

HABITAT AND VEGETATION ASSESSMENT

FANWOOD BOROUGH NATURE CENTER

BOROUGH OF FANWOOD
Union County, New Jersey

October 2013

Prepared For:

Borough of Fanwood Environmental Commission
c/o Casey & Keller, Inc.
258 Main Street
Millburn, NJ 07041

Sponsor:

Association of New Jersey Environmental Commissions (ANJEC)
P.O. Box 157
Mendham, NJ 07945

Prepared by:

Amy S. Greene Environmental Consultants, Inc.
4 Walter E. Foran Blvd. Suite 209
Flemington, New Jersey 08822
Attn.: Harry Strano

ASGECI Project #3531

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION	1
2.0 DOMINANT VEGETATION COMMUNITIES.....	3
3.0 INVASIVE SPECIES	7
4.0 WILDLIFE USE.....	9

TABLES

TABLE 1- HIGHLY INVASIVE SPECIES.....	8
TABLE 2- IDENTIFIED WILDLIFE SPECIES.....	11

APPENDICES

APPENDIX A	Figure 1 – Wetlands and Soils Map Figure 2 – Vegetation Map
APPENDIX B	SITE PHOTOGRAPHS WITH DESCRIPTIONS
APPENDIX C	Resume of Preparer
APPENDIX D	Vegetation Communities Map with Photo Locations (Back Pocket)

1.0 Introduction

The Fanwood Nature Center is an approximately 7.75 acre municipally-owned forested plot in the Borough of Fanwood, Union County along the municipal southern border with Plainfield City. The forest is located immediately north of County Road 611 between County Road 602 to the northwest and Cray Terrace to the southeast. The forest is bordered by an early succession vegetated and maintained power line right-of-way (ROW) to the north and single family medium density residences to the south, east and west (see Appendix A, Figure 1). The forest is utilized by the public for passive outdoor recreation and contains a small well-defined trail system.

The Nature Center's surrounding land use is primarily medium-density single unit residences. The forest plot is isolated on all sides by development. There are; however, several additional forested patches in adjacent communities within a one mile radius of the Nature Center, including an approximate 32 acre wetland forest approximately 600 feet south of the Nature Center in Plainfield City.

Topography of the Fanwood Nature Center is gently sloping from 160 feet above mean sea level (AMSL) along parts of the eastern end of the site to approximately 138 ft AMSL in the central and southern portions of the site. The Fanwood Nature Center is bisected by an unnamed tributary of Ash Brook, which is part of the Rahway River/Woodbridge Creek Watershed (see Figure 2).

There are four soil types found in the Fanwood Nature Center. The dominant soils are hydric loams typically found on level grounds and would be expected to be associated with the lowland red-maple sweet gum forests found onsite. Figure 1 in Appendix A illustrates the boundaries of these soils. The soils are as follows:

- Boonton Moderately Well Drained gravelly loam 8-15% slopes (BohC). This is a non-hydric soil found in the sloping and elevated portions of Area 1.
- Haledon Loam 0-3% slopes (HakA). This hydric soil is found throughout much lowland forest dominating the eastern half of the Nature Center.
- Hasbrouck silt loam, 0-3% slopes rarely flooded (HctAr). This hydric soil is found throughout the northern and western portions of the Fanwood Nature Center. Associated communities include the lowland forests of Area 3 as well as the riparian areas and wetland areas associated with Areas 4, 5 and 6.
- Raritan –Urban Land Passaic Complex 0-3 % slopes rarely flooded (RasAr). This soil is a mix of hydric soils Raritan and Passaic and urban land. Urban land soils are soils that have been disturbed through human development and lack distinguishing characteristics. This soil is found a small amount in the southern portion of Area 2.

The Fanwood Nature Center is comprised of primarily lowland deciduous forest comprised of mixed hardwoods of multiple stages of growth and slightly varying levels of dominance. Canopy coverage over much of the site is greater than 50% with recent open breaks in the canopy caused by recently downed trees from Hurricane Sandy. The parcel also contains remnants of oak dominated upland forest, particularly along its sloping eastern end (Area 1) and secondary successional forest, particularly along its edges. Aerial photos from 1930 confirm that much of the Nature Center Forest (approximately 80%) was cleared of trees, which is consistent with the types and age of forest trees onsite. One large oak observed in the field that fell as a result of Hurricane Sandy appeared to be approximately 85 years of age. The Nature Center contains many types of exotic/or and invasive plant species, some of which may have been planted or naturalized from plantings on adjacent properties. Invasive plant and wildlife species present onsite (such as earthworms - *Lumbricus terrestris*) may also have an impact on the onsite diversity and relative abundance of native flora and fauna. A list of the most highly invasive species is included in Section 3 of this Report. All plants identified as exotic contain an “E” after their binomial name in the text.

