www.forestryimages.org

How to Control this Species:

Physical

Seedlings, up to two feet tall, can be easily hand-pulled, especially when the soil is moist.

Larger plants must be dug out with a spading fork, pulled with a weed wrench, or cut. The stump must be ground out or the re-growth clipped; be sure to remove a majority of the root system.

Chemical

Glyphosate can be applied as a foliar spray or painted on cut stumps.

Look-A-Likes:

Winged euonymous may be confused with other species of euonymous, including our native strawberry bush (*Euonymus americana*). Saplings of native sweetgum (*Liquidambar styraciflua*) also have winged stems.

Karan A. Rawlins, University of Georgia
www.forestryimages.org

Native Alternatives:

A wide variety of native shrubs provide beauty and wildlife value to the landscape, including:

Dow Gardens
www.forestryimages.org

Chris Evans, River to River CWMA
www.forestryimages.org

Rob Routledge, Sault College
www.forestryimages.org

Vern Wilkins
www.forestryimages.org

James Miller & Ted Bodner, SWSS
www.forestryimages.org

References:

Center for Invasive Species and Ecosystem Health: http://www.invasive.org/browse/subinfo.cfm?sub=3023

U.S. National Park Service: http://www.nps.gov/plants/alien/pubs/midatlantic/eual.htm

For More Information:

DCNR Invasive Species Site: http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm

DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers: http://www.dcnr.state.pa.us/forestry/invasivetutorial/winged_euonymus.htm

Invasive Plants in Pennsylvania

Burning Bush

Euonymus alatus

Leslie J. Mehrhoff, UConn
www.forestryimages.org

Background:

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pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
www.dcnr.state.pa.us

Description:

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Barry Rice, Sarracenia,
James H. Miller, USDA Forest Service
www.forestryimages.org

Habitat:

Winged euonymus quickly escapes into woodlands, mature forests and open fields. It is highly adaptable to a variety of soil types and pH levels, although it generally doesn't do well in dry areas. It is tolerant of full shade.

Biology and Spread:

This shrub is a prodigious seed producer. Many germinate where they fall, close to the mother plant, creating a dense bed of seedlings. Others are carried by birds, allowing infestations to spread rapidly.

Ecological Threat:

Winged euonymus easily outcompetes native plants with its large, dense silhouette. Lacking pests and tolerant of deep shade, this shrub can force itself into moist forested sites, creating large thickets that displace native herbs and shrubs. This displacement has negative consequences for both aquatic and terrestrial ecosystems.

Leslie J. Mehrhoff, UConn
www.forestryimages.org

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Seedlings, up to two feet tall, can be easily hand-pulled, especially when the soil is moist.

Larger plants must be dug out with a spading fork, pulled with a weed wrench, or cut. The stump must be ground out or the re-growth clipped; be sure to remove a majority of the root system.

Chemical

Glyphosate can be applied as a foliar spray or painted on cut stumps.

Look-A-Likes:

Winged euonymous may be confused with other species of euonymous, including our native strawberry bush (*Euonymus americana*). Saplings of native sweetgum (*Liquidambar styraciflua*) also have winged stems.

Karan A. Rawlins, University of Georgia
www.forestryimages.org

Native Alternatives:

A wide variety of native shrubs provide beauty and wildlife value to the landscape, including:

Dow Gardens
www.forestryimages.org

Chris Evans, River to River CWMA
www.forestryimages.org

Rob Routledge, Sault College
www.forestryimages.org

Vern Wilkins
www.forestryimages.org

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www.forestryimages.org

References:

Center for Invasive Species and Ecosystem Health: http://www.invasive.org/browse/subinfo.cfm?sub=3023

U.S. National Park Service: http://www.nps.gov/plants/alien/pubs/midatlantic/eual.htm

For More Information:

DCNR Invasive Species Site: http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm

DCNR Invasive Exotic Plant Tutorial for Natural Lands Managers: http://www.dcnr.state.pa.us/forestry/invasivetutorial/winged_euonymus.htm

Invasive Plants in Pennsylvania

Callery or Bradford pear

Pyrus calleryana

Dan Tenaglia, Missouriplants.com

Background:

Callery pear is native to Asia and was brought to Maryland in 1918 as rootstock for cultivated pears. A non-spiny seedling was selected and named "Bradford." This tree became the second most popular tree in America by the 1980s.

Range:

Reports of this tree as invasive in southeast Pennsylvania are starting to surface, but further south in Maryland, Virginia and beyond they have been dealing with this issue for much longer. These trees can also be found throughout the south and Midwest.

Biology and Spread:

The "Bradford" variety of pear was supposed to produce sterile fruits, but more recent cultivars were created to resist splitting by wind and snow. These trees were able to cross pollinate and produced viable seeds that are spread by wildlife. It also spreads vegetatively.

Description:

This ornamental, deciduous tree can grow up to 40 feet in height. The shiny green leaves are alternate, simple and two to three inches long. Their margins are wavy with a slightly-toothed margin.

Chuck Bargeron, Univ. of Georgia

The overall shape of the tree is often described as tear-dropped or spade-like. The bark is scaly and gray-brown in color. Abundant small, malodorous, white flowers appear in spring before the leaves emerge. Fruits are under half an inch in diameter and green to brown in color.

Britt Slattery, US Fish and Wildlife Service

Habitat:

Typically found along roads, rights-of-way and old fields where they have escaped from landscape plantings. Callery pears will tolerate a wide range of soil conditions and pollution. It prefers full sun but will tolerate partial shade.

Ecological Threat:

Naturalized callery pears compete with native early successional trees in old fields and hedgerows.

How to Control this Species:

Manual and Mechanical

Seedlings and shallow-rooted trees can be pulled when soil is moist. Small trees will need to be dug up or pulled out with a Weed Wrench tool to ensure removal of all roots.

If cutting down the tree is not possible, it can be girdled during the spring or summer by cutting through the bark all around the trunk, about six inches above the ground.

Chemical

Cutting the tree, followed by an immediate application of a triclopyr or glyphosate herbicide to the cut stump, is the most practical means of control.

Herbicide can also be applied to a girdled tree if total removal of the tree is not possible.

Invasive Plants in Pennsylvania

Canada thistle

PA Noxious Weed

Cirsium arvense

Brett Pifer, DCNR - BOF

Background:

Canada thistle was probably introduced into the United States by accident in the early 1600s. By 1954, it had been declared a noxious weed in 43 states. It is considered one of the most tenacious and economically important agricultural weeds and is becoming increasingly recognized as a problem in natural areas.

Range:

Despite its name, Canada thistle is native to temperate regions of Eurasia. In North America, it is distributed throughout Canada and the northern United States, from northern California to Maine and south to Virginia.

Description:

Canada thistle is an erect herbaceous perennial with an extensive creeping rootstock. Its leaves are irregularly lobed with spiny, toothed margins. Rose-purple or sometimes white flower heads appear in terminal clusters from June through October. The small seeds have feathery plumes.

Brett Pifer, DCNR - BOF

Habitat:

This plant does best in open and disturbed upland areas, but also invades wet places with fluctuating water levels, such as stream bank meadows. It is commonly found in barrens, glades, meadows, prairies, fields, pastures and waste places.

Biology and Spread:

Canada thistle produces an abundance of feathery seeds, which are quickly dispersed in the wind. The seeds can remain viable in the soil for up to 20 years or more. The fibrous taproot is capable of sending out lateral roots, which sprout shoots at frequent intervals.

Ecological Threat:

Once established in an area, Canada thistle crowds out and replaces native plants, changing the structure and species composition of plant communities and reducing diversity. This thistle outcompetes native plants through shading, competition for soil resources and possibly through the release of toxic allelochemicals.

Deric Case, DCNR-BOF

How to Control this Species:

Because Canada thistle is a perennial and spreads primarily by its root system, the entire plant must be destroyed for effective control.

Control efforts may be more successful when Canada thistle is under environmental stress, such as during droughts and floods, or after a very severe winter.

Canada thistle is stubborn and difficult to remove. Management practices that limit soil disturbance and encourage diverse native plant communities will help prevent establishment of this species.

Physical

For light infestations, black plastic sheeting can be used to smother this thistle. Repeated and frequent pulling or hand-cutting will eventually starve under-ground stems. This should be performed at least three times each season.

Mowing does not kill Canada thistle unless repeated monthly for up to four years. This method is not recommended for natural areas.

Late spring burns, between May and June, are detrimental to this invasive.

Chemical

In areas interspersed with desirable native plants, targeted application of a systemic herbicide, such as glyphosate, works well. For extensive infestations in disturbed areas, a broad application may be more effective. Repeated applications are usually necessary in order to exhaust the seed bank.

Herbicide treatment is best done in late summer or fall when plants are in the rosette stage.

Varying the type of herbicide used will prevent clone colonies from becoming resistant.

Look-A-Likes:

Native species of thistle (*Cirsium* sp.), some of which are rare, could be confused with Canada thistle. Before control is attempted, the thistle species in question should be accurately identified.

Deric Case, DCNR -BOF

If You Find This Plant:

Canada thistle is on the **Pennsylvania Noxious Weed Control List**. It is illegal to sell, transport, plant or otherwise propogate this species. If you believe that you have found a new population of this plant, please contact:
Botany/Weed Specialist Pennsylvania Dept of Agriculture Phone 717-787-7204

Invasive Plants in Pennsylvania

Common buckthorn

Rhamnus cathartica

John M. Randall, The Nature Conservancy

Background:

Common buckthorn was introduced into North America as an ornamental shrub in the mid 1800s. Prized for its hardiness and ability to thrive in a variety of soil and light conditions, common buckthorn was planted extensively for use in hedges, farm shelter belts and wildlife habitat. It is no longer available for purchase.

