



# Ecological Restoration Plan

Brightside Farm Park

Grassland Bird Sanctuary

Charlestown Township

RFP # | Date



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## Introduction

Brightside Farm Park (BFP) currently exists primarily as former agricultural fields left without intervention beyond consistent mowing. Residents of and visitors to Charlestown Township utilize this park and its walking path for passive recreation such as walking dogs, bird watching, and enjoying greenspace. The park adjoins Brightside Farm and its community gardens. A stream and its floodplain cut through the northwest of the park where volunteers maintain some riparian buffer plantings. Charlestown Township enlisted Resource Environmental Solutions (RES) to assess the site and create an Ecological Restoration Plan to translate the findings into actionable items that can be prioritized and implemented in a practical way to benefit the human, wildlife, and floral residents of the township.

RES performed a rapid assessment of BFP to determine existing habitat type and condition, and potential interventions. Full methodology, results, and discussion can be found in the Ecoassessment Report (to be delivered 1/31/23). Encouraged by Dan Mummert of the Pennsylvania Game Commission, the project's overarching goal has remained native grassland habitat restoration for BFP to support a robust grassland bird community. Led by the goals of creating a grassland bird sanctuary and creating overall ecological uplift, RES created the following Ecological Restoration Plan. Grassland birds have been recognized as the guild experiencing the greatest losses of individual birds in the past 50 years and highest risk of extinction in North America. This is due to, primarily, loss of functional grassland systems from conversion to row crops and/or development (primarily residential but also industrial) and, secondly, habitat quality degradation by invasives species and lack of adequate management.

## Existing Conditions and Interventions

### Hayfield to Grassland

Approximately 75% or 50 acres of BFP is currently comprised of former hayfields (Unit 6 in Figure 1) with low quality habitat conditions including a significant abundance non-native grasses commonly used in forage hay, such as timothy (*Phleum pratense*), tall fescue (*Festuca arundinacea*), and orchard grass (*Dactylus glomerata*) as well as invasive species such as Johnson Grass (*Sorghum halepense*), Japanese Stiltgrass (*Microstegium vimineum*), and autumn olive (*Eleagnus umbellata*). The goal of treatment is to convert these hayfields to high-quality warm season grasslands that support a more diverse and abundant trophic web from the primary taxa of interest, grassland birds, all the way down to the insects that support them.

The strategies are a combination of seasonally appropriate mowing, herbicide application (in locations with concentrated invasive plant colonies), and native seeding. Mowing should occur outside of nesting season. Time of year restrictions (TOYR) for mowing will be from May 1 – August 31 (with possible additional TOYR in winter pending monitoring results). Any herbicide (glyphosate) application for meadow management will be timed after mowing to target fresh regrowth of specific invasive plants (spot treatment) to allow herbicides to penetrate the foliar layer and cycle through the plant to effectively eradicate the intended species while minimizing any overspray. Any herbicides used by RES are applied by licensed, experienced, professionals according to labels, safety sheets, and industry accepted best practices. Eradication of invasive species and their seed stock is crucial to optimizing habitat to promote growth of native seed.

After controlling the invasive species, a native grassland seed mix will be drill seeded.

- 1 part [PA Piedmont Province UPL Meadow Mix](#) (10 pounds per acre/\$34.28 per pound)
  -
- 1 part [PA Piedmont Province UPL Grass Mix](#) (10 pounds per acre/\$13.14 per pound)

In a 10-foot buffer to either side of the trail, an esthetically pleasing wildflower-heavy mix will be installed.

- [Showy Northeast Native Wildflower Mix](#) (10 pounds per acre/\$99.78 per pound)

Maintenance will include spot treatment of invasives over the first three growing seasons and mowing. If the township has interest and ability to secure a team and permits, RES will create a fire management plan similar to that operated by Longwood Gardens in their meadows. Use of fire as a management tool can have significant ecological benefits and should be considered as a valuable long-term management strategy.

