



Brightside Farm Park

Ecoassessment Report

Prepared by Resource Environmental Solutions
For Charlestown Township
January 2023



Table of Contents

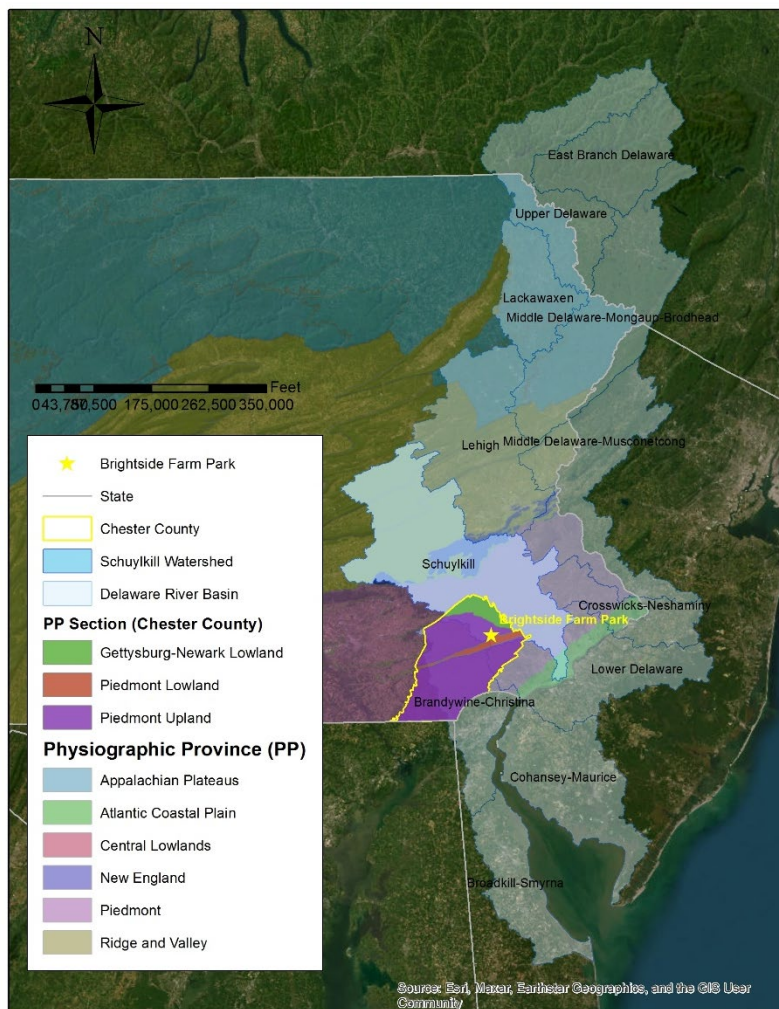
Background	3
Introduction and Project Purpose	3
Location	3
History.....	4
Current Site Use	4
Geology and Soils	4
Methodology.....	6
Rapid Assessment.....	6
Avifauna	6
Vegetation.....	7
Ecological Assessment Points.....	8
Management Units.....	8
Results	9
Avifauna	9
Vegetation.....	11
Discussion	16
References	22

Background

Introduction and Project Purpose

Based on 2021 Wildlife Diversity Management Recommendations from the Pennsylvania Game Commission’s Dan Mummert, Charlestown Township hired Resource Environmental Solutions (RES) to further study Brightside Farm Park (BFP) and create an actionable plan to transform the site into a Grassland Bird Sanctuary. Grassland habitats and grassland-dependent birds are recognized as some of the most imperiled systems in North America, with most being converted to development and agricultural uses. From a regional conservation standpoint, any opportunity to convert open space to functional grasslands is a high priority. Brightside Farm Park already has open, herbaceous dominated fields making this an ideal location for a grassland habitat conversion project. That said, the site requires some critical vegetation management to make it suitable for use by grassland birds.

Most breeding grassland birds rely on large, unbroken tracts of open grassland that are free of hedgerows, tree lines, and other structures that allow predators to compromise nesting suitability. Brightside Farm Park has been under perennial hay management for many years which has kept the space open, but a series of hedgerows dominated by non-native shrubs and trees currently exists.



To create a site-specific management plan, RES performed a baseline natural resource inventory of avifauna and vegetation and classifying existing habitat type and quality. This report represents a snapshot of condition and best professional understanding based on primary and secondary data. Its contents are sufficient to make an ecologically sound restoration and management plan and provide a starting point for repeatable data collection and understanding into the future.

Location

BFP sits in Charlestown Township in Chester County, in southeastern Pennsylvania. It lies in the Piedmont Physiographic province in the Pickering Creek sub watershed of the Schuylkill drainage basin of the Delaware Bay Basin.

Figure 1 Location and Watershed Map of Brightside Farm Park in Chester County, Pennsylvania

History

Former land use included pasturing of dairy cows and, in more recent years, haying to feed dairy cows. Between 1996 and 2000, the Township purchased seventy-five (75) acres of Brightside Farm to preserve the site from development. Since that time, Charlestown preserved the main farm as agricultural land and created community gardens. Efforts have been made to create a riparian buffer to the stream running through the northwest area of the property.

Current Site Use

The current site is roughly half of the historic farm parcel. The other half was developed for residential homes. The entire site includes the preserved farm area and community gardens however this project focuses on the adjoining hayfields. A trail system consisting of a parking lot and kiosk, paved loop, and some mowed auxiliary trails currently allows for regular use by residents for walking, running, dog-walking (leash-on), nature viewing, and other passive activities. It is largely comprised of perennial grass fields. Approximately nine hedgerows separate the fields and are dominated by invasive vines (e.g., honeysuckle and oriental bittersweet), shrubs (e.g., privet, bush honeysuckle, and multiflora rose), and trees (e.g., tree-of-heaven) as well as native trees (e.g., black walnut, red maple, and white oak).

The field grasses are non-native haying grasses such as orchard grass as well as emerging colonies of the aggressive invasive, Johnson grass. Few wildflowers or native grasses occur here, offering little food and structure for native insects, amphibians, birds, and mammals.