Range:

Native to Eurasia, common buckthorn can now be found throughout the Northeast and North-central regions of the United States.

Description:

Common buckthorn is a dioecious shrub or small tree growing up to 22 feet high. Twigs are often tipped with a spine. Cutting the stems reveals distinctive yellow sapwood (bottom photo) and pink to orange heartwood. The glossy, dark green leaves remain late into fall, and are broadly oval with up-curved veins and toothed margins. In spring, dense clusters of yellow-green flowers emerge from stems near the bases of leaf stalks. Small black fruits appear in fall.

Paul Wray, Iowa State Univ.

Habitat:

Common buckthorn prefers light shade, but is tolerant of many conditions, including full shade. It often invades upland sites, such as open oak woodlands, tree fall gaps and woods edges. It may also be found in prairies and open fields.

Biology and Spread:

The plentiful fruit, which produce a laxative effect, are eaten by birds and small mammals, allowing for long-range dispersal. Most of the fruit falls directly beneath the parent, creating a dense understory of seedlings characteristic of buckthorn stands.

Ecological Threat:

Common buckthorn forms dense, even-aged thickets, which crowd out native shrubs and herbs and prevent woody plant regeneration. When open woodlands, savannas and prairies are invaded, fire is suppressed, changing the disturbance regimes of these ecosystems. Invasive shrubs like common buckthorn are population sinks for nesting songbirds due to higher predation rates. Common buckthorn is also an alternate host of oat crown rust, which lowers oat yield and quality.

John M. Randall, The Nature Conservancy

How to Control this Species:

Physical

Seedlings less than three feet tall can usually be pulled by hand. Saplings can be removed with a weed wrench, but individuals with a large base diameter are best dealt with by cutting. The resulting stump should be dug out or treated with herbicide. Girdling is also effective.

If enough fuel is present, prescribed burns have a large impact on seedlings and the current year's seeds.

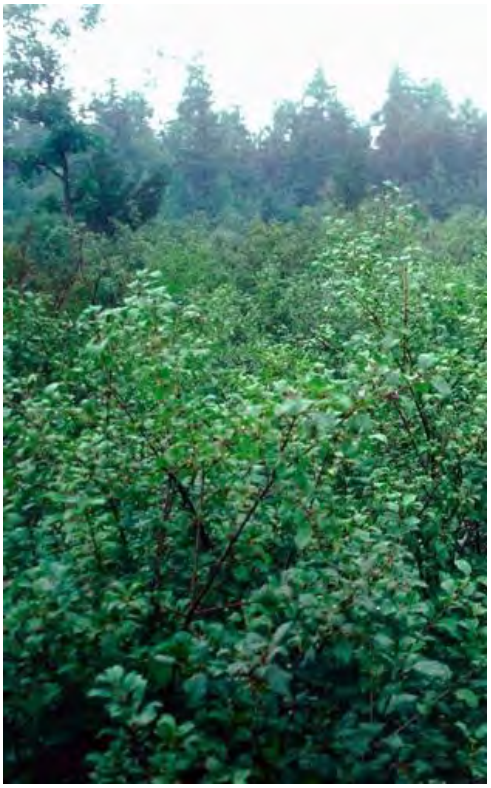
Be sure to remove and dispose of any ripened fruit from the restoration site.

Chemical

Herbicide applications may be done early in the season just after the trees have leafed out, but those conducted in the fall or early winter appear to be most effective.

Use a systemic herbicide, such as glyphosate, in order to destroy the root system.

Brush applications on recently cut stumps, in addition to the basal bark method, often achieve good results.



John M. Randall, The Nature Conservancy

Look-A-Likes:

Common buckthorn may be confused with native buckthorns (*Rhamnus* spp.) and cherries (*Prunus* spp.).

Brett Pifer, DCNR - BOF

Invasive Plants in Pennsylvania

Crown-vetch

Coronilla varia

Deric Case, DCNR - BOF

Background:

Crown-vetch was introduced throughout North America in the 1950s for erosion control, particularly along roadways. It is still being sold and used in many states that have not officially declared it to be invasive.

Range:

Crown-vetch is native to Europe, Asia and Africa. Since its introduction to the U.S., it has spread throughout the country.

Chris Evans, River to River CWMA

Habitat:

Crown-vetch prefers disturbed, open areas, especially with gravelly or sandy soils. Openings and disturbed areas such as fields, waste areas, roadsides and embankments are perfect habitats for this species.

Description:

Crown-vetch is an herbaceous vine that usually forms sprawling mats or thickets up to three feet tall. The leaves are alternate and pinnately compound, with 15 to 25 pairs of leaflets. The pea-like flowers range in color from white to pink or purple, and bloom during the summer. It has a branched, fibrous root system.

Deric Case, DCNR - BOF

Biology and Spread:

Crown-vetch spreads through both seeds and rhizomes. The rhizomes can extend up to 10 feet, and an individual plant can cover 70 to 100 square feet within four years.

Ecological Threat:

Crown-vetch's main impact is the displacement of native plant species from their habitats. Although it can provide forage for some species, it prevents native flowers and shrubs from establishing in open areas. This, in turn, can be detrimental to native animals and insects which rely upon those native plants or the conditions they provide for food or shelter.

How to Control this Species:

Crown-vetch can be controlled with a variety of methods, although some may prove more successful than others.

Manual control can be effective on younger or smaller populations. This can include pulling entire plants (making sure to include as much of the rhizomatous roots as possible). Mowing is another potential method of controlling crown vetch. The mowing should occur in late spring and then multiple times through the growing season, for several consecutive years.

Prescribed burning can also be effective when conducted in late spring and for several consecutive years.

For areas where crown vetch has established large, dense populations, chemical controls can be used. Glyphosate, triclopyr and metsulfuron were shown in experiments to be effective at treating crown vetch. Herbicides can also be used after removing the aerial portion of the plant by mechanical means, which may improve results.

Look-A-Likes:

Many plants in the pea family, like the native American vetch (Vicia americana) - **shown below** - can look similar to crown-vetch, so be sure to positively identify this species prior to controlling it.

Dave Powell, USDA Forest Service

Invasive Plants in Pennsylvania

Russian and Autumn olive

Elaeagnus angustifolia and *E. umbellata*

James H. Miller, USDA Forest Service

Background:

Both Russian and autumn olive were introduced into the United States in the 1800s. Prized for their silvery foliage, hardiness and plentiful berries, these shrubs were planted as ornamentals, for erosion control and wind-breaks, and in wildlife food plots.

Range:

Russian olive, native to Eurasia, can be found scattered throughout the eastern U.S. and is a problem further west. Native to east Asia, autumn olive has naturalized extensively throughout the eastern half of the United States. Autumn olive is the more common of the two species in Pennsylvania.

Description:

Russian and autumn olive are large, multi-stemmed shrubs that can reach upwards of 20 feet in height. Their most distinctive characteristic is a dusting of silvery scales covering young stems, leaves, flowers and fruit. Small yellow or white flowers become edible fruits in late summer and fall, which are red in autumn olive and orange in Russian olive.

Leslie J. Mehrhoff, Univ. of Connecticut

Habitat:

Both species are found along streams, fields, roadsides, sparse woodlands, disturbed sites and open areas. Russian olive does particularly well in sandy floodplains. Neither species does well in densely forested areas.

Biology and Spread:

Both species are spread by birds and other wildlife that feed on the fruit. These shrubs grow rapidly and are able to produce fruit as early as three years of age.

Ecological Threat:

These shrubs are highly competitive against native species, shading out shorter plants. Their nitrogen-fixing capabilities may adversely affect the nitrogen cycle of native communities that depend on infertile soils. Although Russian and autumn olive provide a plentiful source of berries for birds, their fruits are actually quite low in nutrients. Ecologists have found that bird species richness is higher in riparian areas dominated by native vegetation.

Kelly Sitch, DCNR -BOF

How to Control this Species:

Physical

Young seedlings can be pulled by hand when the soil is moist enough to ensure complete removal of the root system.

Small saplings can be pulled sufficiently with a weed wrench. Larger individuals can be cut at ground level or girdled.

Cutting is an initial control measure and should be followed by herbicide treatment to prevent re-sprouting.

Chemical

Use a systemic herbicide, such as triclopyr. Glyphosate is not an effective chemical to control Russian and autumn olive.

Herbicide should be applied immediately to cut stumps to prevent regeneration. It can also be applied to girdle wounds or directly to the lower bark using the basal bark method.

E. umbellata flowering: Deric Case, DCNR - BOF

Look-A-Likes:

Russian and autumn olive may be confused with invasive bush-honeysuckles (*Lonicera* spp.) or native deciduous hollies (*Ilex* spp.)

The Dow Gardens Archive

Invasive Plants in Pennsylvania

English ivy

Hedera helix

Chuck Bargeron, Univ. of Georgia

Background:

English ivy was probably first introduced into the United States by early European settlers for ornamental purposes. It continues to be a popular groundcover and vine due to its fast-growing, evergreen, pest-free and cold-hardy nature.

Range:

English ivy is native to Europe, western Asia and northern Africa. In the United States, it is now established mainly in the east, south and along the West Coast.

Description:

English ivy is an evergreen climbing vine with waxy, dark green leaves and conspicuous white veins. It attaches to surfaces by aerial rootlets. In sufficient light, terminal clusters of yellow-green flowers are produced in the fall. The black-purple fruits persist through the winter if not eaten by wildlife.