# Brightside Farm Park Grassland Bird Sanctuary Existing Habitat

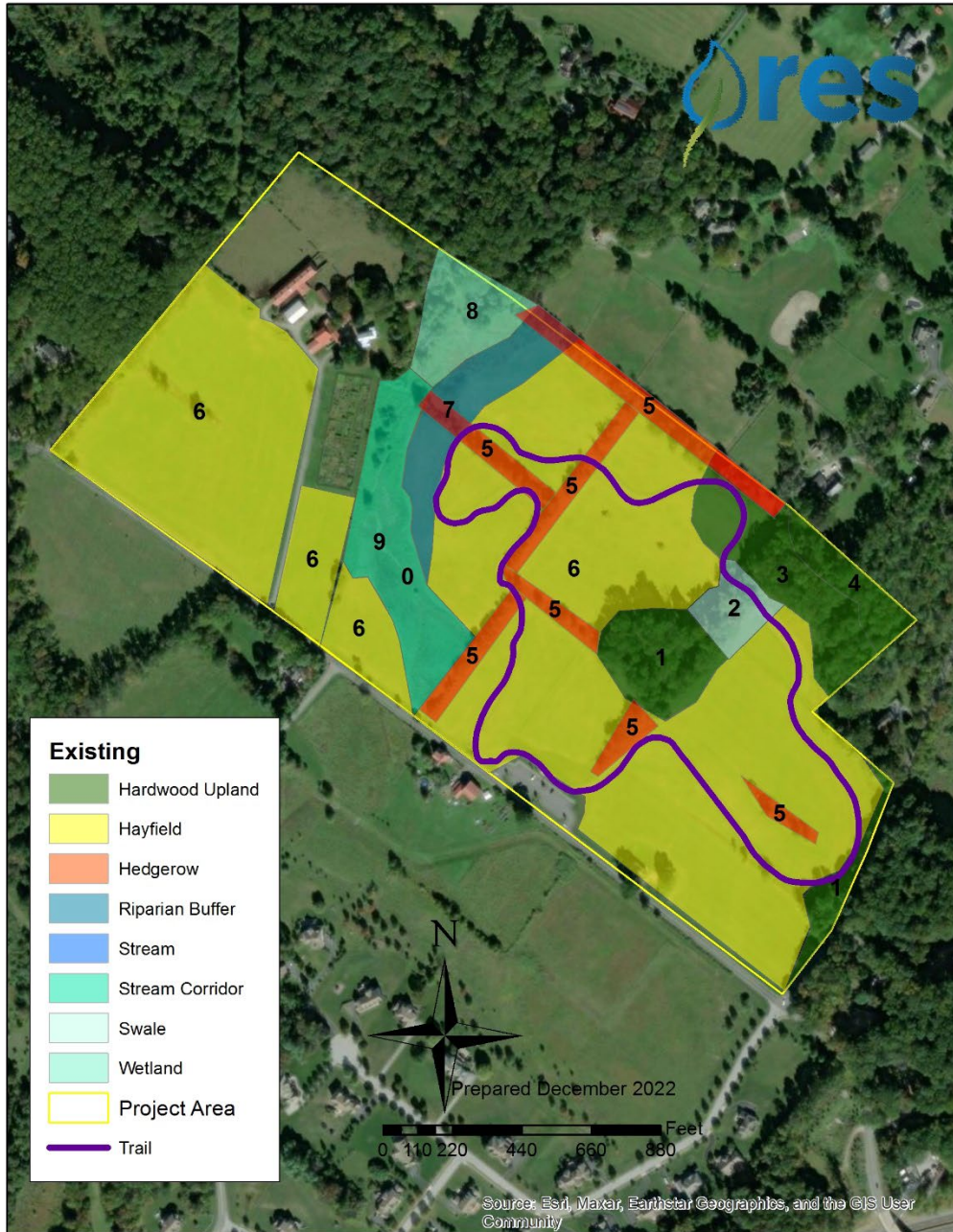


Figure 1 Existing habitat as documented at Brightside Farm Park in 2022. The management unit numbers correspond to Table 1 and to the written descriptions of each habitat type.