Geology and Soils

BFP sits atop Precambrian felsic and intermediate gneiss that consists largely of quartz, feldspar, and mica (Pennsylvania Department of Conservation and Natural Resources, 2023). The soils are primarily Gladstone Gravelly loam (82.3%) with the remaining areas comprised of Cokesbury Silt Loam, Califon Loam, Edgemont Channery Loam, and Hatboro Silt Loam (Soil Survey Staff, n.d.) (see *Figure 2*). These soil types are generally well drained with moderately high saturated hydraulic conductivity in the subsoil with medium to high runoff potential. Many non-stony areas with these soils are favored for crop production.



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaB	Califon loam, 3 to 8 percent slopes	4.0	5.3%
CpA	Cokesbury silt loam, 0 to 3 percent slopes	7.7	10.2%
EdC	Edgemont channery loam, 8 to 15 percent slopes	0.6	0.7%
GdB	Gladstone gravelly loam, 3 to 8 percent slopes	39.3	51.8%
GdC	Gladstone gravelly loam, 8 to 15 percent slopes	22.0	28.9%
GdD	Gladstone gravelly loam, 15 to 25 percent slopes	1.2	1.6%
GfD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery	0.0	0.0%
Ha	Hatboro silt loam	1.0	1.4%
Totals for Area of Interest		75.9	100.0%

Figure 2 Soil Map from the NRCS Websoil Survey

Methodology

Rapid Assessment

A team of RES ecologists visited the site in summer and fall to walk the site in its entirety in search of indication of various ecological stressors and examples of intact habitat types. The ecologists used ArcCollector to spatially align observations throughout the site for aid in mapping and location-specific recommendations. Some of the primary goals of this rapid assessment included:

- Understand the current breeding bird composition by conducting a point count survey.
- Document plant communities and understand the extent of invasive species on site.
- Create management units by habitat type to prescribe specific restoration recommendations.

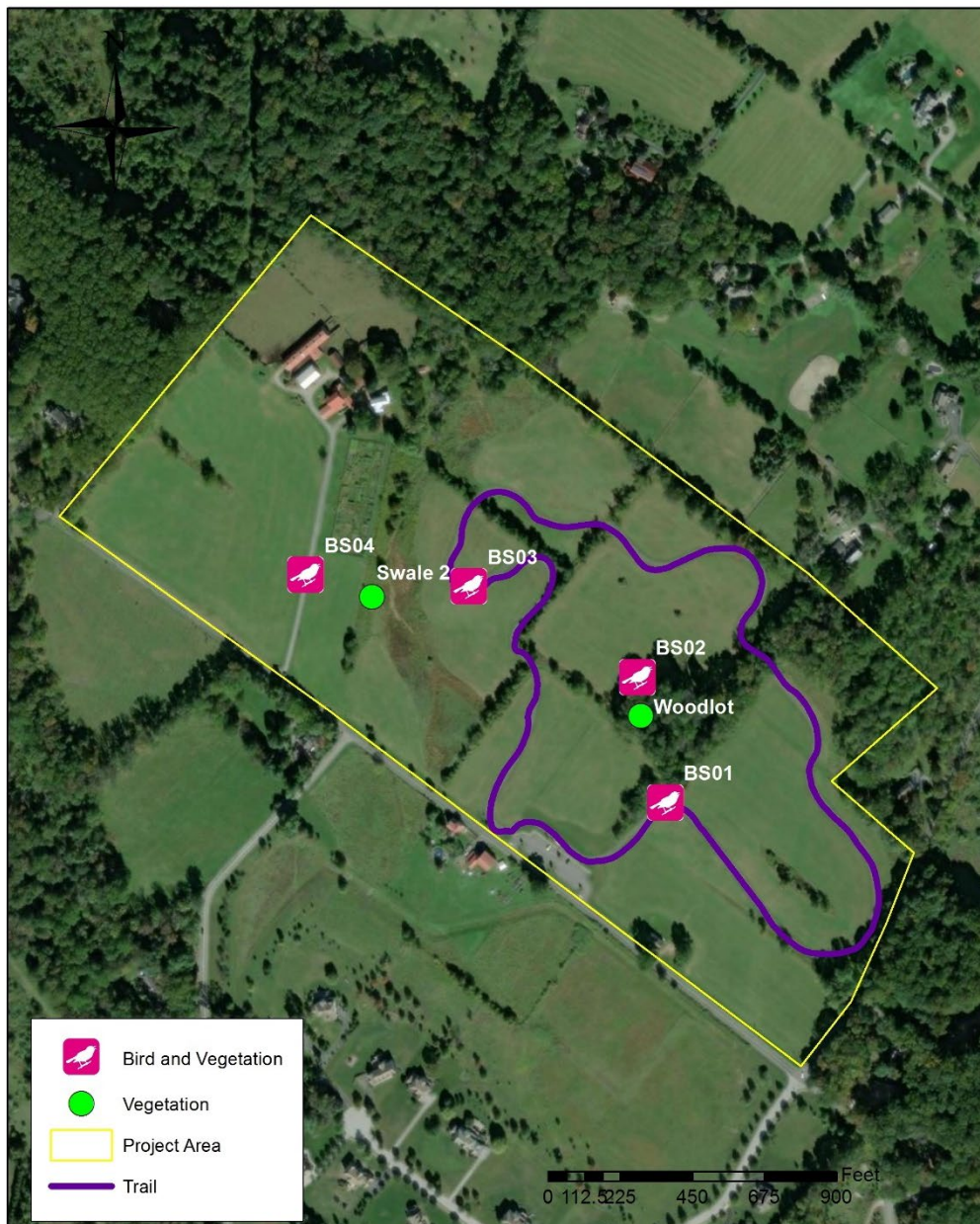


Figure 3 ArcCollector Points noting Ecoassessment points for Birds and Vegetation and vegetation characterization points.

Avifauna

Four permanent locations (Figure 3) were chosen for timed single observer point counts of birds (Ralph et al., 1995). The points were placed to capture variations in habitat and provide full statistical representation of the overall project area without significant overlap due to proximity. Two surveys were conducted to capture summer breeding (June 3, 2022), and fall migration (September 20, 2022). Surveys were conducted within two hours of sunrise.

At each point, an avifaunal ecologist observed birds visually and aurally, noting species, count, behavior, direction and distance observed from the point, and flight height and direction if applicable. Each point was surveyed for 10 minutes with observations noted in time bins of 0-3 minutes, 3-5 minutes, 5-10 minutes, and 10+ minutes if additional birds entered the observation area past the ten-minute time limit.