Forest & Kim Starr, Starr Environmental

Habitat:

This invasive vine infests woodlands, forest edges, fields, hedgerows and coastal areas; however, it does not grow well in extremely wet locations. It tolerates a wide range of soil pH, but prefers slightly acid soils. It is often associated with habitat disturbances and old home sites.

Biology and Spread:

Frugivorous birds are important seed dispersers of English ivy, transporting the vine to new areas over long distances. This vine also spreads through vegetative growth and can form new plants via broken pieces of stem that manage to root in the soil.

Ecological Threat:

Both a climbing vine and a groundcover, English ivy impacts all structural levels of ecosystems. As it climbs trees in search of light, it kills branches by covering leaves and preventing photosynthesis. Its sheer weight makes trees susceptible to blow-over during inclement weather. On the ground, it forms dense monocultures that exclude native plants. English ivy is also a reservoir for Bacterial Leaf Scorch (*Xylella fastidiosa*), a threat to native trees.

David J. Moorhead, Univ. of Georgia

How to Control this Species:

Physical

Vines growing as a ground-cover can be pulled by hand, but not without difficulty. Another option is mulching, where the infestation is smothered under several inches of biodegradable plant material, such as wood chips. The mulch needs to stay in place for at least two growing seasons. Climbing vines may be severed near the ground in order to kill upper portions. Damage to the host tree's bark should be minimized if possible. Rooted portions of climbing vines should be pulled or treated with herbicide.

Chemical

A 25 percent solution of triclopyr or glyphosate mixed in water can be applied to freshly cut stumps. Products like Brush-B-Gone®, Brush Killer®, and Roundup Pro® Concentrate are effective. Alternatively, a 20 percent solution of triclopyr ester (Garlon® 4) mixed in basal oil may be applied to intact vine stems. Garlon 4 may also be applied to wet leaves. Herbicide applications can be made at any time of the year as long as temperatures are above 60° Fahrenheit and rain is not expected within 24 hours. Garlon 4 is very toxic to aquatic life and should not be used near water sources.

Look-A-Likes:

English ivy is sometimes confused with eastern poison-ivy (*Toxicodendron radicans*), especially in the winter, because both are robust vines with obvious aerial rootlets.

Poison-ivy

Charles T. Bryson, USDA ARS

Invasive Plants in Pennsylvania

Garlic mustard

Alliaria petiolata

Deric Case, DCNR -BOF

Habitat:

This invasive is frequently found in moist, shaded soil of river floodplains, forests, edges and openings, especially in disturbed areas. Garlic mustard is associated with calcareous soils and does not tolerate high acidity.

Background:

Garlic mustard was likely introduced into the United States by early European settlers for culinary or medicinal purposes. It was first recorded in Long Island, New York in 1868.

Description:

Garlic mustard is a cool season biennial herb with triangular to heart-shaped leaves. Leaves give off an odor of garlic when crushed. First-year plants appear as a rosette of leaves that remain green through winter, maturing the following spring. Button-like clusters of white flowers give way to erect, slender pods by May. Dead stalks of dry, brown seedpods hold viable seed throughout the summer.

Deric Case, DCNR - BOF

Deric Case, DCNR - BOF

Biology and Spread:

Garlic mustard plants develop rapidly, each individual producing thousands of seeds that scatter nearby. Because white-tailed deer find garlic mustard distasteful, they further its expansion by eliminating native competition, as well as by exposing the soil and seedbed through trampling.

Ecological Threat:

Highly shade-tolerant, garlic mustard is capable of invading high-quality, mature forests. To the detriment of spring ephemeral wildflowers, garlic mustard quickly forms monocultures by monopolizing resources. Its allelopathic compounds inhibit seed germination of other species.

Toothwort (*Dentaria* sp.), the host plant of the rare West Virginia white butterfly (*Pieris virginiensis*), is one of the spring ephemerals outcompeted by garlic mustard. The butterfly is drawn to lay its eggs on garlic mustard, a fatal mistake for its offspring. Garlic mustard may also disrupt the mutualistic relationship between native trees and mycorrhizal fungi.

How to Control this Species:

Physical

Because garlic mustard seeds can remain viable in the soil for five years or more, effective management is a long-term commitment. The goal of management is to prevent further seed production and to nip pioneering colonies in the bud.

For small infestations, hand-pulling is extremely effective. Larger infestations may be controlled by cutting. This should be done when the plant is in flower. All plant material should be removed from the site following treatment, since seeds can still develop on cut stems.

Chemical

For heavy infestations, where the risk to non-target species is minimal, the systemic herbicide glyphosate may be useful.

Herbicide can be applied at any time of the year, including winter (to kill overwintering rosettes) as long as the temperature remains above 50° Fahrenheit, and rain is not expected for at least 8 hours.

Chemical control is best done in late fall when most native plants are dormant.

Prevention

Infestations may be prevented by monitoring and removing pioneering plants. Disturbances, such as foot traffic, overgrazing and erosion, should be minimized.

A regular burning regime in fire-adapted oak woodlands can also prevent infestations.

Deric Case, DCNR - BOF

photo right: garlic mustard seedling

Look-A-Likes:

Many native white-flowered plants occur alongside garlic mustard, and may be mistaken for it. These include tooth-worts, sweet cicely (*Osmorhiza claytonia*) and early saxifrage (*Saxifraga virginica*).

Brett Pifer, DCNR -BOF

photo above: early rosettes of Alliaria petiolata

Brett Pifer, DCNR - BOF

Invasive Plants in Pennsylvania

Shrub honeysuckles

(Amur, Morrow's, Bell's, Standish, and Tartarian)

Lonicera maackii, L. morrowii, L. x bella, L. standishii, and *L. tatarica*

Chuck Bargeron, Univ. of Georgia

Background:

Shrub or bush honeysuckles were introduced to North America for use in landscaping, erosion control and wildlife cover.

Range:

The non-native bush honeysuckles are native to eastern Asia, Europe and Japan. Currently, they can be found in a variety of habitats from the Great Plains to southern New England, and south to Tennessee.

Habitat:

Non-native bush honeysuckles are relatively shade-intolerant, and often occur in disturbed woods or edges, roadsides and abandoned fields. Morrow's and Bell's honeysuckles are capable of invading bogs, fens, lakeshores and sandplains.

Description:

Non-native bush honeysuckles grow to heights of six to 20 feet. Their stems are thornless with a hollow brown pith. Their leaves are opposite and egg-shaped. Their flowers, which bloom from May to June, are fragrant, tubular and less than an inch long. They range in color from white to yellow to pink to red. The berries are small and red or yellow.

Brett Pifer, DCNR - BOF

Biology and Spread:

Nonnative bush honeysuckles produce large numbers of small fruits, particularly when growing in open sunlight. These are eaten by birds, which then spread the seeds in their droppings. Once a population establishes, vegetative sprouting continues the spread of these plants.

Brett Pifer, DCNR - BOF

Ecological Threat:

These invasive species compete with native plants for sunlight, moisture and pollinators. And while birds eat the fruit, it is poorer in fats and nutrients than fruits from native plants, so the birds do not get enough nutrients to help sustain long flights during migrations.

Leslie J. Merhoff, Univ. of Connecticut

How to Control this Species:

The two main methods of controlling nonnative bush honeysuckles are mechanical and chemical. Smaller populations can be removed by hand, making sure to include the roots. Larger populations should be cut to ground level at least once per year, in either early spring or late fall.

Glyphosate can be sprayed onto the leaves, or could also be applied to cut stems in order to kill the root system.

No biological controls are known that would target solely nonnative bush honeysuckle species. In open areas, prescribed fire may help to eradicate this species. In order to optimize this approach, however, the burn should be conducted prior to late summer in order to prevent seed dispersal.

Look-A-Likes:

Native bush honeysuckles exist throughout North America. The natives generally have solid stems, as opposed to the hollow pith of the invasive ones. Be very cautious when buying so-called "native" honeysuckles from a nursery or online.

PA Native : Bush-honeysuckle (*Diervilla lonicera)*

Brett Pifer, DCNR - BOF

Deric Case, DCNR Bureau of Forestry

Brett Pifer, DCNR - BOF

Brett Pifer, DCNR - BOF

Invasive Plants in Pennsylvania

Japanese honeysuckle

Lonicera japonica Thunb.

Deric Case, DCNR - BOF

Background:

Also known as Chinese honeysuckle, this Asian plant was first introduced into Long Island, NY in 1806. It has been planted as an ornamental, for wildlife habitat and for erosion control, especially on farms.

Range:

Japanese honeysuckle is very common on the eastern third of the U.S. from Southern Maine to Florida. Isolated patches can also be found from Texas west to California, in Washington state and Hawaii.

Brett Pifer, DCNR - BOF

Habitat:

This vine can be found in a variety of habitats including forests, wetlands and disturbed habitats like farm fence rows, roadsides and rights-of-way.

Biology and Spread:

This vine spreads both vegetatively through runners and roots as well as by seeds within the black fruits. Birds and other wildlife readily consume the fruits.

Ecological Threat:

The vines can girdle and kill small saplings and form dense mats in tree canopies, shading native vegetation below.

Regardless of the chosen control method, repeated monitoring and sprout removal may be necessary.

Description:

This evergreen to semi-evergreen woody vine can grow up to 80 feet in length. It has opposite leaves that are typically oval in shape, although the leaves close to the ground may be lobed (*see photo right*). Fragrant white to yellow flowers appear from the leaf axils between April and July. Small, shiny black fruits develop in the fall.