# Brightside Farm Park Grassland Bird Sanctuary Existing Habitat Quality

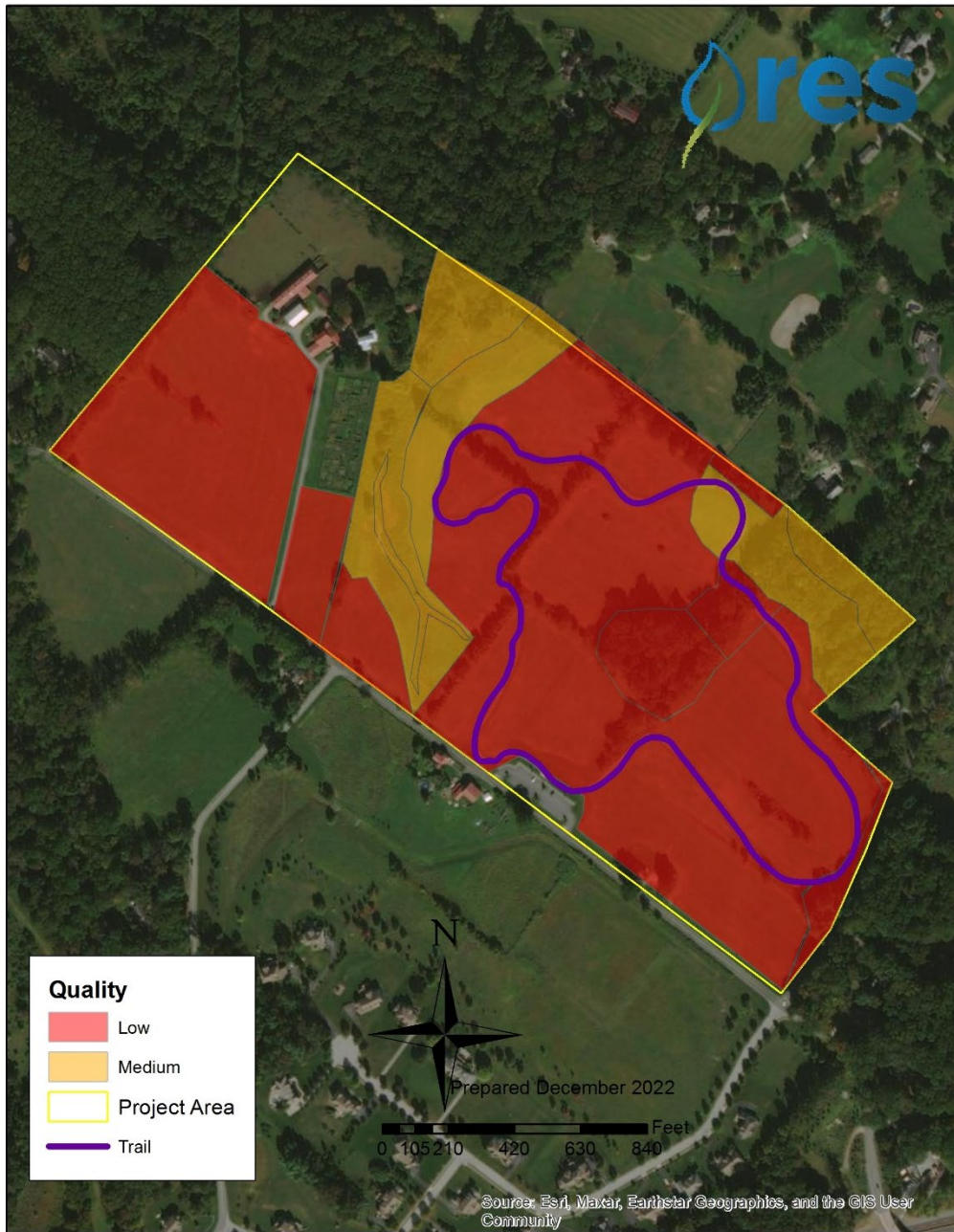


Figure 2 Existing Habitat Quality at BFP.