Vegetation

Timed meanders were the primary method used for botanical data collection within each of the identified MUs on site. This involved setting a fixed time and walking through each polygon collecting notes of species presence and relative abundance per species. Primary goals for plant surveys were to characterize vegetation communities, locate any rare plants/rare plant habitats, and to document invasive species throughout the park.

The species were then entered into the Universal FQA Calculator (Freyman et al. 2016) to determine C-values or Conservatism Based Metrics. C-values or Coefficients of Conservatism are numeric values assigned to plant species to indicate their sensitivity to anthropogenic disturbance (Salter, 2018). C-values vary by location, as plants are more or less adapted in different locations. For this assessment, the Pennsylvania Piedmont, 2013 database was used (Ebert et al. 2013). The number scale used by this database ranks 3,419 plant species including 1,840 non-native species based on their value in native plant communities, and is considered the standard for measuring plants in the Pennsylvania Piedmont region in which BFP sits. C-values used to classify plants found during this assessment are defined as:

0-3 Plants with a high range of ecological tolerances/found in a variety of plant communities

4-6 Plants with an intermediate range of ecological tolerances/associated with a specific plant community

7-8 Plants with a poor range of ecological tolerances/associated with an advanced successional state

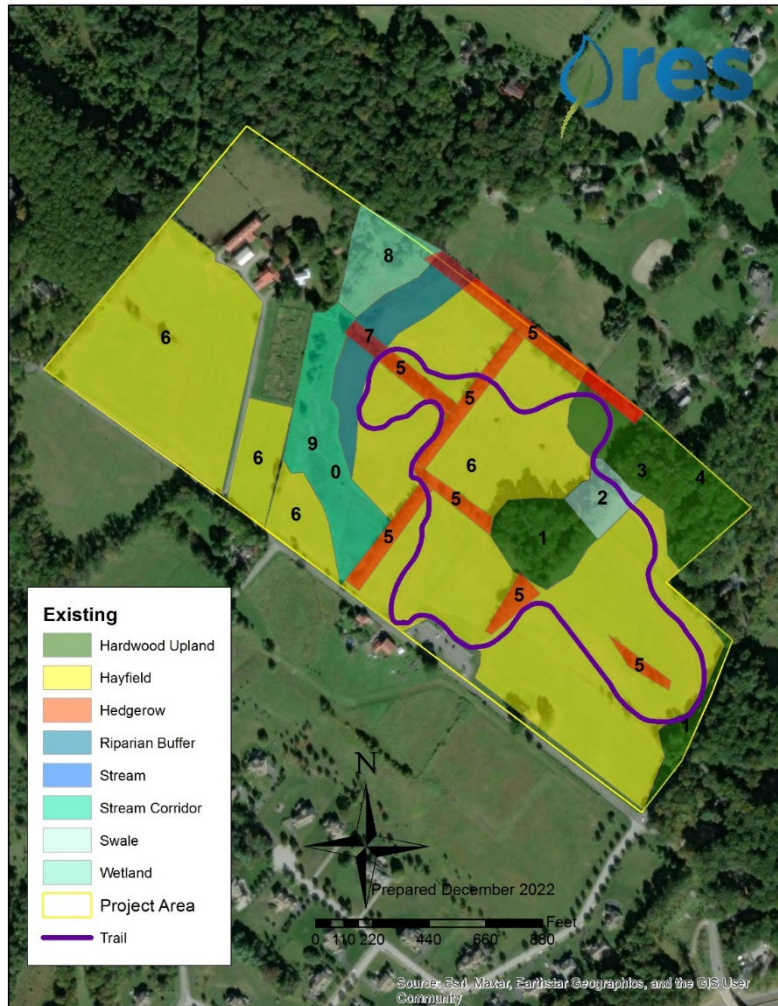
9-10 Plants with a high degree of fidelity to a narrow range of habitats

To understand the rankings in colloquial language, Miles Arnott, executive director of Bowman's Hill Wildflower Preserve, describes the rankings, "Plant thugs and other undesirables rate a 0. 'Generalists' that aren't exactly unwelcome but that tend to show up even in highly disturbed sites rate somewhere between 1 and 3. Scores rise along with each plant's demand for increasingly pristine conditions, up to a 9 or 10 for plants you're only likely to find in sites unblemished by human activity. Just because a plant gets a 9 or 10 doesn't mean it's endangered or rare. But it does mean it's indicative of a good quality ecosystem," (Weigel n.d.).

The FQA calculator also provides a Floristic quality index or FQI that is the mean C multiplied by the square root of the species richness. The FQI "indicates overall vegetative quality of the site. Generally, 1–19 is low quality, 20–35 is high quality, and above 35 is exceptional" (Lotze n.d).

Ecological Assessment Points

The avifaunal points also served as more intensive botanical inventory plots where plant species within a



10-meter radius of the point were noted. These observations included to which strata the species belonged (tree, shrub, herbaceous etc.), dominance, abundance, and conservation status. By combining point specific bird and flora observations, habitat health indicators become more robust and can be extrapolated to similar habitats throughout the area.

Management Units

Following a desktop review of aerial imagery and subsequent ground-truthing, our team has developed management units (MUs) for interpretation and management purposes. Each unit is described by dominant vegetation communities and any prominent natural features, such as rocky outcrops, streams, etc. Ecological restoration recommendations are also organized by each determined MU.

Figure 4 Map of Management Units that corresponds to descriptions in Table 1.

Table 1 Management Units by Existing Habitat Type, Proposed Habitat Type, and Quality corresponding to the map in Figure 4.

Area Number	Existing Type	Quality	Proposed Type
1	Hardwood Upland	Low	Savanna
2	Swale	Low	Swale
3	Hardwood Upland	Medium	Savanna
4	Hardwood Upland	Medium	Hardwood Upland
5	Hedgerows	Low	Grassland
6	Hayfield	Low	Grassland
7	Riparian Buffer	Medium	Riparian Buffer

Results

Avifauna

Over two (2) survey events, 54 unique bird species were observed. 261 individual birds were observed in 167 distinct observations (Table 2). The most frequently observed bird in the largest quantity was the blue jay (*Cyanocitta cristata*) followed by the red-winged blackbird (*Agelaius phoeniceus*). Two obligate grassland breeding bird species were observed (American kestrel and savanna sparrow) during the breeding season. Each were represented by one territory-- American kestrels are successfully breeding in the onsite box and the savanna sparrow's breeding status is unknown but formally listed one probable breeding territory.