Brett Pifer, DCNR - BOF

Charles Bryson, USDA, www.invasive.org

How to Control this Species:

Manual and Mechanical

For small patches, repeated pulling of entire vine and root system may be effective, especially when the soil is moist. Mowing is NOT recommended, as it stimulates growth and leads to denser mats of vegetation.

Prescribed burning will remove the above-ground growth but will not kill the rhizomes, leading to re-sprouts. Grazing by goats has been used in the past but has a similar effect as mowing does, increasing the chance of root sprouts.

Chemical

There are several systemic herbicides that will work on Japanese honeysuckle including glyphosate and triclopyr. Apply a two percent glyphosate or triclopyr and water mix to the vine's leaves from spring through fall (fall is best). A 25 percent solution of herbicide and water can be applied using the cut stump method.

Invasive Plants in Pennsylvania

Japanese stiltgrass

Microstegium vimineum

James H. Miller, USDA Forest Service

Background:

Japanese stiltgrass was first documented in Tennessee in 1919. Its introduction into the United States was accidental, likely a result of its use as a packing material for porcelain.

Range:

Native to Asia, this successful invasive has colonized most of the eastern United States, as far west as Texas.

Habitat:

Japanese stiltgrass occurs in a variety of habitats, including moist ground of open woods, floodplain forests, wetlands, uplands, fields, thickets, road-sides, and ditches. It readily invades areas subject to regular disturbance. Stilt grass appears to prefer moist, acidic to neutral soils that are high in nitrogen.

Description:

Japanese stiltgrass is an annual that typically grows one to three feet in height. Despite its branching, sprawling, mat-like manner, it resembles a small, delicate bamboo. Leaves are narrow and lance-shaped with a distinctive, pale, silvery stripe of reflective hairs on the upper surface. Flower spikes appear in September.

James H. Miller & Ted Bodner, SWSS

Biology and Spread:

Stiltgrass reproduces exclusively by seed. One plant may produce 100 to 1,000 seeds that typically fall close to the parent plant. Seeds may be carried by water during heavy rains or move about in contaminated hay, soil or mud stuck in footwear. Stilt grass seeds remain viable in the soil for five or more years and germinate readily.

Ecological Threat:

When Japanese stiltgrass invades a site, it can quickly crowd out native plant species. Invasions can also change soil nutrient cycling processes, inhibit tree survival and growth, and reduce light availability. After it dies back in late fall, it forms a thick layer of smothering thatch that is slow to decompose. Because stilt grass is relatively unpalatable, it may encourage heavier deer browsing on native plant species.

Deric Case, DCNR - BOF

How to Control this Species:

Physical

Japanese stiltgrass is quite shallow-rooted and can be easily pulled by hand, especially when the soil is moist. Pulling is easiest in late summer when plants are mature. Stilt grass can also be mowed. Follow up monitoring and treatment will be necessary for years.

Hand pulling and mowing should be done in late summer when the plants are just about to flower. Performing these activities earlier in the summer months encourages flowering and early seed dispersal.

Chemical

For extensive infestations, a systemic herbicide can be used quite effectively. Using an herbicide leaves the plants and soil in place, minimizing the likelihood of additional germination of stilt grass seed.

Grass-specific herbicides, such as quizalofop, limit damage to native plants.

Be careful when treating stiltgrass in wetland sites. Make sure you use an herbicide suitable for wetlands.

Look-A-Likes:

The native perennial Virginia cutgrass (*Leersia virginica*) is quite similar. Japanese stilt- grass may also be confused with some smartweeds (*Persicaria* spp.).

Leslie Mehrhoff, Univ. of Connecticut

Kelly Sitch, DCNR - BOF

Brett Pifer, DCNR - BOF

Left photo: Example of the persistence of the previous year's growth is shown. This is a good winter indicator.

Right photo: New growth in spring denoted by **yellow arrows**. Previous year's growth, which is also a good way to locate this plant, is marked by **red arrows**.

Deric Case, DCNR - BOF

Invasive Plants in Pennsylvania

Japanese and giant knotweed

Fallopia japonica Sieb. & Zucc. and
Fallopia sachalinensis F. Schmidt ex Maxim.

Leslie Mehrhoff, Univ. of Connecticut

Background:

Both species of knotweed were introduced into North America for ornamental use and for forage and erosion control in the late 1800s.

Range:

Both Japanese and giant knotweed come from Japan. They can be found throughout much of the United States and Canada, as well as Europe.

Habitat:

These plants are found at sites with varying combinations of sun, moist soil and human disturbance, such as stream and river banks, wet meadows, roadsides, railroad and utility rights-of-way, vacant lots and waste places.

Brett Pifer - DCNR BOF

Description:

Both are annual, herbaceous perennials with erect, hollow stems that are light green, smooth, jointed and swollen at the nodes (resembling bamboo).

Early in the season, new shoots can grow three to four inches per day.

Knotweed grows three to 12 feet tall. The two species are known to hybridize, so ID can some-times be difficult. The shape of the leaf base is the best characteristic—Japanese knotweed leaves are squared-off, giant knotweed's are heart -shaped.

The plant's greenish white flowers are functionally unisexual, grow approximately four inches in length and appear from August to October. The fruits are papery and contain a three-sided shiny, brown seed.

Biology and Spread:

Knotweeds spread primarily by rhizomes. The rhizomes can be dispersed by natural causes, such as flooding and erosion, and also by man-made disturbances to the soil. Cut or broken stems will also root if left on moist soil or put directly into water. It produces only small amounts of viable seed that are dispersed mainly by gravity, wind and water.

Kelly Sitch, DCNR - BOF

Ecological Threat:

Knotweeds are capable of quickly forming dense stands where they can crowd out native vegetation. Thickets can clog small waterways and displace streamside vegetation, increasing bank erosion and lowering the quality of riparian habitat for fish and wildlife. Once established, these stands are very difficult to eradicate.

How to Control this Species:

The key to successful knotweed mgmt. is controlling the rhizomes.

Manual and Mechanical Mechanical methods alone are largely ineffective. It may be possible to grub or pull single plants if they are not well established and soil conditions allow for complete rhizome removal. Small portions of the rhizome system not removed have the potential to resprout.

The herbaceous stems of knotweed can be cut or mowed quite easily. Cutting alone will not control the plant but when performed after June 1 will significantly reduce the height of the regrowth.

Chemical

Several herbicides, such as glyphosate, are effective in controlling this species. If the plants grow in a wetland, be sure to use an aquatic approved herbicide. Check label directions and state requirements.

Foliar herbicide applications made after July 1 and before the first killing frost are most effective at injuring the rhizomes. During this time of year carbohydrates produced in the leaves are moved to the rhizomes for growth and storage. Foliar applied herbicides move through the plant with the carbohydrates.

Japanese knotweed (*Polygonum cuspidatum*)

Japanese knotweed in flower (Photo by Kelly Sitch, DCNR - BOF).

Japanese knotweed sprouts early in growing season

Japanese knotweed (*Polygonum cuspidatum*)

Previous year's Japanese knotweed stems in winter & early spring.

Japanese knotweed Treatment Guidance

Small populations of knotweed (1-5 plants) can be considered for digging and hand removal. Be advised that the taproots of knotweed are very extensive and often branch, exercise caution while digging these plants. Consider an herbicide application to the roots if they break off when pulling or become difficult to remove.

The most effective means to treat knotweed is to cut the plants and treat with glyphosate eight weeks later. Typically this cutting occurs in late May or June and treatment is conducted eight weeks following cutting, this helps to reduce root/rhizomes reserves prior to spraying.

If there is no mowing or cutting, treatments should take place after July 1st and end by mid-September, this should be a high volume application. Depending on the glyphosate formulation, a surfactant may be necessary (Glyphomate 41 does not need an additional surfactant).

Invasive Plants in Pennsylvania

Mile-a-minute

PA Noxious Weed

Persicaria perfoliata

Brett Pifer, DCNR - BOF

Background:

Also known as devil's tear-thumb, mile-a-minute has been introduced into the U.S. from the Philippines several times between the late 1800s and the 1930s. It arrived in Pennsylvania in contaminated nursery stock in York.

Range:

A native of eastern Asia, this vine is not yet widespread in the U.S. but is very common is the southern two-thirds of Pennsylvania, as well as parts of WV, VA, MD, DE, NJ, NY, CT, MA, RI and NH.

Brett Pifer, DCNR-BOF

Description:

This is an herbaceous, annual vine with delicate, highly branched stems that are covered by small, curved spines. The **alternate leaves are triangular, light green, one to three inches wide and barbed on the underside**. Round leaf-like structures called ocreae surround the stem. It is from there that the inconspicuous flowers and fruits arise. From mid-July though the first frost, **green fruits appear, turning a metallic blue color** as the season goes on.

Habitat:

This plant readily colonizes disturbed areas along forest edges, wetlands, stream banks and roadsides. It needs regular sunlight to thrive and prefers high soil moisture.

If You Find This Plant

Mile-a-minute is on the Federal and PA Noxious Weed List. It is a violation of the Noxious Weed Control Law to sell, transport, plant or otherwise propagate a listed species, like mile-a-minute, within the Commonwealth. If you believe that you have found a new population of this plant, please contact:
Botany/Weed Specialist
Pennsylvania Dept of Agriculture
Phone: 717-787-7204

Biology and Spread:

Its fast growth is one way that the plant spreads, but its seeds are the primary means. Birds and other wildlife eat the fruits and spread the seeds in their droppings. Seeds are also buoyant for up to nine days in water and can be spread by streams and floods.

Ecological Threat:

Because this plant can grow up to six inches a day, it can quickly smother native vegetation and climb into the tree canopy where it restricts light availability to plants below. It can be a pest plant on tree farms and for horticultural crops where the soil is not regularly tilled.

