Preston Meadows: Transfoming a Former Airfield for Grassland Bird Conservation and Education

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1. **What is the purpose of this Project?**

   The purpose of this project is to create a park design which balances habitat creation with human recreation. Specifically, the design of this park will seek to create habitat for threatened migratory grassland birds while still providing recreational opportunities for humans; the goal being that by having some type of engagement with the birds, site experience will promote stewardship. This project will explain why there is a need for grassland bird conservation, why this particular site was chosen, and how allowing people to access the site can help educate them about the need for conservation.

2. **The History of Grassland Birds in the Northeast: Why is there a Need for Conservation?**

   Bird species which depend on savanna or grassland habitats have been seeing greater population declines than any other avian group in North America, especially over the last 25 years. Analysis of population trends on Breeding Bird Surveys from 1966 to 2002, have shown that 17 of 28 grassland specialist species have shown significant decline (Askins et al 2007). Therefore, there is a real need for conservation of this particular group of birds. Major factors leading to the decline of grassland birds are attributed to changes in grassland habitat, including changes in agricultural processes, loss of agricultural land to development and the suppression of natural disturbance regimes responsible for creating or maintaining grasslands (Askins et all 2007, Kress 2006). Prior to the arrival of European settlers, there were large expanses of grassland covering the interior of North America with grassland patches reaching out to the Atlantic coast. There is a popular misconception that before settlement, forests in the eastern half of the country were so dense that a squirrel could travel from New England to the Mississippi River without having to touch the ground. However, this was not the case. Natural grasslands were found throughout the North-east and were the result of natural factors such as lightning strikes igniting fires or hurricane force winds downing trees, and clearing patches of woodland (below). In addition, grasslands also occur in areas with infertile soil which does not support other vegetation types. Hempstead Plains is an example of a large 24,000
ha sandplain grassland located on Long Island, and is one of the best nearby examples of these large, naturally occurring grasslands (Askins et al 2007). Animals were also responsible for creating or maintaining grassland habitat. Large herds of grazing animals such as bison kept vegetation low, while other animals such as beavers, would clear patches of woodland to dam small streams and create their lodges (bottom left). Once the beavers ran out of suitable trees to fell, they would move on in search of new food sources. The beaver dams degrade under natural conditions and eventually fail, draining the once flooded area. This beaver meadow is now able to support various grasses and forbs before eventually being overtaken by woody vegetation, starting the entire cycle over again. In addition to beavers, Native Americans were also responsible for the creation of grasslands in the Northeast. Areas of forest near villages were often burnt for agricultural or hunting purposes, in turn creating conditions for graminoid vegetation to be established (Kress 2006, Vickery et al 2005).

With the arrival of European settlers, grassland bird populations saw a large initial increase, thanks to an increase in available habitat. The settlers cleared and burned most of the deciduous forests in the east for the creation of farms and settlements (below). The continued land clearing benefitted grassland birds which already occupied habitats associated with agriculture and hayfields (Kress 2006). However, as agricultural practices began to change with industrialization, former habitat was lost to practices such as earlier mowing, the spraying of pesticides and the shift to monoculture crop production. As the country expanded westward, the agricultural industry followed with many eastern farms moving to the west. Abandoned Eastern farmlands, now idle of activity, were allowed to revert to old field and second-growth forest. Finally, the remaining aban-
duned farmland and even operational farmland which provide grassland habitat are often sought after by developers. Unfortunately these landscapes are typically flat and open, making the development process easier and therefore making the land more desirable to business and housing developers (Kress 2006, NRCS 1999).

Because humans have either suppressed natural disturbance regimes such as forest fires, have changed agricultural practices and have either allowed grasslands to revert to woodland or be lost to development, grassland bird species are becoming dependent on man-made grasslands for habitat. Many industrial sites, such as capped landfills (below), reclaimed surface mines, airports and military bases, restrict the growth of woody vegetation for one reason or another, unintentionally creating the type of habitat favored by these birds. However, even with these industrial meadows, privately-owned agricultural lands still represent the largest proportion of grass dominated open land in northeastern North America (Askins et al 2007, Kress 2006). These man-made habitats, whether be industrial or agricultural are vital in linking an ever fragmented landscape, and could be important in linking large, grasslands and also in providing the amount of habitat needed.

### 3. Why Airfields?

The relationship of man-made, industrial meadows on airfields and their use by grassland birds is interesting and could also be vital in protecting the future of these birds, providing large amounts of habitat. Airport regulations restrict woody growth from areas around runways, making airfields a desirable nesting place for grassland birds (MAS “Managing Large Grasslands for Grassland Birds”). With habitat on active airfields, management plays a large role to ensure the success of nesting birds and includes practices such as deferred mowing schedules and reduced vehicular traffic in nesting areas (Askins et al 2007).