Most birds observed were ground-foraging generalists (ex. blue jays and starlings) and aerial gleaning insectivores (ex. swifts and swallows). Species that require a combination of open space and trees (eastern bluebird, field sparrow, and orchard oriole) were observed in low numbers. Most breeding birds observed on site are hearty woodland species and were associated with the existing larger forested tracts along the margins of the property and within the wooded riparian area. Two shrub-nesting species (brown thrasher and eastern towhee) were observed as well. The proposed planting plan will increase suitable nesting habitat for shrub-dependent species within designated forest restoration areas. Flyovers (species that were observed from the site but did not interact with the property) included turkey vultures, peregrine falcon, and bald eagle.

Table 2 Results of Bird Surveys

Common Name	Scientific Name	Count	Observations	Summer	Fall
Blue Jay	<i>Cyanocitta cristata</i>	26	14	2	12
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	21	17	17	0
European Starling	<i>Sturnus vulgaris</i>	19	8	6	2
Turkey Vulture	<i>Cathartes aura</i>	16	8	1	7
American Goldfinch	<i>Spinus tristis</i>	12	8	4	4
Song Sparrow	<i>Melospiza melodia</i>	8	8	7	1
Tree Swallow	<i>Tachycineta bicolor</i>	20	7	7	0
American Crow	<i>Corvus brachyrhynchos</i>	5	5	2	3
American Robin	<i>Turdus migratorius</i>	5	5	4	1
Yellow Warbler	<i>Setophaga petechia</i>	5	5	5	0
Red-shouldered Hawk	<i>Buteo lineatus</i>	5	4	0	4
Eastern Bluebird	<i>Sialia sialis</i>	4	4	3	1
Northern Mockingbird	<i>Mimus polyglottos</i>	4	4	3	1
Willow Flycatcher	<i>Empidonax traillii</i>	4	4	4	0
Common Yellowthroat	<i>Geothlypis trichas</i>	3	3	3	0
Gray Catbird	<i>Dumetella carolinensis</i>	3	3	2	1
House Wren	<i>Troglodytes aedon</i>	3	3	2	1

Orchard Oriole	<i>Icterus spurius</i>	3	3	3	0
Warbling Vireo	<i>Vireo gilvus</i>	3	3	3	0
Common Grackle	<i>Quiscalus quiscula</i>	6	2	2	0
Black Vulture	<i>Coragyps atratus</i>	4	2	0	2
Cedar Waxwing	<i>Bombycilla cedrorum</i>	4	2	2	0
Barn Swallow	<i>Hirundo rustica</i>	3	2	2	0
American Redstart	<i>Setophaga ruticilla</i>	2	2	2	0
Baltimore Oriole	<i>Icterus galbula</i>	2	2	2	0
Brown Thrasher	<i>Toxostoma rufum</i>	2	2	2	0
Brown-headed Cowbird	<i>Molothrus ater</i>	2	2	1	1
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	2	2	2	0
Mourning Dove	<i>Zenaida macroura</i>	2	2	2	0
Northern Cardinal	<i>Cardinalis cardinalis</i>	2	2	1	1
Northern Flicker	<i>Colaptes auratus</i>	2	2	1	1
Northern Harrier	<i>Circus hudsonius</i>	2	2	0	2
Pileated Woodpecker	<i>Dryocopus pileatus</i>	2	2	2	0
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	2	2	1	1
Red-eyed Vireo	<i>Vireo olivaceus</i>	2	2	1	1
Chimney Swift	<i>Chaetura pelagica</i>	30	1	0	1
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	3	1	1	0
American Kestrel	<i>Falco sparverius</i>	2	1	1	0
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1	1	0	1
Carolina Chickadee	<i>Poecile carolinensis</i>	1	1	0	1
Carolina Wren	<i>Thryothorus ludovicianus</i>	1	1	0	1
Cooper's Hawk	<i>Accipiter cooperii</i>	1	1	0	1
Eastern Wood-Pewee	<i>Contopus virens</i>	1	1	1	0
Field Sparrow	<i>Spizella pusilla</i>	1	1	0	1
Great Blue Heron	<i>Ardea herodias</i>	1	1	0	1
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	1	1	1	0
Hairy Woodpecker	<i>Dryobates villosus</i>	1	1	1	0
House Finch	<i>Haemorhous mexicanus</i>	1	1	1	0
Indigo Bunting	<i>Passerina cyanea</i>	1	1	1	0
Peregrine Falcon	<i>Falco peregrinus</i>	1	1	0	1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	1	1	0	1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1	1	1	0
Sharp-shinned Hawk	<i>Accipiter striatus</i>	1	1	0	1
White-breasted Nuthatch	<i>Sitta carolinensis</i>	1	1	0	1
TOTAL		261	167	109	58

Vegetation

The vegetation survey comprised of categorizing habitat as observed in the habitat map (*Figure 4*). The large quantity of agricultural grasses and weeds were not fully captured in this survey and are generally not listed by name. The identified species were input into the Floristic Quality Assessment (FQA) Calculator using the 2013 Pennsylvania Piedmont database. This database captured 101 species that are included in calculating the non-weighted conservatism-based metrics in Table 3. However, 4 additional invasive species were classified using the USDA Plants Database (highlighted in red), and 10 species only identified to genus level (highlighted in yellow) were classified also using the USDA Plants Database for a total of 115 unique species (*Table 5*). Percent cover was not included in the FQA, so the metrics are not weighted by abundance.