Amy S. Greene Environmental Consultants, Inc. (ASGECI) visited the Fanwood Nature Center on June 23, 2013 and briefly again on September 19, 2013 to evaluate vegetation and wildlife, and review the site relative to existing general forest community mapping created in 1994. For this report, ASGECI reviewed the existing material and described the vegetated communities observed in the field. There is major species overlap among the community areas described Section 2. The areas identified in this report do not always have discrete boundaries that are easily observable in the field and therefore determining precise boundaries can be somewhat subjective. For example, lowland maple-sweetgum forest areas have some shrub successional or upland secondary successional forest components or species (such as black locust - *Robinia pseudoacacia*) interspersed. These boundaries may be further complicated by monocultures of invasive species such as Japanese stiltgrass (*Microstegium vimineum*) that span across most communities. Boundaries are generally determined by subtle varying levels of tree dominance (such as red maple or sweet gum) and specific characteristics that define the area, such as riparian habitat or open wetlands. A wetland delineation was not performed for this report.

The original parcel division of communities on the parcel map created by Najarian Associates (1994) and the dominant species identified are generally accurate. However, some community boundaries were changed on the mapping associated with report based on ASGECI field observations and for convenience of description. Particular changes include the removal of a community boundary between Community V and Community I which are very similar in forest structure and dominance, and the creation of a riparian area (Area 4) and an additional secondary successional forest area (Area 7). Both of these Areas are characterized in part by a more open (patches less than 50%) canopy and the presence of dense secondary successional shrub or young tree species. To facilitate understanding of the forest communities onsite, particularly in relation to the map

provided, the vegetation characteristics and key features of each identified area is described in detail in Section 2.

2.0 Dominant Vegetation Communities

Included in this section are descriptions of the vegetated areas onsite (Areas 1-6 on Figure 2). These areas are broadly categorized by the dominant generalized community type within that area. These generalized types include a primarily upland secondary successional forest with an oak component; a lowland forest dominated by mature and sub-mature red maple and sweet gum; open successional shrub areas; and herbaceous or shrub wetlands. Riparian areas which correlate with the stream corridor (in Areas 4 and 5) are also identified on the corresponding Figure 2.

Although Areas 1-6 are categorized by the dominance of a particular community, components of more than one of these communities may occur within in one defined area.

2.1 Oak and Upland Secondary Successional Forest

Much of the edges of the Fanwood Nature Center Forest are dominated by a mix of opportunistic native and exotic successional shrub, vine and tree species. In addition, many of the dominant forest tree species onsite including red maple (*Acer rubrum*), black cherry (*Prunus serotina*), sweet gum (*Liquidambar styraciflua*), and black locust are typical indicators of past clearing. The few upland oaks that are present provide an indicator of the oak dominant forest type that may have been more common onsite and adjacent to the site prior to initial site disturbance.

Area 1

Area 1 is a small sloping section of upland deciduous forest in the northeast quadrant of the Fanwood Nature Center. This area is characterized by remnants of mature oak forest mixed with secondary successional species (see Photos A and B). Area 1 contains a canopy of several mature red oak (*Quercus rubra*) or black oaks (*Quercus velutina*) as large as approximately 36" diameter at breast height (DBH) on its southern sloping end in its central portions. There are also some large pin oak (*Quercus palustris*), sweet gum, red maple and isolated tulip poplar (*Liriodendron tulipifera*). Area 1 and other areas contain multiple forest canopy openings and increased light penetration from recently downed trees resulting from Hurricane Sandy (see Photo C).

Area 1 contains components of a more disturbed secondary successional forest with a dense understory, particularly along its eastern and northern edges (Photo C). Forest edges often have a greater disturbance-oriented community due to the increased exposure to wind, sunlight, encroaching exotic species, deer foraging, trash piles, and other elements.

The disturbed secondary successional forest is dominated by black locust to approximately 12" DBH, with lesser amounts of black cherry generally ranging from 4-

12" DBH. Examples of invasive Norway maple (*Acer platanoides*) were also identified along the eastern edge of this community. Portions of the northern boundary of the Nature Center (Area 1 and Area 5) contain mature black walnut (*Juglans nigra*).

The understory of Area 1 successional forest edge contains a dense patch of invasive Japanese knotweed (*Polygonum cuspidatum*) along its northern edge (Photo D). Other areas are dominated by submature or stump sprouting black locust to approximately four feet in height. Dominant vines include common greenbrier (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*) and Virginia creeper (*Parthenocissus quinquefolia*) and blackberry (*Rubus alleghensis*). These vines, particularly the greenbrier, form some dense thickets, particularly near the Nature Center forest entrance. Other understory components of the upland forest include several isolated small (under 8" DBH) American beech (*Fagus grandiflora*) and sassafras (*Sassafras albidum*) trees.

Some portions of the forest floor in Area 1 are dominated by herbaceous species. Very dense monocultures of Japanese stilt grass (*Microstegium vimineum*) occur on the forest floor in portions of Area 1 and other locations (described below –see Photo C). Other herbaceous plants observed in lesser cover amounts include goldenrod (*Solidago* spp.), white snakeroot (*Ageratina altissima*), pokeweed (*Phytolacca americana*), deer tongue grass (*Dichanthelium clandestinum*), garlic mustard (*Alliaria petiolata*), periwinkle (*Vinca* sp. - E) yellow woodsorrel (*Oxalis stricta*), and Asiatic dayflower (*Commelina communis* - E). Similar successional vines, shrubs and herbaceous species are found throughout the Nature Center, particularly where there are canopy breaks, trails, and forest edges.