Look-a-Likes:

There are several other vines with triangular-shaped leaves that may be confused with mile-a-minute, including halbard-leaved tearthumb (Polygonum arifolium), climbing false buckwheat (Polygonum scandens), wild morning glory (Ipomoeae pupurea) and hedge bindweed (Calystegia sepium). The presence of spines and ocreae will let you know that it is indeed mile-a-minute.

D. Case, DCNR - BOF

How to Control this Species:

Manual and Mechanical
Hand-pulling of vines is possible, especially when the soil is wet, but be sure to wear thick gloves. Removal should be done prior to fruit formation. Repeated mowing will prevent the plant from flowering and thus reduce or eliminate fruit and seed production. Monitor the site for several years to ensure no seeds germinate.

Chemical
A systemic herbicide like glyphosate will work on mile-a-mine, especially when used with a surfactant that will help to penetrate the leaves' waxy coating. Apply the herbicide in the summer, before fruits appear.

Biocontrol
A weevil, *Rhinocominus latipes*, is being used on various test plots in Pennsylvania and elsewhere to control mile-a-minute. These small insects feed on the leaves and bore into the stems. While they will not completely eliminate the plant they help keep it in check and reduce fruit production.

Photos by Luke Ulsamer, DCNR - BOF

MAM growing out of silt sock

Mile-a-minute early growth (late May – early June)

Mile-a-minute (Persicaria perfoliata)

Leslie Mehrhoff, Univ. of Connecticut

Mile-a-minute late season (late September-early October)

Mile-a-minute weevils

Mile-a-minute (Persicaria perfoliata)

Mile-a-minute cotyledons and first leaves (late May – early June)

Mile-a-minute Treatment Guidance

Large populations of this species are best controlled with pre-emergent application, such as Oust, during March or April. Be advised that any pre-emergent applications will likely effect non-target species in the application area.

For very small populations, hand pulling and digging may be effective. Small plants pull out by the roots easily early in the growing season. As the season progresses and plants become larger, root material can be more difficult to remove completely. Due to barbs on mature plants, gloves are recommended for pulling plants. Plants can be pulled until fruits mature (begin to turn blue).

Both tricolpyr (Garlon 3A) and glyphosate (Glyphomate 41) can be used as a foliar application during the growing season. A surfactant should be used as well. Garlon 3A targets only broadleaf plants, which may be more desirable if mile-a-minute is growing with other non-target species. The extent of the population should be flagged and considered for pre-emergent treatment the following growing season.

Mile-a-minute weevils also provide control of large mile-a-minute populations where herbicides may not be practical. Field trials indicate that the weevils take several years to control large populations

Invasive Plants in Pennsylvania

Mimosa

Albizia julibrissin Durazz.

Kelly Sitch, DCNR - BOF

Background:

Introduced to the United States from China in 1745 and grown as an ornamental tree since then.

How to Control this Species:

Planting of this species should be avoided and existing trees removed when possible, with care taken not to spread the seeds of the tree during its removal.

If cut, the stump will need to be treated with herbicide to prevent re-sprouting. Larger trees may be girdled, as an alternative to herbicides. Young seedlings may be controlled through pulling, but care must be taken to ensure that the entire root system is removed, in order to prevent re-sprouting of remaining root fragments.

Range:

Found in most states in the Northeast and southern United States.

Description:

A deciduous tree typically growing 10 to 50 feet high. Leaves are alternately arranged and bipinnately compound, resembling ferns (typically five to eight inches in length). Flowering occurs from May to July with flowers that are fragrant, pink and approximately one to two inches long. Fruit is a flat, six-inch long straw-colored pod.

James Allison, Georgia DNR, www.invasive.org

Habitat:

This species is adaptable to a wide range of soil types. Habitat can range from vacant lots, road sides and other disturbed habitats, to stream banks.

Kelly Sitch, DCNR - BOF

Biology and Spread:

Mimosa reproduces vegetatively and by seed. Seeds can sprout in close proximity to the parent plant or spread longer distances by water or wildlife. Vegetative reproduction occurs through sprouting that occurs as a response to cutting.

Kelly Sitch, DCNR - BOF

Ecological Threat:

Mimosa is highly competitive in disturbed areas due to high seed production and sprouting ability. Mimosa has the potential to create dense stands that shade out other vegetation on-site.

Kelly Sitch, DCNR - BOF

Invasive Plants in Pennsylvania

Multiflora rose

Rosa multiflora

PA Noxious Weed

Deric Case, DCNR - BOF

Background:

Multiflora rose was introduced into the United States as ornamental rootstock from Japan in 1866. Beginning in the 1930s, the U.S. Soil Conservation Service promoted it for use in erosion control and livestock fencing. It was also encouraged in wildlife plantings and as a crash barrier along highways. Recognition of its tenacious and unstoppable growth habitat came too late, and it is now considered a noxious weed in many states.

Range:

Native to Asia, multiflora rose now occurs throughout most of the United States, especially the eastern half.

Deric Case, DCNR - BOF

Description:

Multiflora rose is a dense, thorny shrub, reaching up to 15 feet in height, with arching canes (stems) that are capable of rambling up trees. Its leaves are pinnately compound, divided into seven to nine leaflets, and finely serrate. Clusters of fragrant white to pink flowers appear in May or June. Small bright red hips (fruit) develop during the summer and remain on the plant through winter.

James H. Miller, USDA Forest Service

Habitat:

This invasive shrub has a wide tolerance for various soil, moisture and light conditions. It can be found in dense woods, along stream banks and roadsides, and in open fields and prairies.

Biology and Spread:

It is estimated that a single plant may produce a million seeds per year, which may remain viable in the soil for up to 20 years. The hips are readily eaten by birds, which are the primary seed dispersers. New plants can also be formed by rooting from the tips of canes touching the ground.

Ecological Threat:

Multiflora rose forms impenetrable thickets that exclude native plant species. This shrub grows very prolifically in riparian areas, where its inedible leaf litter can change the composition of the aquatic macroinvertebrate community. Its occasional habitat of climbing can weigh down trees, making them susceptible to breakage.

Deric Case, DCNR - BOF

How to Control this Species:

Physical

Frequent cutting or mowing, three to six times per growing season, for two to four years, is effective in achieving high mortality. Be careful—the strong thorns have been known to puncture rubber tires.

Scattered populations may be eliminated by complete removal of the plants. Be sure to remove all root material because this shrub readily re-sprouts.

In areas where multiflora rose is detected early, prescribed fire may limit its establishment.

Chemical

Application of herbicides, such as glyphosate or triclopyr, on freshly cut stems is an effective control method since it destroys the root system and prevents re-sprouting. This may be done during the dormant period, which reduces the likelihood of damaging desirable species.

A foliar spray of fosamine can be used from July through September, but die-back will not be apparent until the following summer. Fosamine will only affect woody species.

Biological

Biological control is currently under investigation. Rose-rosette disease, a native viral pathogen, is spread by a mite, and is slowly spreading eastward from the west. The European rose chalcid, a seed-infesting wasp, promises to reduce seed viability. Unfortunately, both of these measures have the potential to impact native rose species.

If You Find This Plant:

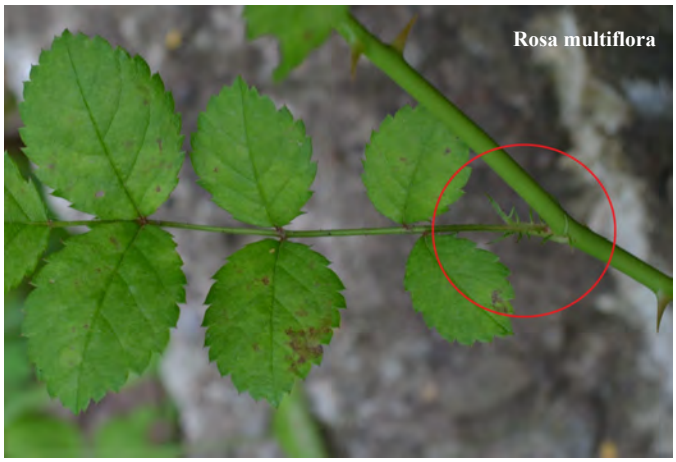
Multiflora rose is on the Pennsylvania Noxious Weed Control List. It is illegal to sell, transport, plant or otherwise propogate this species. If you believe that you have found a new population of this plant, please contact:
Botany/Weed Specialist
Pennsylvania Dept of Agriculture
Phone 717-787-7204

Look-A-Likes:

Multiflora rose could easily be confused with other rose species (both native and non-native), especially when not in bloom. This is a concern, since some native species are of conservation interest.

PA native rose species: Rosa virginiana

Brett Pifer, DCNR - BOF



Multiflora rose has stipules that are conspicuously fringed (as shown in the photo to the left).

photos to the left by: Brett Pifer, DCNR - BOF

PA native rose species have stipules with entire margins or with sessile or stipitate glands, but are <u>not</u> fringed (as shown in the picure to the left).

Invasive Plants in Pennsylvania

Norway maple

Acer platanoides

Leslie Mehrhoff, Univ. of Connecticut

Background:

Norway maple was originally introduced into North America by John Bartram of Philadelphia, who received seedlings from London in 1756. Bartram began offering this plant to nurseries and Norway maple subsequently became a popular tree for city plantings. This species is naturalized throughout the state, but is more common in the southern half.

Range:

Norway maple is the most widespread maple in Europe where it occurs from Norway and Sweden to Turkey and northern Iran. Norway maples are widely planted in the U.S., from the Canadian border south to the Carolinas.