Table 3 Conservatism-Based Metrics for vegetation observed at Brightside Farm Park (Pennsylvania Piedmont Database, 2013)

Conservatism-Based Metrics:	
Total Mean C:	1.4
Native Mean C:	2.5
Total FQI:	14.1
Native FQI:	19
Adjusted FQI:	18.9
% C value 0:	48.5
% C value 1-3:	38.6
% C value 4-6:	9.9
% C value 7-10:	3
Native Tree Mean C:	2.8
Native Shrub Mean C:	2.5
Native Herbaceous Mean C:	2.7

Based on this table we can see that the Mean C is 1.4 which means that most plants found have a high range of ecological tolerances and are found in a variety of plant communities, they're generalists. Only 9.9% of species identified have a C value of 4-6 meaning they have an intermediate range of ecological tolerances/associated with a specific plant community. 3% had a C value of 7-10 or a high degree of fidelity to a narrow range of habitats. No threatened or endangered species were encountered. The overall FQI score for the site based on species (not abundance) was 14.1 which is generally considered "low quality".

Another way to view distribution is by nativity (native or non-native as defined in the FQA or by the USDA) and physiognomy (tree, shrub, vine, etc.) in Table 4. About 66% of the plant species catalogued were native however there were 60% more invasive shrubs than native shrubs. Because the agriculture grasses were lumped into the category of "cut grasses" they were not captured in this metric so it should be considered that the majority of graminoids observed onsite were non-native. The invasive shrubs and vines dominated the hedgerows and the understory of the surrounding woodlands.

Table 4 Nativity by Physiognomy

Physiognomy	Native	Non-native	N/NN	Total
Tree	15	2	1	18
Shrub	3	7	0	10
Vine	3	2	1	6
Forb	38	20	6	64
Graminoid	8	7	2	17
Total	67	38	10	115

Table 5 Table of species observed onsite at Brightside Farm including Physiognomy, Nativity, and C-Value as determined by the FQA Calculator or USDA Plant Database (red highlights)

Scientific Name	Common Name	Family	Native?	C-VALUE	Physiognomy
<i>Acer saccharinum</i>	sugar maple	Aceraceae	native	5	Tree
<i>Acer saccharum</i>	Silver maple	Aceraceae	native	6	Tree
<i>Ageratina altissima</i>	White snakeroot	Asteraceae	native	3	Forb
<i>Agrimonia parviflora</i>	Harvestlice	Rosaceae	native	3	Forb
<i>Amaranthus hybridus</i>	smooth pigweed	Amaranthaceae	native	0	Forb
<i>Ambrosia artemisiifolia</i>	Ragweed	Asteraceae	native	1	Forb
<i>Ambrosia trifida</i>	giant ragweed	Asteraceae	native	2	Forb
<i>Amphicarpaea bracteata</i>	Hog peanut	Fabaceae	native	4	Forb
<i>Andropogon virginicus</i>	Broomsedge bluestem	Poaceae	native	2	Graminoid
<i>Apocynum cannabinum</i>	Dogbane	Apocynaceae	native	2	Forb
<i>Artemisia vulgaris</i>	Mugwort	Asteraceae	non-native	0	Forb
<i>Asclepias incarnata</i>	swamp milkweed	Asclepiadaceae	native	5	Forb
<i>Asclepias syriaca</i>	Common milkweed	Asclepiadaceae	native	1	Forb
<i>Carya tomentosa</i>	Mockernut hickory	Juglandaceae	native	5	Tree
<i>Carex crinita</i>	fringed sedge	Cyperaceae	native	5	Graminoid
<i>Carex vulpinoidea</i>	American fox sedge	Cyperaceae	native	2	Graminoid
<i>Celastrus orbiculatus</i>	Oriental bittersweet	Celastraceae	non-native	0	Vine
<i>Cichorium intybus</i>	Common chickory	Asteraceae	non-native	0	Forb
<i>Cirsium arvense</i>	Creeping thistle	Asteraceae	non-native	0	Forb
<i>Cyperus esculentus var. leptostachyus</i>	yellow nutsedge	Cyperaceae	native	0	Graminoid

<i>Dactylis glomerata</i>	Orchardgrass	Poaceae	non-native	0	Graminoid
<i>Daucus carota</i>	Wild carrot	Apiaceae	non-native	0	Forb
<i>Dichanthelium clandestinum</i>	Deer-tongue grass	Poaceae	native	2	Graminoid
<i>Elaeagnus umbellata</i>	Autumn olive	Elaeagnaceae	non-native	0	Shrub
<i>Epigaea repens</i>	trailing arbutus	Ericaceae	native	7	Forb
<i>Erigeron annuus</i>	Eastern daisy fleabane	Asteraceae	native	0	Forb
<i>Erechtites hieraciifolius</i>	American burnweed	Asteraceae	native	0	Forb
<i>Euonymus alatus</i>	Winged euonymus	Celastraceae	non-native	0	Shrub
<i>Eurybia divaricata</i>	White wood aster	Asteraceae	native	5	Forb
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	Asteraceae	native	3	Forb
<i>Fagus grandifolia</i>	American beech	Fagaceae	native	6	Tree
<i>Fraxinus pennsylvanica</i>	Green ash	Oleaceae	native	5	Tree
<i>Galium aparine</i>	Sticky Willy	Rubiaceae	native	2	Forb
<i>Galium mollugo</i>	false baby's breath	Rubiaceae	non-native	0	Forb
<i>Geum canadense</i>	White avens	Rosaceae	native	3	Forb
<i>Impatiens capensis</i>	Jewelweed	Balsaminaceae	native	3	Forb
<i>Juglans nigra</i>	Black walnut	Juglandaceae	native	4	Tree
<i>Juncus effusus var. pylaei</i>	Soft rush	Juncaceae	native	2	Graminoid
<i>Lactuca canadensis</i>	Canada Lettuce	Asteraceae	native	3	Forb
<i>Ligustrum vulgare</i>	Privet	Oleaceae	non-native	0	Shrub
<i>Lindera benzoin</i>	Spicebush	Lauraceae	native	5	Tree
<i>Liquidambar styraciflua</i>	Sweetgum	Hamamelidaceae	native	1	Tree
<i>Liriodendron tulipifera</i>	Tulip poplar	Magnoliaceae	native	5	Tree
<i>Lonicera japonica</i>	Japanese honeysuckle	Caprifoliaceae	non-native	0	Vine
<i>Lonicera maackii</i>	Amur honeysuckle	Caprifoliaceae	non-native	0	Shrub
<i>Lonicera tatarica</i>	bush honeysuckle	Caprifoliaceae	non-native	0	Shrub
<i>Lycopus virginicus</i>	water horehound	Lamiaceae	native	4	Forb
<i>Mentha arvensis</i>	wild mint	Lamiaceae	native	3	Forb
<i>Microstegium vimineum</i>	Japanese stilt-grass	Poaceae	non-native	0	Graminoid