2.2 Lowland Red Maple –Sweet Gum Forest

The mixed hardwood lowland forest at the Fanwood Nature Center is a predominantly red maple-sweet gum dominant forest. These species along with pin oak and several other minor species occur throughout most of the Nature Center forests with varying levels of dominance. These species are typical components of the previously disturbed Piedmont lowland, wetland and floodplain forests of Northern New Jersey. It is possible that portions of these forested areas may contain the correct hydric soils and hydrology to qualify as wetlands; however, a wetland delineation was not conducted during this evaluation.

Area 2

Area 2 is a large area of forest dominated by sweet gum, red maple and pin oak (see Photos E and F). Most of the northern and central portions of Area B are dominated by mature sweet gum (12-18" DBH) and lesser amounts of red maple and some large (20-24" DBH) pin oak. Understory shrubs are sparse in the northern portion of Area 2 and contains large breaks from fallen trees with monocultures of Japanese stiltgrass common on the forest floor (see Photo G). Dense monocultures of Japanese stiltgrass have developed in the northern portion of this area. There are also patches of Japanese knotweed identified within this community primarily near the southern (church) boundary. This patch was originally identified in the 1994 plan of the Nature Center. A

sparse understory of woody shrubs and smaller 4-10" DBH trees that occur in Area 2 include black gum, Northern arrowwood (*Viburnum dentatum*), and black cherry. Additional understory trees in this area include American beech (*Fagus grandifolia*), white oak (*Quercus alba*), American elm (*Ulmus americana*) and sweet pepperbush (*Clethra alnifolia*). These additional tree species occur as isolated observations and do not comprise a substantial component of the forest community. Major trail edges through this area (particularly on the western boundary of Area 2) contain some of the herbaceous and vine components described in Area 1. The eastern edge of area 2 contains a patch of encroaching bamboo (*Bambusa* sp.-E) and Japanese spurge (*Pachysandra terminalis* -E).

The southern-central portion of Area 2 contains a mix of some larger red maple (10-30" and mostly 10-18" DBH), pin oak, sweet gum, and black locust. One lower portion of Area 2, identified as Area 2 A, contains a slight depression that appears to seasonally hold water. Some trees in this area are buttressed and the floor is one of the few larger areas devoid of Japanese stilt grass. The shrub understory in this area remains sparse with isolated or sparse occurrences of shrubs or small (8" or less DBH) trees including spicebush (*Lindera benzoin*), highbush blueberry (*Vaccinium corymbosum*), American holly (*Ilex opaca*), and flowering dogwood (*Cornus florida*).

Area 3

Area 3 is the community that comprises the majority of the Nature Center to the west of the stream. It is a red maple-sweet gum dominant forested area similar to Area 2 with fewer canopy breaks and slightly greater ratio of red maple to sweet gum (see Photo I) . The area also contains a component of mature 18+" DBH pin oak. The red maples in Area 3 generally range from 8-24" DBH with most trees ranging from 12-18". Much of the forest floor in this area lacks a shrub component and, as with many other portions of the Nature Center forest floor, contains monocultures of Japanese stiltgrass. Very minor amounts of native herbaceous species including soft rush (*Juncus effusus*), and fox sedge (*Carex vulpinoidea*), yellow fruited sedge (*Carex annectens*) and several other *Carex* species were observed near the trail on the northern end of Area 3 (see Photo H). Some invasive Asiatic lady's thumb (*Persicaria longiseta* -E) is also found in this herbaceous layer.

2.3 Shrub Successional Habitats

Within the Fanwood Nature Center, this generalized community type incorporates a variety of successional conditions with many species both native and non-native. These conditions include forest edges dominated by dense vines, forest canopy breaks that include a mix of young opportunistic trees such as black locust, and shrubby trail edges, and open shrubby portions of the riparian corridor. In all situations, these areas are generally dense with a thick woody understory and have less than 50% canopy closure.

Area 4

Area 4 contains the riparian corridor of the unnamed tributary that intersects the Nature Center. The stream itself is a generally shallow (1"-1' depth) and 3-6' wide stream with a stone and cobble bottom. Wetland herbaceous species including clearweed (*Pilea pumila*)

and spotted jewelweed (*Impatiens capensis*) were observed directly within the stream corridor. Other herbaceous wetland species such as various native or nonnative smartweeds (*Polygonaceae*) would be expected along the banks of the stream with varying cover dominance at varying times of the year.

The canopy of Area 4 contains substantial breaks from fallen trees. Dominant tree species include black locust, sweet gum, and red maple. Large silver maple trees (40 +” DBH) were identified immediately adjacent to the stream bank in the northern portion of this area. The understory along the top mix of bank is dominated by a dense growth of primarily wetland or upland shrubs and vines dominated by multiflora rose (*Rosa multiflora* - see Photo J). Other shrubs or vines identified near the stream top of bank include highbush blueberry, Southern arrowwood, Tartarian or Japanese honeysuckles (*Lonicera* spp. - E), and oriental bittersweet (*Celastrus orbicularis* -E - see Photo J). Other exotic species, including Japanese barberry (*Berberis thunbergii* -E) and *Forsythia* sp. - E, were identified in this area but do not appear to be dominant species. A small patch of lily of the valley (*Convallaria majalis*) was identified on the southern end of Area 4 but does not appear to be a dominant floor component. Eastern portions of Area 4 (near the boundary with Area 2) are dominated by dense amounts of sprouting black locust. Wisteria (*Wisteria* sp.) is dominant in this location as an understory species and is invading the canopy. A monoculture of hay-scented fern (*Dennstaedtia punctilobula*) was identified along the main trail in this location and into the western end of Area 2 as well.