Biology and Spread:

Norway maple reproduces by seed, which each tree produces in large amounts. The winged fruits are spread by the wind. The seeds germinate readily, even in dense shade, and grow quickly when young.

Description:

Norway maple is a large, deciduous tree with a broad, rounded crown. It can readily be distinguished from other maples because the leaves and twigs ooze milky sap when cut or torn; however, this may be difficult to detect late in the season. This species grows up to 65 feet in height with up to a seven foot trunk diameter. Norway maple leaves are dark green and are about six inches wide and five inches long, with five to seven lobes. The bark is smooth and gray-brown, twigs are stout, brown with green buds with over-lapping bud scales (*see photo on right*).

Habitat:

Norway maple is usually planted in urban and suburban settings but commonly invades deciduous forests adjacent to suburban areas.

Paul Wray, Iowa State Univ.

Look-A-Likes:

Norway maple is similar to the native sugar maple. However, Norway maple can be readily distinguished from other maples because the leaves and twigs ooze milky sap when cut or torn. It is the only maple in our region with that characteristic.

Ecological Threat:

This species is a frequent invader of urban and suburban forests. Its extreme shade tolerance allows it to penetrate deep within an intact forest canopy. Recent research has shown that forests invaded by Norway maple have less wildflower diversity compared with forests dominated by native Sugar maple (*Acer saccharum*).

John Randall, The Nature Conservancy

How to Control this Species:

Manual and Mechanical

Norway maple seedlings are easy to pull when the soil is moist. For larger plants, dig them out, making sure to get all the roots. Cut down large trees and grind out the stump, or clip off re-growth. Girdle the tree by cutting through the bark and growing layer (cambium) all around the trunk. Girdling is most effective in spring.

Chemical

Norway maple can be controlled effectively by using an herbicide such as glyphosate or triclopyr. Trees up to four inches in diameter can be controlled by applying triclopyr mixed with a horticultural oil to the bark, a foot from the base of the trunk. This can be done in early spring or from June 1 to September 30. The cut stump method may also be used—cut the tree and immediately apply the herbicide around the outer ring of the stump.

Invasive Plants in Pennsylvania

Oriental bittersweet

Celastrus orbiculatus Thunb.

Jessica Sprajcar, DCNR

Background:

Also known as round-leaved and Asiatic bittersweet, this vine was introduced from China into the U.S. around 1860 as an ornamental.

Range:

Oriental bittersweet can be found throughout New England and the Mid-Atlantic states, down to Louisiana and up through the Midwest as far north as Wisconsin. It is not known to occur further west than that.

Description:

Oriental bittersweet is a deciduous, climbing, woody vine that can grow up to 60 feet in length. Vines can grow up to four inches in diameter. The alternate, elliptical leaves are light green in color, finely toothed and two to five inches in length. Fruits are round and yellow, splitting to reveal bright red berries through the fall and winter months.

Leslie Mehrhoff, Univ. of Connecticut

Habitat:

Commonly found on old home sites, in fields and forest edges, and along roadsides and train tracks. While it prefers open, sunny sites it can tolerate shade.

Biology and Spread:

Birds and other wildlife readily consume the large number of berries, spreading seeds far and wide. Humans also spread the seed through the use of bittersweet vines and berries for craft projects. The plant also spreads vegetatively through rhizomes and root suckers.

Ecological Threat:

This vine is able to girdle and kill trees or break their branches off from the weight of the vines. When it grows into the canopy it can shade out natives. Oriental bittersweet has also been shown to hybridize with the American bittersweet, leading to a loss of genetic identity.

Nancy Loewenstein, Auburn Univ.

How to Control this Species:

Manual and Mechanical

Because the seeds of bittersweet are so numerous and can remain viable in the soil for several years, all control efforts will require multiple years to be effective.

Small populations, especially of vines not high up in canopy, can be pulled by hand or dug out prior to fruiting. If fruits are present, all material should be bagged and disposed of.

Vines in trees can be cut close to the ground. The vines will re-sprout, however, unless and herbicide is immediately applied to the cut stump.

Weekly mowing will prevent the vines from fruiting, but less frequent mowing will promote root sprouts.

Chemical

Because Oriental bittersweet looks so much like the native American bittersweet, be absolutely sure you have properly identified the species before doing any control work.

Systemic herbicides like glyphosate and triclopyr can successfully manage bittersweet. It is most effective when stems are cut or mowed and the herbicide is applied to the cut area immediately.

For cut stump applications, a 50% solution of glyphosate and water can be applied as long as the air temperature is above 40 degrees F. A 25 percent solution of triclopyr and water can be applied when the air temperature is above 60 degrees F.

For foliar application, a two percent solution of glyphosate or triclopyr and water, plus a 0.5 percent non-ionic surfactant, can be sprayed on the leaves when the air temperature is above 65 degrees F.

Look-A-Likes:

Oriental bittersweet closely resembles the native American bittersweet (*Celastrus scandens*), but American bittersweet has flowers and fruits at the ends of its branches, rather than in the axils of the leaves, like the Oriental variety.

Brett Pifer, DCNR - BOF

Oriental bittersweet along state forest road: Deric Case, DCNR - BOF

Invasive Plants in Pennsylvania

Empress or Princess tree

Paulownia tomentosa (Thunb.) Sieb. & Zucc. ex Steud.

Jessica Sprajcar, DCNR

Background:

Also known as Royal paulownia, this tree is native to eastern Asia. It was first introduced into North America around 1840 for ornamental purposes and for wood carving. Plantations of this tree are still grown in the U.S. for export to Japan, where the wood is highly prized.

Range:

This tree can be found from southern New England through the Mid-Atlantic states to parts of the south. Its range extends to Arkansas, a few counties in Texas and scattered locations in Washington state.

Description:

This deciduous tree can grow up to 60 feet in height with a trunk diameter of up to two feet. Leaves are very large (six to 12 inches long), alternate along the stem, and are hairy on the underside. The bark is rough, gray-brown and interlaced with shiny, smooth areas. Showy, fragrant, violet flower clusters bloom in the spring. Thin, pecan-shaped fruit capsules open in the fall and persist well into winter.

Tuscarora State Forest District

Habitat:

Paulownia usually invades roadsides, streambanks, forest edges and other disturbed habitats. It tolerates infertile and acidic soils and drought.

Biology and Spread:

Once a tree reaches the age of eight to 10, it is capable of producing twenty million seeds that are spread by wind and water. Trees also have the ability to sprout prolifically from buds on the stems and roots, allowing it to survive fire, cutting and other disturbances. Sprouts can grow up to 15 feet in a single season.

Ecological Threat:

This aggressive tree can take over certain habitats, displacing native vegetation.

James Allison, Georgia DNR

How to Control this Species:

Manual and Mechanical

Seedlings can be hand pulled, especially when the soil is moist. Be sure to remove all roots to prevent resprouts.

Cutting and girdling are not suggested, as they may encourage the tree to send up root suckers. Cutting should only be used in conjunction with an herbicide treatment or as an emergency treatment to prevent seed production.

Chemical

Seedlings and small trees can be controlled by applying a two percent solution of glyphosate or triclopyr and water plus a 0.5 percent non-ionic surfactant to thoroughly wet the leaves.

Larger trees can be killed by cutting the tree and immediately applying a 50 percent solution of glyphosate or triclopyr and water to the outer 20 percent of the stump. A basal bark application of 25 percent triclopyr with 75 percent horticultural oil will also work, as long as the ground is not frozen.

Look-A-Likes:

Princess tree may be confused with the native Northern catalpa (*Catalpa speciosa*). Both trees have similar size, leaf and flower structure. However, paulownia has a hollow pith, while catalpa is solid and whitish. Catalpa leaves are whorled and more pointed at the tip. Catalpa fruits are much longer (eight to 18 inches) than paulownia's (one to 2 inches).

Paul Wray, Iowa State Univ.

Invasive Plants in Pennsylvania

Privets
(Japanese, Border, Chinese and Common)

Ligustrum japonicum, *L. obtusifolium*, *L. sinense* and *L. vulgare*

Troy Evans, www.bugwood.org

Background:

These four species of privets were originally imported for use in landscaping around 1860. They are still often used in hedges and landscaping.

Range:

The various privets are originally from Japan, China and Europe. They have spread through the eastern United States, from New Hampshire and Michigan in the north to Florida and Texas in the south.

Description:

Privets are deciduous or semi-evergreen shrubs that often form dense thickets. They have opposite or whorled stems that are brown to gray with slightly rough bark. Privets produce white flowers from April to June, which are followed by green drupes from July to March. These fruit gradually ripen to a dark purple or black color in the winter. It is often difficult to differentiate between the four privets to the species level, particularly when they are not flowering.

Rebekah Wallace, Univ. of Georgia

Habitat:

Privets are often found in bottom-land forests, fence-rows, fields and rights-of-way. They seem to prefer disturbed areas with rich soil.

Biology and Spread:

Privets mainly spread to new areas via their seeds. Often-times, these are distributed by birds, which have eaten the fruit. Once introduced to an area, privet can regenerate from root and stump sprouts, making it difficult to eradicate.

Ecological Threat:

Privets can form dense thickets, which reduce light and moisture availability for native shrubs and wild-flowers. This decreases plant diversity and impacts the animals which depend on them for food and shelter.

Deric Case, DCNR - BOF

How to Control this Species:

Once established in an area, privet can be difficult to control or remove.

With smaller populations, hand removal can be used. However, fragments of root that are left behind in the ground can re-sprout.