<i>Onoclea sensibilis</i>	Sensitive fern	Dryopteridaceae	native	3	Forb
<i>Oxalis stricta</i>	Yellow woodsorrel	Oxalidaceae	native	0	Forb
<i>Parthenocissus quinquefolia</i>	Virginia creeper	Vitaceae	native	3	Vine
<i>Paulownia tomentosa</i>	Empress tree	Scrophulariaceae	non-native	0	Tree
<i>Persicaria decipiens</i>	slender knotweed	Polygonaceae	non-native	0	Forb
<i>Persicaria maculosa</i>	lady's thumb	Polygonaceae	non-native	0	Forb
<i>Phalaris arundinacea</i>	Reed canary grass	Poaceae	native	0	Graminoid
<i>Phleum pratense</i>	timothy grass	Poaceae	non-native	0	Graminoid
<i>Phytolacca americana</i>	Pokeweed	Phytolaccaceae	native	1	Shrub
<i>Pilea pumila</i>	Canadian clearweed	Urticaceae	native	4	Forb
<i>Plantago lanceolata</i>	Ribwort plantain	Plantaginaceae	non-native	0	Forb
<i>Plantago major</i>	Broadleaf plantain	Plantaginaceae	non-native	0	Forb
<i>Platanus occidentalis</i>	American sycamore	Platanaceae	native	5	Tree
<i>Poa pratensis</i>	Kentucky bluegrass	Poaceae	non-native	0	Graminoid
<i>Polygonum minus</i>	pygmy smartweed	Polygonaceae	non-native	0	Forb
<i>Polygonum perfoliatum</i>	mile-a-minute	Polygonaceae	non-native	0	Forb
<i>Polygonum tenue</i>	slender knotweed	Polygonaceae	native	7	Forb
<i>Polygonum virginianum</i>	Virginia knotweed	Polygonaceae	native	4	Forb
<i>Polypodium virginianum</i>	Common polypodium	Polypodiaceae	native	10	Forb
<i>Potentilla simplex</i>	Common cinquefoil	Rosaceae	native	3	Forb
<i>Prunus serotina</i>	Black cherry	Rosaceae	native	3	Tree
<i>Pyrus calleryana</i>	Callery pear	Rosaceae	non-native	0	Tree
<i>Quercus alba</i>	White oak	Fagaceae	native	6	Tree
<i>Robinia pseudoacacia</i>	Black locust	Fabaceae	native	1	Tree
<i>Rosa multiflora</i>	Multiflora rose	Rosaceae	non-native	0	Shrub
<i>Rubus occidentalis</i>	Black raspberry	Rosaceae	native	2	Shrub
<i>Rubus pensilvanicus</i>	Pennsylvania blackberry	Rosaceae	native	2	Shrub

<i>Rubus phoenicolasius</i>	Wineberry	Rosaceae	non-native	0	Shrub
<i>Rumex acetosella</i>	Sheep sorrel	Polygonaceae	non-native	0	Forb
<i>Rumex crispus</i>	Curly dock	Polygonaceae	non-native	0	Forb
<i>Salix nigra</i>	Black willow	Salicaceae	native	2	Tree
<i>Sassafras albidum</i>	Sassafras	Lauraceae	native	3	Tree
<i>Setaria faberi</i>	Chinese foxtail	Poaceae	non-native	0	Graminoid
<i>Setaria viridis</i>	green foxtail	Poaceae	non-native	0	Graminoid
<i>Smilax rotundifolia</i>	Common greenbrier	Smilacaceae	native	2	Vine
<i>Solanum carolinense</i>	Carolina horsenettle	Solanaceae	native	2	Forb
<i>Solidago canadensis</i>	Canada goldenrod	Asteraceae	native	2	Forb
<i>Solidago nemoralis</i>	Gray goldenrod	Asteraceae	native	2	Forb
<i>Solanum nigrum</i>	black nightshade	Solanaceae	non-native	0	Forb
<i>Sorghum halepense</i>	Johnson Grass	Poaceae	non-native	0	Graminoid
<i>Stellaria media</i>	Chickweed	Caryophyllaceae	non-native	0	Forb
<i>Symphotrichum ericoides</i>	Heath aster	Asteraceae	native	9	Forb
<i>Symphotrichum lateriflorum</i>	White woodland aster	Asteraceae	native	6	Forb
<i>Symphotrichum pilosum</i>	White oldfield aster	Asteraceae	native	0	Forb
<i>Symphotrichum puniceum</i>	Purplestem aster	Asteraceae	native	4	Forb
<i>Symplocarpus foetidus</i>	Skunk cabbage	Araceae	native	5	Forb
<i>Taraxacum officinale</i>	Dandelion	Asteraceae	non-native	0	Forb
<i>Toxicodendron radicans</i>	Poison ivy	Anacardiaceae	native	1	Vine
<i>Tridens flavus</i>	purpletop	Poaceae	native	1	Graminoid
<i>Trifolium pratense</i>	red clover	Fabaceae	non-native	0	Forb
<i>Trifolium rubens</i>	red feather clover	Fabaceae	non-native	0	Forb
<i>Urtica dioica</i>	Stinging nettle	Urticaceae	non-native	0	Forb
<i>Verbesina alternifolia</i>	wingstem	Asteraceae	native	2	Forb
<i>Verbena bonariensis</i>	tall verbena	Verbenaceae	non-native	0	Forb

<i>Vernonia noveboracensis</i>	New York ironweed	Asteraceae	native	3	Forb
<i>Zizia aurea</i>	Golden Alexander	Apiaceae	native	6	Forb
<i>Carya species</i>	hickory species	Juglandaceae	n/nn	NA	Tree
<i>Cuscuta species</i>	Dodder species	Convolvulaceae	n/nn	NA	Vine
<i>cut grass</i>	cut cool season grass	Poaceae	n/nn	NA	Graminoid
<i>Elymus spp</i>	Elymus grass species	Poaceae	n/nn	NA	Graminoid
<i>Galium species</i>	Gallium species	Rubiaceae	n/nn	NA	Forb
<i>Geum species</i>	Avens species	Rosaceae	n/nn	NA	Forb
<i>Ipomea species</i>	morning glory species	Convolvulaceae	n/nn	NA	Forb
<i>Polygonum species</i>	Polygonum species	Polygonaceae	n/nn	NA	Forb
<i>Ranunculus species</i>	Buttercup species	Ranunculaceae	n/nn	NA	Forb
<i>Viola species</i>	Viola species	Violaceae	n/nn	NA	Forb