Area 5

Area 5 is a generally open shrub-dominant disturbed successional community (see Photo L). Edges of the Area and its riparian corridor contain some trees. While Area 5 contains of the successional species common to other locations, there are some distinct differences in plant composition. While the western portion of Area 5 is strictly disturbed successional upland, the eastern half of this area is an ecotonal gradient between wetlands (predominantly in Area 6) and successional uplands. As a result it contains a mix of both wetland and upland shrub and herbaceous species.

A variety of opportunistic vines and shrubs were identified in Area 5 including hedge bindweed (*Calystegia sepium*), grape (*Vitis* sp.) wineberry (*Rubus phoenicolasius* - E), multiflora rose, arrow leaved tearthumb (*Polygonum sagittatum*) and some trumpet vine (*Campsis radicans*) growing on trees along the ROW boundary. There are minor amounts of native shrubs including spicebush (*Lindera benzoin*), arrowwood, common elderberry (*Sambucus canadensis*) and indigo bush (*Amorpha fruticosa*). Herbaceous species identified in this area include patches of dense honewort (*Trinia glauca*), spotted jewelweed, lemon balm (*Melissa officinalis*- E) and dock (*Rumex* sp.). The southernmost portion of this area contains open canopy breaks and dense amounts of young black locust.

2.4 Shrub Scrub and Herbaceous Wetlands

A small portion of groundwater-fed herbaceous wetlands were identified onsite in the same relative location as reported in the Najarian study. These wetlands also contained

some shrubs. These wetlands were not delineated, but clearly visible through the presence of hydrophytic vegetation, the presence of rivulets or puddles of groundwater, and the presence of mud or muck soils. Vegetation in these areas includes multiple wetland sedges and grasses as well as non-woody broad leaved plants and some facultative wetland shrubs. Herbaceous wetland components were also identified in very small amounts in Areas 3 and Area 4 within the stream corridor.

Area 6

The northeast portion of the Nature Center contains a small (0.5 acre or less) partially groundwater-fed herbaceous wetland with a shrub component and some canopy trees typical of other locations (see Photos M and N). Shrubs include arrowwood and multiflora rose. Herbaceous species that intersect this area include sensitive fern (*Onoclea sensibilis*), reed canary grass (*Phalaris arundenacea*), spotted jewelweed, fowl manna grass (*Glyceria striata*), grasses, soft rush (*Juncus effusus*), jack-in-the-pulpit (*Arisaema triphyllum*) and Polygonaceae family smartweeds including Oriental lady's thumb. This wetland area also contains encroaching Japanese stiltgrass.

3.0 Invasive Species

Twelve species considered highly invasive in New Jersey (NJDEP 2009) were identified during the Fanwood Nature Center forest survey conducted by ASGECI. It appears that Japanese stilt grass is the most widespread in terms of cover. Black locust, Japanese knotweed and multiflora rose are also very dominant. Although black locust is native to the United States, it is not native to New Jersey. It is considered invasive due to its aggressiveness in successional areas as it outcompetes native successional species, potentially drops species diversity and depletes soil nutrients due to its nitrogen fixing properties. It is also likely that the onsite wisteria species is *Wisteria foribunda* - E, an additional highly invasive species.

There are multiple exotic species at the Nature Center (marked with an "E" after their binomial name) considered to be potentially invasive in certain communities. Bamboo (*Bambusa sp.*-E) encroaching from an offsite residence in the lower portion of this area near point A-6, periwinkle, pachysandra, and Oriental lady's thumb are examples of these species.

3.0.1 Invasive Species Control

Controlling invasive species under most circumstances is highly difficult and eliminating them once established is often nearly impossible. Early detection and response is the most effective measure. The conditions at Fanwood Nature Center make invasive species control extremely complicated in spite of the forest's relatively small size. Many compounding environmental issues such as patch size and adjacent offsite introductions; impacts and selection by deer; soil disturbance; and climate change collectively present a challenge to successfully maintaining a functioning native forest over the long term. All potential issues must be considered and a well planned approach must be established before any control activities are implemented. Otherwise any invasive species control efforts may be costly and ineffective.

Certainly some species that occur in very low densities onsite, such as Japanese barberry or wineberry, may be easily manually removed and perhaps eliminated. Hand removal for well established and widespread species, such as Japanese stiltgrass, would require a large amount of time and resources for their initial removal. A large and dedicated volunteer or scout group may be essential. Systematic seasonal follow-up would be certainly required to prevent reestablishment of seed banks. In addition, some viable whole plants or fragments of plants (such as root systems that may regenerate) would likely remain after treatment, based on the volume of certain invasive species.

Various herbicides are often considered required in similar conditions, often in conjunction with manual removal. Tricolpyr and glyphosate are the most common general herbicides used. Herbicide is typically sprayed with a special low drift sprayer (stilt grass) or may be injected (Japanese knotweed). For woody species, the trunk is typically slashed or cut and the herbicide is applied to the stump or wound. There are obviously many concerns with using herbicide. Herbicides can be potentially dangerous to humans and non target wildlife and plant species. Herbicides need to be applied very carefully by a licensed professional who uses the correct formulation under the appropriate conditions. Repeated seasonal applications would be expected to be required, which may result in a time consuming and costly process.