Larger areas can also be treated with herbicides such as glyphosate. Herbicide can be applied to the leaves, or painted on cut stems or stumps. Once the herbicide is applied, disturbances to the privet should be avoided for approximately one year, in order for the herbicide to travel through the privet's root systems.

No biological controls are currently known for privet. Studies show that controlled burning does not appear to have a lasting effect on privet populations, so it is not recommended as a control option.

privet berries

Brett Pifer, DCNR - BOF

privet flower cluster

Deric Case, DCNR - BOF

Look-A-Likes:

There are a large variety of shrub-sized, berry-producing, deciduous alternatives to privets for landscaping purposes. These include species such as spicebush (*Lindera benzoin*), chokeberry (Photinia spp.) and dogwoods (*Cornus* spp.). These species will all provide higher quality food and cover for wildlife.

Jessica Sprajcar, DCNR

Chris Vans, River to River CWMA

Deric Case, DCNR - BOF

Invasive Plants in Pennsylvania

Siberian elm

Ulmus pumila L.

Patrick Breen, Oregon State Univ.

Background:

This native to northern Asia was introduced into North America in the 1860s as a windbreak, for lumber and as a street tree that is resistant to Dutch elm disease.

Range:

Siberian elm is widely distributed throughout the Midwest and Great Plains states as well as the west coast. On the east coast it is less common but can be found in parts of the Mid-Atlantic and New England states.

Richard Old, XID Services

Description:

This tree can grow to heights of 70 feet. The crown is open and rounded with slender, spreading branches. The leaves are less than three inches long, alternate along the branch, are dark-green in color with serrated edges. The bark is light gray with irregular furrows.

Inconspicuous flowers develop in dropping clusters during the spring. Fruits are flat, circular and under 1/2 inch wide—*see photo below*.

Steve Hurst, USDA NRCS

Habitat:

Siberian elm can be found in meadows as well as along roads. The trees are very drought and cold resistant so they will grow where other trees cannot.

Biology and Spread:

Each tree produces abundant, wind-dispersed seeds that allow dense thickets to form far from the parent tree. Seedlings grow very quickly.

Ecological Threat:

The dense thickets formed by these trees can close open areas and displace native vegetation, thereby reducing forage for wild animals.

How to Control this Species:

Girdling trees in late spring to midsummer is the preferred management technique. Seedlings can be hand pulled or girdled during the growing season. Prescribed burns will also kill seedlings.

Several systemic herbicides such as glyphosate and triclopyr can also be used. Cut the tree and immediately apply the herbicide to the stump, or use the basal bark treatment method.

Look-A-Likes:

Other species of elms (Ulmus spp.) look similar to Siberian elm. Our native slippery elm (U. rubra) and American elm (U. americana) typically have leaves that are greater than three inches long, with unequal heart-shaped leaf bases and leaf margins with double teeth. These are good native alternatives for the landscape. Some may also confuse young Siberian elms with our native choke-cherry (Prunus serotina) and hackberry (Celtis sp.).

Paul Wray, Iowa State Univ.

Tom DeGomez, Univ. of Arizona

Invasive Plants in Pennsylvania

Tree-of-heaven

Ailanthus altissima

Leslie Mehrhoff, Univ. of Connecticut

Background:

Also known as Chinese sumac, stinking sumac and tree of hell, this tree is native to China. It was brought to Philadelphia in 1784 by an amateur gardener. By 1840 it was commonly available from nurseries. Ailanthus is the subject of the well known book, "A Tree Grows in Brooklyn," by Betty Smith.

Range:

Tree of heaven is very common in the northeast and Midwest, through parts of the southeast, southwest and west coast.

Kelly Sitch, DCNR - BOF

Description:

This rapidly growing tree can reach a height of 80 feet, with up to a six-foot diameter trunk. Leaves are pinnately compound with 10 to 41 leaflets with smooth leaf margins. When crushed, the leaves and other plant parts have a rancid smell like cat urine or burnt peanut butter.

Flowering occurs in early summer, when large clusters of yellowish flowers develop above the leaves, Fruit produced on the female trees are tan to reddish, single winged, papery seeds, called samaras. They may remain on the tree throughout late fall.

Habitat:

Ailanthus is extremely tolerant of poor soils and will even grow through cracks in pavement. Trees are not shade tolerant. They will quickly colonize forest edges, fields and roadsides.

Ecological Threat:

This tree produces chemicals in its roots that prevent the establishment of other plant species nearby. Its fast growth limits habitat for other species. Its root system may be extensive and has been known to cause damage to sewer lines and building foundations.

Biology and Spread:

Tree of heaven spreads by hundreds of thousands of seeds per tree and through vegetative sprouting. A cut or injured ailanthus tree may send up dozens of root suckers and resprouts, creating large clonal colonies.

Look-A-Likes:

The native trees most likely to be confused with ailanthus are the sumacs (Rhus spp.). One way to tell them apart is the small glands on the underside of ailanthus leaves (see photo below). Staghorn sumac leaves do not have this gland, but have toothed leaf margins, while ailanthus' leaf edges are smooth. Sumac fruits are fuzzy and red.

James Miller, USDA Forest Service

Young ailanthus may also be confused with black walnut (Juglans nigra) because of the compound leaves and shield-shaped leaf scars. However, the flowers, seeds and smell of ailanthus should give it away.

John Cardina, The Ohio State Univ.

Tree-of-heaven (*Ailanthus altissima*)

Tree-of-heaven sprout (Photo by Brett Pifer, DCNR - BOF)

Tree-of-heaven in flower.

Tree-of-heaven (*Ailanthus altissima*)

Tree-of-heaven seeds (Photo by Kelly Sitch)

Tree-of-heaven Treatment Guidance

Unless the seedling is extremely small (less than 6-8 inches tall), cutting or breaking of Ailanthus stems should **not** be considered an effective treatment for an infestation.

Herbicide applications should take place from July 1st until Ailanthus leaves turn colors in the fall. One potential treatment method is basal bark application of triclopyr and oil (pre-mixed sold as Pathfinder II).

Hack and squirt can also be effective, given that each stem is not entirely girdled or damaged (a small portion should be left intact) while treating.

A native biocontrol measure developed from a *Verticillium* fungus is currently being field tested and may soon be available. Initial results indicate that this control is extremely effective at controlling tree-of-heaven.

Invasive Plants in Pennsylvania

White Mulberry

Morus alba

John M. Randall, The Nature Conservancy
www.forestryimages.org

Background:

White mulberry was introduced into the United States during colonial times in a failed attempt to establish a silkworm industry in the New World. Although the climate was not conducive to silkworm operations, the white mulberry tree thrived and spread throughout much of North America. Today, cultivars still exist in horticulture.

Range:

A native of northern China, white mulberry now ranges from southern Canada south throughout the contiguous United States. It occurs in every state except for Nevada.

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
www.dcnr.state.pa.us

Description:

White mulberry is a small deciduous tree with low branches and a wide spreading crown. Its roots are a distinctive, obnoxious orange, a color that is lightly reflected in its ridged, brown bark. A glossy sheen is obvious on the upper surface of its variably–lobed leaves. White mulberry flowers are green-yellow and occur in dense spikes. The aggregate fruits, which ripen from May to August, turn from green to white to red to black.

Ohio State Weed Lab Archive
www.forestryimages.org

Habitat:

White mulberry is most common in disturbed, sunny areas such as fields, forest edges and roadsides, although it tolerates part shade. It is adaptable to a variety of soil types, and can handle flooding and droughty conditions.

Biology and Spread:

The fruit is relished by wildlife, which spread white mulberry to new locations. This tree can also expand locally through root sprouting.

Ecological Threat:

A quick-growing species, white mulberry easily outcompetes native plants, especially in disturbed locations. The most dire threat posed by white mulberry is the hybridization and possible replacement of our native red mulberry (*Morus rubra*). To add insult to injury, it may also transmit a harmful root disease to its native relative.

Chris Evans, River to River CWMA
www.forestryimages.org

How to Control this Species:

Physical

White mulberry seedlings can be easily pulled by hand, especially when the soil is moist.

Trees can be controlled through cutting and herbicide applications. During the growing season, trees should be cut near ground level, followed by an immediate application of herbicide to the stump in order to destroy the root system.

Chemical

Apply a 25 percent solution of glyphosate mixed with water to cut stumps or girdle wounds.

If cutting is not feasible and the tree is less than six inches in diameter, herbicide may be applied to the lower trunk. From late winter to late summer, a solution of 20 percent triclopyr mixed in oil may be applied in a 12-inch band around the base of the tree.

Foliar applications of two percent glyphosate mixed with water may be considered in areas where the risk to non-target species is minimal.

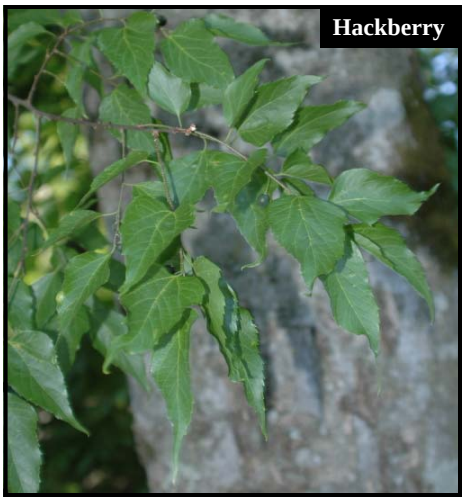
Look-A-Likes:

White mulberry may be confused with the exotic paper mulberry (*Broussonetia papyrifera*), as well as our native red mulberry, an issue complicated by the presence of hybrids between the two species.