Discussion

In the 20+ years since active agriculture ceased, the park has returned to a semi-wild space where invasive species have found their niche in the space left behind the agricultural grasses. It is common in this region that hedgerows are dominated by invasive plants. Brightside Farm Park is no exception. While they may provide some structure for certain nesting birds, they simplify the botanical diversity by outcompeting native plants. Further, non-native plants have drastically less insect relationships than native plants, thus reducing the amount of food available for birds. The degraded condition of these hedgerows from an ecological perspective, coupled with the pressing need to remove them to facilitate functional grassland habitat validates this effort.

All ecological restoration involves some change to the landscape, be it process-based (ex. mowing regime), structurally-based (ex. conversion from one habitat to another) or involving biodiversity management (ex. removal of invasive species, planting/seeding of native plants). The proposed grassland habitat and forest edge enhancement will involve a combination of all of these. In concert with the Pennsylvania Game Commission's observations and professional recommendations, RES has proposed a plan to increase the suitability of the onsite grasslands (currently multiple fields of low-diversity, non-native forage grasses for cattle feed/hay separated by invasive-dominated hedgerows).

RES recognizes that any change in the landscape will have an impact on the existing wildlife using the site. That is why RES ecologists collected baseline data on breeding birds, especially since the metrics of success for this habitat enhancement project can be best interpreted through the breeding bird community and vegetative diversity. Because of the multitude of significant benefits to the site including but not limited to a dramatic increase in native insect diversity, foraging habitat for reptiles and amphibians, increased small mammal population diversity and abundance, soil character development (such as increased soil organic carbon, fungi, and microbial communities), stormwater mitigation

capacity (via capture and slowing of sheetflow, increased evapotranspiration, and increased water holding capacity in the soil), and other benefits, many metrics could be used. However, using breeding birds as indicators of ecosystem condition is a reliable, cost-effective, and rewarding metric.

To this extent, RES ecologists developed a list of perceived impacts to onsite bird species to:

- a. Develop metrics for success regarding habitat restoration for grassland, savanna, forest edge, and riparian zones
- b. Develop a framework for understanding the net ecological benefit of the proposed actions by virtue of conservation need
- c. Provide interested public with contextual information about this change and why it is important/worth investing in.

The most current Pennsylvania Wildlife Action Plan (2015-2025) expresses that 9 of the recognized 13 grassland bird species that occur in PA exhibited precipitous declines between the first and second Breeding Bird Atlases (BBA). The main reasons are stated as:

1. Conversion from agriculture to development, and
2. Successional establishment of non-native/invasive woody plants within grassland areas.

The Township has prevented issue number one (in part) by preserving half of the original farm footprint (the other half converted to development). Active removal of invasive species and woody plant establishment within this preserved space is the next identified priority for stewarding functional grasslands and grassland bird habitat. Please see the below two summary tables of proposed habitat change and how this will impact the existing onsite breeding bird population (*Table 6*) as well as attract new species (*Table 7*).

Table 6. Observed Birds and their Perceived Influence as Result of the Proposed Restoration

Species	Habitat Preference	PA Species of Conservation Need Status	Benefit from Hedgerow Removal and Grassland Enhancement?	Mitigation Action through Forest/mid-succession enhancement elsewhere on site?
Blue Jay	forest/ edge	None	Y	Y
Red-winged Blackbird	grassland/ wetland	None	Y	Y
European Starling	edge forest	None/ Invasive	N	Y
Turkey Vulture	N/A	None	N	N
American Goldfinch	edge forest	None	Y	Y
Song Sparrow	fields and edge forest	None	Y	Y
Tree Swallow	grassland/ wetland	None	Y	N
American Crow	edge forest	None	Y	Y
American Robin	forest	None	Y	Y

Yellow Warbler	shrubland/ woodland	None	Y	Y
Red-shouldered Hawk	forest	None	Y	Y
Eastern Bluebird	savanna/ grassland	None	Y	Y
Northern Mockingbird	edge forest	None	N	Y
Willow Flycatcher	shrubs	G5, S4B (High Concern)	N	Y
Common Yellowthroat	grassland/ wetland	None	Y	Y
Gray Catbird	edge/ shrub	G5, S5B (no concern)	N	Y
House Wren	edge forest	None	N	Y
Orchard Oriole	savanna/ woodland	None	Y	Y
Warbling Vireo	woodland	None	N	Y
Common Grackle	forest/ wetland	None	N	Y
Black Vulture	N/A	None	N	N
Cedar Waxwing	savanna/ woodland	None	Y	Y
Barn Swallow	N/A	None	Y	N
American Redstart	forest	None	N	Y
Baltimore Oriole	woodland	None	N	Y
Brown Thrasher	shrub/ edge forest	None	N	Y
Brown-headed Cowbird	N/A	None	N	Y
Eastern Towhee	shrub/ edge forest	G5, S4N (M) (no concern for breeding)	N	Y
Mourning Dove	general	None	Y	Y
Northern Cardinal	forest	None	N	Y
Northern Flicker	forest	None	Y	Y
Northern Harrier	grassland	G5, S2B (very high concern) THR	Y	N
Pileated Woodpecker	forest	None	N	Y
Red-bellied Woodpecker	forest	None	N	Y
Red-eyed Vireo	forest	None	N	Y
Chimney Swift	artificial/ chimneys	G5, S3B (high concern)	Y	N
Northern Rough- winged Swallow	stream bank	None	Y	N