Table 1: Highly Invasive species identified at Fanwood Nature Center

Common name	Scientific name	Areas*
Japanese knotweed	<i>Polygonum cuspidatum</i>	1,2
Japanese stiltgrass	<i>Microstegium vimineum</i>	All
Garlic Mustard	<i>Alliaria petiolata</i>	1,2
Multiflora Rose	<i>Rosa multiflora</i>	4,5,6
Oriental bittersweet	<i>Celastrus orbicularis</i>	1,4,5
Wineberry	<i>Rubus phoenicolasius</i>	5
Norway Maple	<i>Acer platanoides</i>	1,2
Black locust	<i>Robinia pseudoacacia</i>	All

Honeysuckles Shrub and vine	<i>Lonicera spp.</i>	4,5
Japanese barberry	<i>Berberis thunbergii</i>	4
English Ivy	<i>Hedera helix</i>	1

Species identified as I1 (highly invasive) by NJ Invasive Species Council. Strategic Management Plan (2009). * Species were identified in the specific Nature Center Areas (1-6) by ASGECI. Species may occur in other areas in lesser amounts – particularly in dense successional edges.

4.0 Wildlife

In spite of the impacts of invasive species resulting from fragmentation and/or disturbance, small forest patches in a regional context have wildlife value, particularly for more mobile or migratory species. The Nature Center’s proximity (less than 2 miles) to forested tracts of the Watchung Mountains increases its likelihood of being used as a “habitat island” for migratory bird species moving along the Atlantic Flyway in the spring and fall. The value of these patches may increase if there are established connections, such as linear riparian corridors, linking multiple habitat patches. These connections allow for the migration and recruitment of wildlife.

The Nature Center stream corridor is listed by NJDEP Landscape mapping as “Rank 2” (Presence of a Rare or Special Concern Species) as documented foraging habitat for great blue heron. Great blue heron will utilize a wide variety of wetlands and open waters, including disturbed areas, for foraging. ASGECI did observe forage species for wading herons in the creek including small fish (likely Cyprinid species) and a bullfrog. During the visit, a heron species (likely green heron) briefly observed in the stream corridor’s open water (Area 3). This bird was likely foraging. The general conditions for blue heron foraging habitat are met by this stream corridor.

Other resident bird species that would be expected at the Nature Center consist of common suburban, disturbance-tolerant habitat generalist species. Field observations made by ASGECI (see list below) support this determination. Species such as common woodpeckers would be expected to nest in cavities of dead or dying trees onsite. Disturbance tolerant songbirds that prefer shrubby edge habitats, such as robins or catbirds, would be expected to nest onsite. Based on the relatively small size of the Nature Center Forest and the amount of breaks and disturbance, it is unlikely that the site would support substantial nesting populations of forest-interior bird species.

Some common forest-nesting species, such as wood thrush and red-eyed vireo occasionally utilize highly fragmented forested tracts for nesting. Nest success of these species; however, drops rapidly on smaller forest tracts (such as sites under 20 acres). The increased presence of paths and edges for brood-parasite cowbirds is thought to be a primary cause for this small-patch nest failure. It would be expected that some rarer or

less expected migrants, such as various thrushes, vireos or warbler species, may periodically use the site for resting and foraging during migration, particularly during April and May.

While some herptiles (reptiles and amphibians) such as green frogs and bullfrogs would be expected in the Nature Center, less mobile and widespread species such as box turtles or various snakes would be less likely to occur onsite based on site isolation. Red-backed salamanders, a typical component of healthy Northeastern deciduous forests, sometimes occur in disturbed and fragmented forest environments. ASGECI did not observe this species onsite. Recently fallen trees onsite will provide a variety of microhabitat structure for invertebrates and potentially herptiles. However, the site's high density of invasive earthworms, indicated by numerous burrows, casts and direct observation, may be depleting the soil of micronutrients and impacting the invertebrate diversity and salamander presence.

A forest depression in Area 2 lacks herbaceous ground cover appears to seasonally collect and hold water. As a result, it appears this location contains some characteristics indicative of a vernal pool habitat. Vernal pools are wetlands that seasonally retain fishless standing water and provide breeding habitat for a variety of wildlife, particularly certain frogs and salamanders. Due to the lack of supporting forest surrounding this area, common generalist frog species such as green frogs (*Lithobates clamitans*) and spring peeper (*Pseudacris crucifer*) would be the species most likely species to utilize this type of habitat at the Fanwood Nature Center. Relatively less common (obligate) vernal pool breeding amphibians that typically utilize larger forested tracts would not be expected at the Nature Center. These species include wood frog (*Lithobates sylvaticus*) and spotted salamander (*Ambystoma maculatum*)

White-tailed deer (*Odocoileus virginianus*) adults and young were also observed in the Nature Center forest. As with other similar locations in Northern New Jersey, deer may be impacting forest Nature Center's community structure by selecting for invasive species and potentially suppressing native tree seedling growth. The predominance of certain invasive species (such as Japanese stilt grass) may in part be the result of deer selection. To determine deer impact on seedling growth and plant composition, some fenced study plots could be established onsite and may be maintained and studied as part of school study project.