## Hedgerows to Grassland

The current hedgerows (Unit 5 in Figure 1) at BFP break the site into smaller hayfields and prevent the ability to support grassland birds. Invasive vines and shrubs such as Japanese barberry (*Berberis thunbergii*), bittersweet (*Celastrus orbiculata*), bush honeysuckle (*Lonicera maackii*), multiflora rose (*Rosa multiflora*), and wineberry (*Rubus phoenicolasius*) dominate the hedgerows. The few forbs that are found in the hedgerows are mostly invasive species, such as mugwort (*Artemisia vulgaris*), red clover (*Trifolium pratense*), and Canada thistle (*Cirsium arvense*). In its current condition, these hedgerows are providing some structural habitat for a few common (native and invasive) bird species (ex. song sparrow, gray catbird, European starling, and house sparrow) but have very little nutritive value. Their presence inhibits grassland birds from occupying the site in any meaningful fashion. Removal of the hedgerows was initially suggested by Dan Mummert and the PA Game Commission and RES fully concurs. Increasing the contiguity and quality of grassland habitat will greatly increase diversity and abundance of grassland birds.

Hedgerow removal will begin with mechanical brushing and use of a forestry mower in wintertime. Any species prone to clonal reshoots such as Tree of Heaven (*Ailanthus altissima*) will be painted with Garlon-4 Ultra, a bark penetrating oil, to prevent clonal reshoots. Cut stumps will be painted with Garlon-3 to prevent any resprouting. This herbicide treatment prevents large amounts of herbicides or superfluous mechanical work from needing to take place in the future. In the spring, invasive resprouts will receive a foliar treatment of triclopyr.

The hedgerow areas will be seeded with the same mix as the grasslands (PA Piedmont Province UPL Meadow/Grass Mix) to suppress regrowth of any non-natives and create continuity of habitat.

## Hardwood Upland

Several sections of hardwood upland exist in the east of BFP, and conditions range from low to medium quality. The first area of hardwood uplands (Unit 1 on Figure 1) contains an anthropogenic clearing in the center and a proliferation of invasive species. Breeding birds in this location were observed to be very similar to the hedgerows, with hearty, generalist species dominating the community. All invasive species should be removed, including tree-of-heaven and Norway maple (*Acer platanoides*). Black walnut (*Juglans nigra*), black cherry (*Prunus serotina*), and tulip poplar (*Liriodendron tulipifera*) should be selectively thinned to remove dead/dying and densely arranged trees. All oaks (*Quercus species*) and hickories (*Carya species*) should be protected. All older, open-form native trees will be retained. Few trees on site are older than 80 years and these will be maintained/stewarded. This conversion to savanna should result in approximately 60% openness and 40% canopy closure (retained second-growth trees), with clustered plantings of native shrubs. The herbaceous layer is nearly 100% Japanese stiltgrass in modified areas/clearings, then transitions to nearly no herbaceous cover within the invasive shrub thickets. The habitat mosaic of true grassland and oak savanna on site will provide critical habitat for a variety of rare and declining species in Northeastern United States

The second area of hardwood uplands (Unit 3 in Figure 1) is in better condition and has more quality trees to maintain. It will transition into woodland and should retain 50-60% canopy cover.

The third area of hardwood uplands (4) transitions into a larger tract of forest leading off of the property. This area should act as a buffer to encroaching invasive species from outside of the site.

Invasive species should be removed and the existing understory layer of spicebush (*Lindera benzoin*) should be maintained.