American Kestrel	grassland	G5, S4B (high concern)	Y	N
Bald Eagle	N/A	G5, S4B, S5N(W) (no concern)	N	N
Carolina Chickadee	forest	None	Y	Y
Carolina Wren	forest/ edge	None	Y	Y
Cooper's Hawk	forest	None	Y	Y
Eastern Wood-Pewee	forest/ woodland	None	N	Y
Field Sparrow	grassland/ savanna	G5, S3B (very high concern)	Y	Y
Great Blue Heron	riparian woods	None		
Great Crested Flycatcher	edge/ woodland	None	Y	Y
Hairy Woodpecker	forest	None	N	Y
House Finch	edge woods/ conifer	None	Y	Y
Indigo Bunting	savanna/ edge forest	None	Y	Y
Peregrine Falcon	N/A	G4, S1B (very high concern)		
Red-tailed Hawk	forest	None	Y	Y
Savannah Sparrow	grassland	G5, S3B (no concern)	Y	N
Sharp-shinned Hawk	N/A	G5, S3B, S5N(M) (no concern)		
White-breasted Nuthatch	forest	None	N	Y
G= global rank, S= state rank, 1-5 = from rare to secure, B= breeding population, N= non-breeding population with clarifier, (M)= clarifier for migratory population, (W)= clarifier for wintering population				
END= Pennsylvania State Endangered, THR= Pennsylvania State Threatened				
No concern, High Concern, and Very High Concern relate to the regional (Northeast) Priorities				

Table 7. Species Likely to Benefit from Proposed Grassland and Forest Edge Restoration (ranked by color)

Species	Habitat Preference	PA Species of Conservation Need Status	Benefit from Hedgerow Removal and Grassland Enhancement?	Mitigation Action through Forest/mid-succession enhancement elsewhere on site?
Upland sandpiper (migration)	grassland	G5, S2B (very high concern) END	Y	N

American woodcock	grassland/woodland matrix	G5, S4B (least concern)	Y	N
Short-eared owl (wintering only)	grassland (upland and wetland)	G5, S1B, S3N(W) (very high concern) END	Y	N
Barn owl	grassland (upland and wetland)	G5, S2B (very high concern)	Y	N
Eastern whip-poor-will	grassland/woodland matrix	G5, S3B (very high concern)	Y	N
vesper sparrow (early years nesting)	grassland	G5, S2B (very high concern)	Y	N
grasshopper sparrow	grassland	G5, S3B (very high concern)	Y	N
Henslow's sparrow (migration)	grassland	G4, S3B (very high concern)	Y	N
dickcissel	grassland	G5, S3B (high concern) END	Y	N
bobolink	grassland	G5, S4B (very high concern)	Y	N
eastern meadowlark	grassland	G5, S3B (very high concern)	Y	N
horned lark (early years)	grassland/sparse	None	Y	N
blue-winged warbler	shrubland/mid-succession	G5, S4B (very high concern)	Y	Y
yellow-breasted chat	shrubland/mid-succession	G5, S2B (high concern)	Y	Y
blue grosbeak	shrubland/mid-succession	None	Y	Y
<i>Green=likely/expected and breeding, Yellow=possible breeding pending field performance, Orange=unlikely but possible as vagrants, wintering, and/or in migration.</i>				
IF THE PROPOSED STREAM/WETLAND RESTORATION IS ENACTED, THE FOLLOWING SPECIES MAY ALSO BENEFIT				
Virginia rail (breeding)	PEM	G5, S3B (high concern)	Y	N
sora (breeding)	PEM	G5, S3B (high concern)	Y	N
Wilson's snipe (breeding)	PEM	G5, S3B (high concern)	Y	N
sedge wren (migration)	PEM	G4, S1B (very high concern) END	Y	N
marsh wren (breeding)	PEM	G5, S2B (high concern)	Y	N
swamp sparrow (breeding)	PEM	None	Y	N

This report serves as a baseline assessment to provide data for creation of an actionable Ecological Restoration Plan (draft submitted 1/19/23) and to provide a more in-depth understanding of the historic land use, current landscape condition, and create a meaningful framework in which to work towards the future. This data can be collected using the same methodology by different practitioners to capture changes as the site undergoes its transition and as the grassland habitat becomes fully established to quantify changes in the bird population as the vegetative community changes. Not all indicators are captured using a rapid assessment however these two indicators, vegetation and avifauna correlate strongly to soil health, insect health, and overall health of an area. This greenspace that is currently considered low quality based on observed vegetative and avifaunal species has potential to become an ecological hotspot of high value with the priority of acting as sanctuary for the important and imperiled group, grassland birds.

References

- Ebert, Janet; Holt, Jack; Rhoads, Anne. Bowman's Hill Wildlife Preserve. 2013. Pennsylvania Piedmont Floristic Quality Assessment Database.
- Freyman, W.A., L.A. Masters, and S. Packard. 2016. The Universal Floristic Quality Assessment (FQA) Calculator: an online tool for ecological assessment and monitoring. *Methods in Ecology and Evolution* 7(3): 380–383
- Lotze, N. (n.d.). Floristic Quality Assessment. ConservationTools. Retrieved November 10, 2022, from [https://conservationtools.org/guides/33-floristic-quality-assessment#:~:text=Floristic%20Quality%20Assessment%20\(FQA\)%20is,land%2Dmanagement%20and%20restoration%20practices.](https://conservationtools.org/guides/33-floristic-quality-assessment#:~:text=Floristic%20Quality%20Assessment%20(FQA)%20is,land%2Dmanagement%20and%20restoration%20practices.)
- Ralph, C. John; Sauer, John R.; Droege, Sam, technical editors. 1995. Monitoring Bird Populations by Point Counts. Gen. Tech. Rep. PSW-GTR-149. Albany, CA: Pacific Southwest Research Station, Forest Service, US. Department of Agriculture; 187 p
- Pennsylvania Department of Conservation and Natural Resources. (2023, February 1). *PaGEODE Pennsylvania GEOlogic Data Exploration Geologic Survey*. Retrieved from <https://www.gis.dcnr.state.pa.us/pageode/>
- Soil Survey Staff. (n.d.). *Websoil Survey*. (N. R. Service, Editor, & U. S. Agriculture, Producer) Retrieved January 10, 2023, from <http://websoilsurvey.sc.egov.usda.gov/>
- Weigel, G. (n.d.). Plant Stewardship Index. Outdoor Living PA. Retrieved February 4, 2022, from <https://www.plna.com/page/PlantStewardshpIndex>