**Table 2: Fanwood Nature Center Wildlife Species (terrestrial vertebrate)
Observed by ASGECI**

Common name	Scientific Name
American robin	<i>Turdus migratorius</i>
Starling	<i>Sturnus vulgaris</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Red bellied woodpecker	<i>Melanerpes carolinus</i>
Northern flicker	<i>Colaptes auratus auratus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Green heron	<i>Butorides virescens</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Downy woodpecker	<i>Picoides pubescens</i>
Common grackle	<i>Quiscalus quiscula</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
bullfrog	<i>Lithobates catesbeianus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Gray squirrel	<i>Sciurus carolinensis</i>

APPENDIX A

FIGURES

Figure 1 – Wetlands and SSURGO Soils Map



NJDEP Wetlands and SSURGO Soils

Legend

- Fanwood Nature Center
- NJDEP Wetland

Wetlands Key:

PSS1A - Palustrine, Scrub / Shrub,
Broad Leaved Deciduous, Temporary

SSURGO Soils Key:

BohC - Boonton moderately well drained gravelly
loam, 8-15% slopes
HakA - Haledon loam, 0-3% slopes
HctAr - Hasbrouck silt loam, 0-3% slopes, rarely
flooded
RasAr - Raritan-Urban land-Passaic complex,
0-3% slopes, rarely flooded

Sources:
Soil Survey Geographic (SSURGO) Database for Union County, New Jersey, USDA, National Resources
Conservation Service, Fort Worth, Texas, December 2004.

NJDEP Wetlands of Middlesex County, New Jersey 1999, New Jersey Department of Environmental
Protection (NJDEP), Office of Information Resource Management (OIRM), Division of Geographic
Information and Analysis, NJDEP, Trenton, November 1999.

This (map/publication/report) was developed using New Jersey Department of Environmental Protection
Geographic Information System digital data. This data secondary product has not been verified by NJDEP
and is not State-endorsed.

875 437.50 0 875 1,750
Feet

*Fanwood Borough
Nature Center
Union County, New Jersey*



AMY S. GREENE
ENVIRONMENTAL
CONSULTANTS.

APPENDIX B

SITE PHOTOGRAPHS WITH DESCRIPTIONS



Photo A: Looking southwest along secondary successional areas in Area 1.



Photo B: Looking northwest at larger oaks in Area 1.



Photo C: View of open successional forest with downed trees in Area 1. Note the Japanese siltgrass patches in the understory.



Photo D: View looking northwest at Japanese knotweed monocultures near the northwest boundary of the Fanwood Nature Center Forest and the powerline ROW.



Photo E: View looking southwest at the eastern end of Area 2.
This forest contains a mix of mature and semi mature red maple and sweetgum.



Photo F: View looking west in Area 2 A. This part of Area 2 contains
a significant break in the monoculture of Japanese stiltgrass in the floor and
appears to periodically hold standing water.



Photo G: View looking west at a large forest break in Area 2 caused by downed trees. The monoculture of Japanese stiltgrass is extremely dense in this area.



Photo H: View looking southeast from area 3. Some native herbaceous wetland species mixed with Japanese stiltgrass were identified in the understory in the left of the photo.



Photo I: View looking west across Area 3 at a mix of red maple and sweet gum.



Photo J: View looking northwest at the riparian habitat and adjacent shrub successional area in Area 4.



Photo K: View looking south near the border of Areas 4 and 2. A patch of hay scented fern is the dominant understory cover in this area.

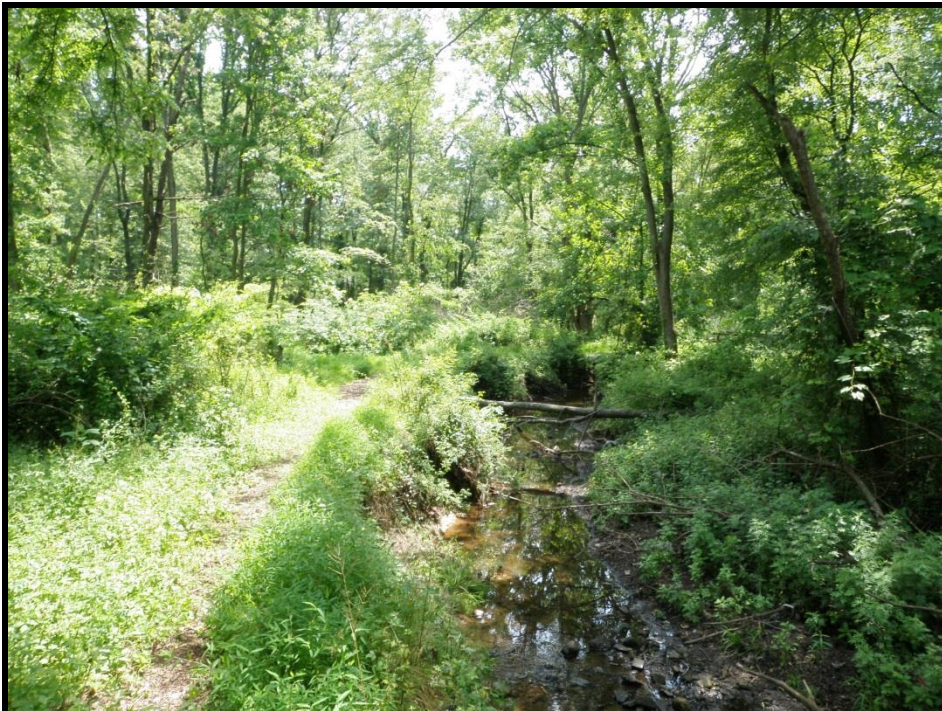


Photo L: View looking south at riparian and shrub successional habitats along the stream in Area 5.