In each of these areas, invasive trees will be cut and stump treated with Garlon-3. Some trees will be dead-headed to create snags for wildlife habitat. Persistent herbaceous invasives will be treated with glyphosate using backpack application while invasive woodies will be targeted with triclopyr.

Seeds will be broadcast after invasive removal. Plugs will be planted in clusters with deer fencing around each cluster.

#### **Seed Mix**

- [Partially Shaded Area Roadside Mix](#) (20 pounds per acre/\$34.04 per pound)

#### **Plugs**

- Winterberry (*Ilex verticillata*)
- Elderberry (*Sambucus canadensis*)
- Red Osier dogwood (*Cornus sericea*)
- Mapleleaf viburnum (*Viburnum acerifolium*)
- Blackhaw (*Viburnum prunifolium*)

#### **Upland Swale**

The upland swale exists in the hardwood uplands between Units 1 and 3 and currently provides low quality habitat. The drainageway conveys stormwater from a small sub-watershed (Unit 1 and subset of Unit 6) which has resulted in conveyance of invasive plant material into the adjacent woodlands. Much of the shrub layer is dominated by invasive plants and very few herbaceous plants are growing here (resulting in unstable soils that are mobilized during storm events). Similar to other areas of hardwood upland, some trees will need to be cut and stump-treated while others can be dead-headed for habitat creation. The invasive understory needs to be controlled in this area using mechanical brushing and surgical herbicide application of Garlon-3 or 4 to woodies or triclopyr for foliar application. It may be necessary to place e-matting and native seed mixes to prevent erosion and sediment input into the existing drainageway and stabilize the area.

Additional stabilization and buffering will be provided by planting live stakes and seeding the area.

#### **Seed mix**

- [PA Piedmont Province Riparian Mix](#)

#### **Live Stakes**

- Black willow (*Salix nigra*)
- Ninebark (*Physocarpus opulifolius*)
- Elderberry (*Sambucus canadensis*)
- Smooth alder (*Alnus serrulata*)
- Silky dogwood (*Cornus amomum*)



## Riparian Buffer

The township and volunteers enacted some riparian buffer restoration efforts beginning in 2019 so continuing efforts would seek to build on existing activity and organization. This plan has identified a location within the meadow mosaic that, from a spatial ecology perspective, would least impact the grassland breeding bird community by adding trees and shrubs (Unit 7). The goal is to convert the herbaceous layer from hay grasses to native, warm season grasses and native forbs, then plant native FAC/FAC-W shrubs that are denser in the north where the water enters BFP and open into the grasslands as it moves further south.

Due to proximity to the stream, invasive control will be limited to mowing, mechanical removal and precision application with backpack spray of glyphosate as needed.

The grassland mix (PA Piedmont Province UPL Meadow/Grass Mix) will be drill seeded in the area. Plantings will be placed in clusters and fenced in for deer protection.

### Plugs

#### *Trees*

- American Holly (*Ilex opaca*)
- Black Willow (*Salix nigra*)
- River Birch (*Betula nigra*)
- White Oak (*Quercus alba*)
- Common hackberry (*Celtis occidentalis*)

#### *Shrubs*

- Inkberry (*Ilex glabra*)
- Flowering dogwood (*Cornus florida*)
- Mapleleaf viburnum (*Viburnum acerifolia*)
- Nannyberry (*Viburnum lentago*)

## Stream and Wetland Restoration

The focus of this project is restoration and creation of grasslands but does take a sitewide view since these onsite habitats are ecologically interconnected. While comprehensive stream and wetland restoration is outside the scope of this current project, as a next step, RES suggests completing a more detailed stream and wetland analysis and providing a plan for this area including bank stabilization, in-stream control structures, and beaver dam analogs. Efforts to improve this section could be in direct support of the towns MS4 requirements. RES did conduct a cursory stream assessment and found that increased stormwater volume from up-watershed is causing erosion within the wet meadow conveyance (i.e., upper reaches of the stream). This is causing a hydrological disconnection between the stream and floodplain/adjacent wetlands and simplification by invasive plant colonization. Retention and enhancement of stream-associated wetlands and intact native forb communities within Unit 9 is an important set of actions, and can greatly increase the site's resources for grassland birds as well as other species, while adding beauty and increasing water quality.