Chris Evans, River to River CWMA
www.forestryimages.org

Native Alternatives:

There are many native trees that make great alternatives. Some include red maple (*Acer rubrum*), hackberry (*Celtis occidentalis*), black gum (*Nyssa sylvatica*) and sassafras (*Sassafras albidum*).



Chris Evans, River to River CWMA
www.forestryimages.org

References:

Center for Invasive Species and Ecosystem Health: http://www.invasive.org/browse/subinfo.cfm?sub=6050

The Nature Conservancy: http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/journeywithnature/white-mulberry.xml

USDA Forest Service: http://www.invasive.org/weedcd/pdfs/wow/white_mulberry.pdf

For More Information:

DCNR Invasive Species Site: http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm

Invasive Plants in Pennsylvania

Wineberry

Rubus phoenicolasius Maxim.

Photo: John Randall, The Nature Conservancy, www.invasive.org

Background:

Also known as wine raspberry, this shrub from eastern Asia was introduced into the U.S. in 1890 as breeding stock for new raspberry cultivars. It is still used today by berry breeders.

Range:

This shrub is found mostly along the Appalachian ridge from Massachusetts to Tennessee, with scattered patched in New York, the Carolinas and parts of the Midwest.

pennsylvania
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
www.dcnr.state.pa.us

Description:

This is a multi-stemmed shrub that can grow up to nine feet tall under favorable conditions. The entire plant is covered in tiny, reddish hairs and sharp spines. The compound leaves are made up of three heart-shaped, toothed leaflets. The leaves alternate along the stem and are green on top, white on the under-side. White, five-petaled flowers appear in the spring and later give way to red, raspberry-like fruits in June and July.

Photo: Tuscarora State Forest

Habitat:

This shrub prefers moist, open areas like fields, roadsides and forest edges.

Biology and Spread:

The berries of this shrub are eaten by a variety of wildlife and humans, thus contributing to its spread. It also reproduces vegetatively through root nodes. New plants can also form as the branches touch the ground and root.

Ecological Threat:

This plant can form extensive, dense thickets that displace native vegetation and restrict light to lower growing vegetation. Wineberry is also host to several viruses that can affect raspberries, like raspberry yellow spot.

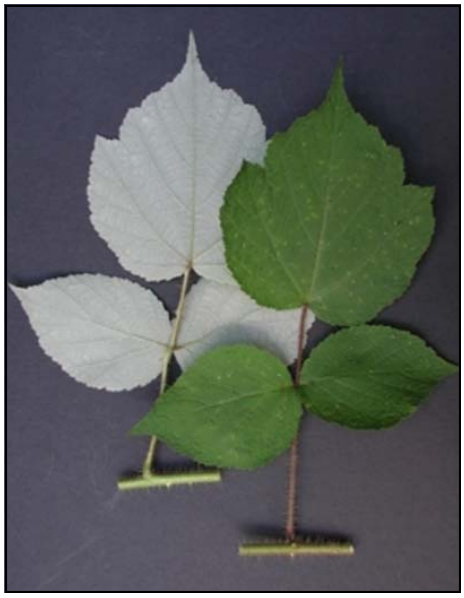


Photo: Leslie Mehrhoff, U. of Connecticut, www.invasive.org

How to Control this Species:

Manual

Plants can be removed by hand pulling with thick gloves or by using a four-prong spading fork, especially when the soul is moist. All roots and branches must be removed to prevent re-sprouting.

Chemical

Use of a systemic herbicide like glyphosate or triclopyr is also effective at controlling this species. Herbicide can be sprayed on the leaves, or the plant can be cut near the base and the herbicide painted on the exposed stump.

Look-A-Likes:

There are two native *Rubus* shrubs that might be confused with wineberry. Neither has the abundant reddish hairs and thorns (*see photo on right*) that mark wineberry.

Common blackberry
(*Rubus allegheniensis*)

Photo: Britt Slattery, USFWS

Flowering raspberry
(*Rubus odoratus*)

Photo: Sten, http://en.wikipedia.org

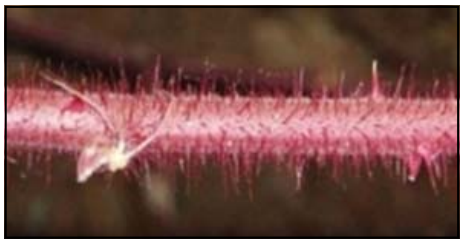


Photo: Leslie Mehrhoff, U. Of Connecticut, www.invasive.org

Native Alternatives:

In addition to the look-a-alike *Rubus* species shown below, there are other native shrubs that provide good food for wildlife, including red chokeberry (*Aronia arbutifolia*), spicebush (*Lindera benzoin*), American beautyberry (*Callicarpa americana)* and common winterberry (*Ilex verticillata*), shown below).

Photo: Dow Gardens Archive, www.forestryimages.org

References:

Center for Invasive Species and Ecosystem Health: http://www.invasive.org/browse/subinfo.cfm?sub=3072

Invasive Exotic Plant Pest Tutorial: http://www.dcnr.state.pa.us/forestry/invasivetutorial/wineberry.htm

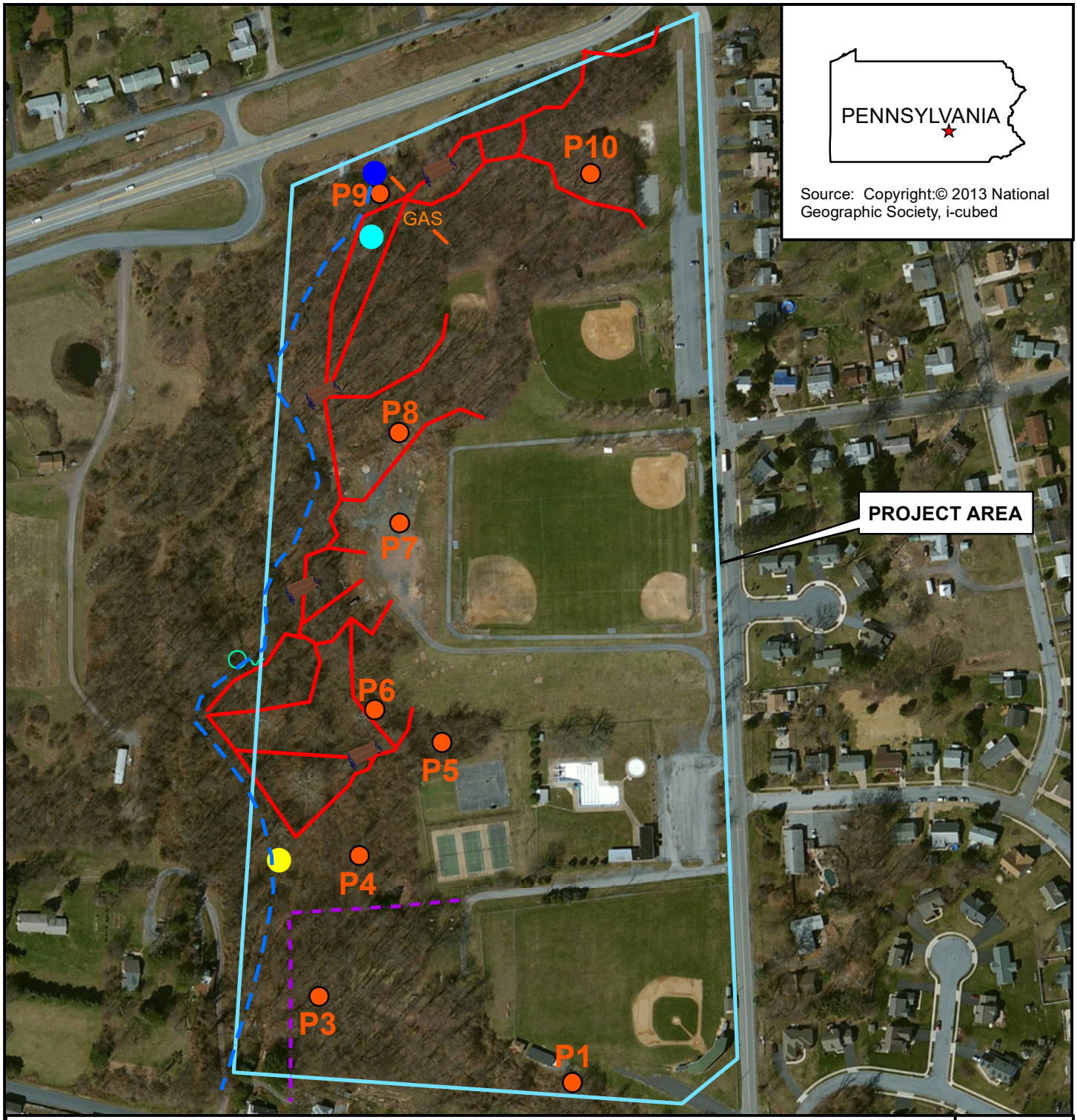
Plant Invaders of Mid-Atlantic Natural Areas: http://www.nps.gov/plants/alien/pubs/midatlantic/midatlantic.pdf

For More Information:

To learn more about invasive species in Pennsylvania, visit:

DCNR Invasive Species Site: http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm

Exhibit D: Dauphin-Middle Paxton Community Park Features Map



LEGEND

- Hiking trails
- Environmental data point
- GAS — Gas line
- Survey marker
- Pipe outfall
- Stream
- Sewer line
- Lizard's tail patch
- Spring house
- Park bench

N

SCALE
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American Engineers Group

FEATURES MAP

Dauphin Middle Paxton Community Park
Dauphin Borough
Dauphin County, PA

FIGURE
3

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