Photo M: view looking southwest at herbaceous and shrub wetlands near the border of Areas 5 and 6.



Photo N: View looking north at the edge of the herbaceous wetlands in Area 6. There was evidence of groundwater hydrology in this area.

APPENDIX C

RESUME OF PREPARER



Years Of Experience: 17

Education

- ⇒ B.S. Natural Resource Management, Rutgers University, New Brunswick, New Jersey 1999
- ⇒ B.A. Communications, Rowan University, Glassboro, New Jersey, New Jersey, 1994

Presentations:

- ⇒ Environmental Assessment / Environmental Resource Inventory presentation, Association of NJ Environmental Commissions (ANJEC) 2006

Professional Affiliations

- ⇒ Recognized Qualified Bog Turtle Surveyor, New Jersey, Pennsylvania (USFWS), New York (USFWS/HHRU) , and Maryland (USFWS/MD DNR)

Training

- ⇒ American Red Cross, Adult First Aid/CPR: 9-2012
- ⇒ USFWS Refuge Comprehensive Conservation Planning (WLD 2126), 2010;
- ⇒ NJ Boating Safety Certificate, 2010;
- ⇒ Bog Turtle Phase I Habitat Training, PennDOT Bureau of Design, April 20, 2010;
- ⇒ Threatened and Endangered Species Desk Reference Training, PennDOT Bureau of Design, March 31-April 2, 2009; ⇒ Metro-North Railroad Safety Training, 2005.
- ⇒ Rutgers University, Hydric Soils, 2005;
- ⇒ PADI certified scuba diver, 1994.
- ⇒ Former New Jersey Herptile Atlas contributor and Research Assistant for NJ Division of Fish and Wildlife, American Society of Ichthyologists and Herpetologists
- ⇒ Member, American Zoo and Aquarium Association's Conservation Education Course; spring, 1999;

HARRY STRANO

Project Manager /Senior Environmental Scientist
ASCE Grade PIII

KEY QUALIFICATIONS

Mr. Strano has diverse experience in the environmental field as a field biologist, consultant and educator. Mr. Strano has extensive experience in characterization of aquatic habitats including performance of fish and aquatic invertebrate surveys.

Mr. Strano has experience delineating in a variety of wetland habitats including palustrine freshwater and brackish emergent wetlands, scrub/shrub and forested wetlands, and modified agricultural wetlands. Mr. Strano has prepared applications for NJDEP Letters of Interpretation, Freshwater Wetlands permits and Flood Hazard Area permits. Mr. Strano is familiar with the flora and fauna of a wide variety of local communities in New Jersey including freshwater aquatic ecosystems, coastal communities, Pinelands and upland forest habitats. He has prepared a variety of threatened and endangered/wetland reports of findings. Mr. Strano has prepared Ecological Assessments (EA) and Environmental Resources Inventories (ERI) for multiple municipalities and one county (Essex County) within NJ. He has worked closely with environmental commissions to develop documents that properly and accurately reflect the resources and conditions of the locality.

Mr. Strano has conducted surveys and identified critical habitat for threatened and endangered species, including birds, reptiles, amphibians, mammals, invertebrates and plants throughout New Jersey and Pennsylvania. He has surveyed for wood turtle, vernal pool and bog turtle habitat. Mr. Strano is a US Fish and Wildlife Service Recognized Qualified Bog Turtle Surveyor for New Jersey, New York, Pennsylvania, and Maryland (USFWS/DNR) and has extensive experience conducting bog turtle habitat assessments and visual and trapping surveys in fens, marshes, wet meadows and other wetland habitats, and has

located turtles on many sites, both new and existing. He has assisted in training state and federal employees on bog turtle habitat quality. Mr. Strano has aided various bog turtle projects including trapping to determine bog turtle presence and site management for invasive species and woody vegetation control using chemical and biological methods. He has also monitored for wood turtles and bog turtles during bridge construction projects in compliance with State and Federal permit requirements

Mr. Strano has experience with local avian species ID and habitat assessment for shorebirds, passerines and raptors. Mr. Strano has surveyed for, and assessed habitat for endangered and threatened birds including piping plover, osprey, heron rookeries, grasshopper sparrow and other grassland birds, barred owl, and red-shouldered hawk.

Mr. Strano is proficient in identification of coastal plain aquatic, wetland and estuarine ecosystem flora and fauna; including fish and invertebrates. He has prepared habitat management plans for aquatic and terrestrial species. He has delineated wetlands and evaluated habitat in rural, industrial, preserved open space, suburban and urban settings. He has performed numerous studies of threatened and endangered species and wetlands, and prepared permit applications.