Table 1 Habitat Type, Quality, Conversion, and Intervention Table

Area Number	Existing Type	Quality	Proposed Type	Interventions	Notes	Methods
1	Hardwood Upland	Low	Savanna	Selectively thin canopy of walnut, cherry, poplar, and all invasives. Retain hickory and oaks. Plant native shrub and tree clusters. Remove groundstory and vining invasives	Low quality hardwood upland with anthropogenic clearing in center. Proliferation of invasives. Retain 20% canopy, 20% clusters, 60% open	cut/stump treat; foliar herbicide; dead-head trees to create snags, seed, plug, deer protection (cluster fences)
2	Swale	Low	Swale	Control invasives. Create enhanced buffer using livestakes and seed. Remove invasive understory, retain spicebush.	Stabilize drainageway	cut/stump treat; foliar herbicide; seed/plant/livestake; potential e-mat
3	Hardwood Upland	Medium	Savanna	Selectively thin canopy to 40%. Remove invasives, plant native clusters.	Transition to woodland. Swale moves through area.	cut/stump treat; foliar herbicide; dead-head trees to create snags, seed, plug, deer protection (cluster fences)
4	Hardwood Upland	Medium	Hardwood Upland	Control invasives. Create enhanced buffer using livestakes and seed. Remove invasive understory, retain spicebush.	May need to overseed or plant depending on proliferation of invasives	cut/stump treat; foliar herbicide; dead-head trees to create snags, seed, plug, deer protection (cluster fences)
5	Hedgerows	Low	Grassland	Remove all woodies. Retain select native trees/shrubs like Prunus. Control invasives.	Critical for grassland habitat creation	pre-application of bark penetrating oil for clonal offshoot species; forestry mower; winter brushing; on-site chipping; foliar application for resprouts; return application of herbicide; seed grassland mix and maintain
6	Hayfield	Low	Grassland	Convert to high-quality warm season grassland through mowing and seeding	Connecting patches and increasing native grass/forb community will greatly increase bird habitat suitability	mow; drill-seed grassland mix; spot treat invasives with backpack sprayer or mechanical removal
7	Riparian Buffer	Medium	Riparian Buffer	Convert to warm season grass and plant native fac/facw shrubs	Denser plantings in the north, gradient into grassland going south.	Mow; drill-seed grassland mix; spot treat invasives with backpack sprayer or mechanical removal. Plant trees and shrubs in clusters, mostly shrubs. Deer protection fencing of clusters. Maintain.