RELEVANT EXPERIENCE

NJ Turnpike Authority/ T and M Associates, 50 Mile Garden State Parkway Widening Interchanges 30-80, Atlantic, Burlington and Ocean Counties, NJ.

Environmental Scientist responsible for updating the Species Management Plan for 15 endangered and threatened species identified within the 50 mile long project area. Assessed potential impacts to endangered and threatened species habitat and prepared habitat management recommendations, which were incorporated into project design and implemented during construction. Presented plan and findings to US Fish and Wildlife Service (USFWS), NJ Department of Environmental Protection (NJDEP), US Army Corps of Engineers, NJ Pinelands Commission (NJPC) and other participating agencies. The Management Plan facilitated the development of a Memorandum of Agreement (MOA) between the NJ Turnpike Authority, USFWS, NJDEP, the NJPC and other agency stakeholders. Obtained USFWS approval under Section 7 of the *Endangered Species Act*. The study was subsequently used by Pepco to obtain NJ Pinelands Commission approval for construction of a new electric transmission line parallel to the Parkway.

Christ Church/Hatch Mott MacDonald, Rockaway Township, Morris County, NJ.

Environmental Scientist responsible for an endangered and threatened species habitat assessment and report of findings for a property containing a large wetland complex, vernal habitat and forest habitats. Prepared a report of findings and management suggestions based on assessments for 20 state and/or federally endangered, threatened and state special concern species potentially onsite.

Essex County Environmental Commission. Essex County, NJ. Environmental Resources Inventory. Project Manager responsible for researching the natural and cultural resources of Essex County, and preparing an Environmental Resources Inventory (ERI). The Inventory included an extensive review of all natural resources including

endangered and threatened species records; fisheries; soils, geology and topography; wetlands, floodplains and vegetation communities, open space; land use and land cover; and varying pollution issues including air pollutants and toxicants, superfund sites and brownfields, and water quality. All maps were prepared in GIS. Responsible for close correspondence with the client and presenting the project scope, draft document and final results to the Commission and the public.

Monmouth County Park System/French & Parrello Associates, P.A., Clay Pit Creek/Hartshorne Woods Park Middletown Township, Monmouth County, NJ.

Senior Environmental Scientist responsible for assisting the Project manager in a vegetation community and habitat assessment of a 41 acre tract within the Park. The project included a characterization of wetland, upland and open water areas; assessment of sensitive species habitats; evaluation of invasive species and adjacent development impacts; general faunal investigation; and suggestions for trail placement, site maintenance and passive recreational uses. A report of findings was prepared.

Avian Surveys for Proposed Wind Turbine at National Guard Training Center (NGTC), Sea Girt, NJ.

NJ Department of Military and Veteran's Affairs/Mabbett and Associates, Inc./West Environmental. Inc. Senior Environmental Scientist responsible for coordinating year-round weekly avian field surveys throughout the NGTC. Surveys targeted all species including passerines, waterfowl, raptors, shorebirds, seabirds, and wading birds as part of an impact study for a proposed wind turbine. Surveyed habitats included dunes, beach, open ocean, salt marsh and freshwater wetlands, brackish pond, open fields, and urban areas. Identified birds to species level and recorded relevant data. Over 100 avian species were identified. Additional information was collected regarding endangered and threatened species onsite. Provided QA/QC on night radar surveys for birds and bats. Funded by the US Army Corps of Engineers NY Division.

US Fish and Wildlife Service, Great Swamp National Wildlife Refuge, Long Hill, Harding and Chatham Townships, Morris County NJ.

Project Manager/Senior Environmental Scientist responsible for assisting with the development and writing of a Comprehensive Conservation Plan (CCP) for the Refuge. Responsibilities include developing goals objectives and strategies for the refuge for both public use and wildlife management. The goals objectives and strategies determine refuge direction for the next 15 years. Responsible for assisting in the research and development of various public use and management alternatives and analyzing their feasibility at the refuge. Assisted in the coordination and communication with resource experts, the public, and refuge and regional USFWS staff.

National Guard Joint Training Center, Borough of Sea Girt, Monmouth County, NJ. Department of Military and Veterans Affairs/AECOM.

Project Manager/Senior Environmental Scientist responsible for assisting with the revision of the facility's Integrated Natural Resource Management Plan (INRMP). The INRMP provides management guidelines for facility resources including the Federally threatened piping plover and seabeach amaranth, other State-listed species, vegetation communities, and wetlands. Incorporated onsite survey and vegetation data collected by ASGECI under Mr. Strano's direction under a separate contract between 2007 and 2011 into the plan.

Reviewed and edited endangered species management and regulation language in the document. Prepared an invasive species section for the plan.

APPENDIX D

**VEGETATION COMMUNITIES MAP
(INSERTED IN BACK POCKET)**

Vegetation Communities

Dominant Community:

F - Red Maple,
Sweet Gum Forest
HW - Herbaceous Wetland
R - Riparian (Stream Habitat)
SF - Secondary Successional
Forest Black Locust
SS - Scrub / Shrub
UF - Oak Successional Forest

Legend

- Nature Center Boundary
- Vegetation Community
- Photograph Location

*Fanwood Borough
Nature Center
Union County, New Jersey*

0 20 40 80 Feet