# Brightside Farm Park Grassland Bird Sanctuary Proposed Concept

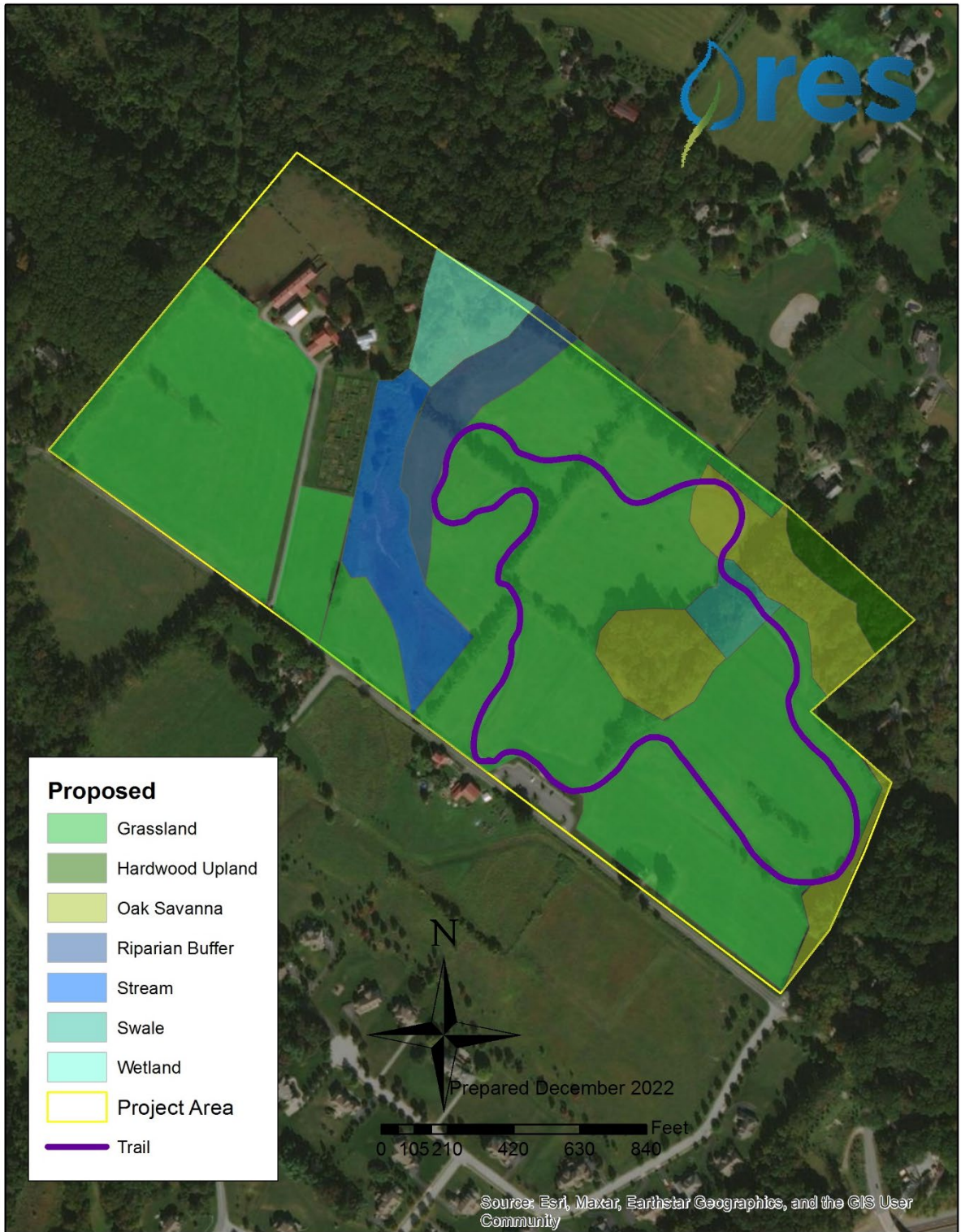


Figure 3 Map of proposed concept areas for Brightside Farm Park

## Maintenance and Monitoring

RES technicians will monitor the site for resilient invasives and if there were areas where the seed mix and plantings were underperforming. Any invasives that continue to thrive will be spot treated with herbicide, mechanically removed, or will be treated with a mixture of the two. Areas of sparse seed germination or survival will receive additional seed and will continue to be monitored for success. We anticipate 10 maintenance trips after installation.

## Schedule

*Table 2 This schedule shows ideal timing for implementation and maintenance and monitoring. 0 represents the as-built year, 1 represents 1 year after implementation, etc.*

Task	January	February	March	April	May	June	July	August	September	October	November	December
<b>Invasive Removal</b>												
Hedgerow Removal		0										0
Mow					0				0			
Herbicide Application					0				0			
<b>Planting</b>												
Seeding				0	0						0	
Plugs and Live stakes				0	0							0
<b>Monitoring and Maintenance</b>												
Mow			1,2									
Herbicide					1,2,3			1,2,3				
Overseed			1							1		