Two examples of habitat management in New Jersey can be found at the Lakehurst Naval Air Engineering Station and the Atlantic City International Airport (opp. page). Beginning in 2004, the New Jersey Audubon Society (NJAS), Parsons Brinkerhoff (ESRI business partner) and the New Jersey Transportation Authority began a program at the airport to mitigate loss of grassland habitat for two target species, the grasshopper sparrow and upland from proposed airport development. The airport now has the largest known breeding population of grasshopper sparrows (Ammodramus savannarum) in the state and the second largest known breeding population of upland sandpipers (Bartramia longicauda) in the state. The management regime includes prescribed burns (opp. page) by the NJ Forest Fire Service in order to control woody species and non-native invasives, and the planting of native warm-season grass species to improve habitat conditions (NJAS “Atlantic City Airport”).

Lakehurst Naval Air station is located in the Pinelands

Grasshopper Sparrow at Atlantic City International Airport
Project Site

Lakehurst Naval Air Station

Atlantic City International Airport

Reserve and contains over 1,700 acres of grassland habitat, supporting the largest known population of upland sandpipers and the second largest known population of grasshopper sparrows in the state. At Lakehurst, the NJAS has partnered with the Department of Defense to conduct research on the effect of mowing schedules during the breeding season of grassland birds (NJAS “Grassland Bird productivity on Military Airfields”).

This relationship between grassland birds and airports can actually be mutually beneficial to both parties if a proper maintenance/management plan is followed. As previously mentioned, due to airport safety regulations, airfields are required to mow in order to control woody vegetation near runways. In order to control woody vegetation, grass areas would only need to be mowed a few times a year, reducing overall maintenance costs associated with mowing. If the mowing schedule is coordinated with the breeding season of grassland birds, it will also provide the habitat needed for nesting and brood rearing without destruction by mowing equipment. An additional benefit by providing un-mowed areas during breeding season, is the determent of large, flocking birds such as Canada Geese and Gulls. These bird species prefer areas of very low vegetation and also pose the greatest threat to aircrafts. Grassland bird species on the other hand, due to their small size and low flying patterns, should not pose a threat to aircraft (MAS “Managing Large Grasslands for Grassland Birds”). This unique relationship of birds and man-made grassland sites is what sparked an interest in the subject.

Due to a loss of habitat, these specialist bird species are becoming more dependent on sites with similar habitat conditions as airfields. It is also interesting to know that management for grassland birds on airfields is not only possible but also beneficial; typically news of birds and airports is focused on keeping them out while this relationship actually invites them in. While these active management plans on sites such as airfields and military bases are vital in ensuring the success of these species, there is less of an opportunity for people to be educated about the management process and need for conservation. Since active airfields are typically off-limits to the general public due to safety and security concerns, it is nearly impossible to get them out into the habitat to experience both the unique vegetation and birds. Therefore the focus was on finding an airfield which was no longer operational, making it much easier for people to access the site and observe the birds and experience the space first hand. Education and direct contact are vital in creating an interest in grassland conservation within the non-bird enthusiast community visiting the site.

Section I: Introduction & Background
4. Grassland Management Practices

Management of grasslands by humans is critical to their survival now that many natural disturbance regimes, such as wildfires, are suppressed or have been eliminated (Vickery et al 2005). When it comes to managing grasslands the basic goal of any plan is to prevent the growth of woody vegetation, which would naturally transition to scrubland and woodland if given the chance. There are three basic methods for controlling woody vegetation and invasive species from overtaking a grassland site: mowing, grazing and prescribed burns. These methods are all effective for maintaining a grassland habitat, however, when specifically aiming to create habitat for grassland birds, certain considerations must be made when devising a disturbance schedule. Furthermore, the implementation of each of these techniques will vary slightly given the size and use of the site, that is to say, a smaller conservation site would have a slightly different mowing regime than an agricultural site used for livestock grazing (MAS “Grassland Birds”). Given the size of the project site, 56 acres, of which about 26 acres have the potential for quality grassland habitat, I have focused on standard management techniques from the MAS and NRCS scaled for smaller grasslands (10-75 acres).

A. Mowing Small Grasslands

Mowing is effective at maintaining fields in grasses and preventing the growth of woody vegetation and should occur every 1 to 3 years. Timing is crucial when mowing fields to prevent the destruction of nests and young birds. Recommendations are as follows:

- Delay mowing until after August 1 in areas where birds are nesting. Certain bird species such as savannah sparrows and eastern meadowlarks will raise a second brood later in the breeding season and early cutting can destroy nests.

- If mowing is necessary prior to August 1, locate nesting areas. Again this is to avoid the destruction of nests and young birds. It is also important to leave some areas uncut to still provide cover and food sources for birds.

- Limit mowing to every 1-3 years. Grassland birds do not require a field to be mowed every year in order to use it. Not mowing every year or delaying mowing allows for the development of late-blooming wildflowers which provide food to butterflies and other invertebrates.

- Maintain areas of fields with patches of bare ground. Species such as Horned Lark and Killdeer prefer areas of bare soil or very low vegetation for nesting and feeding. This can be done in areas where soil conditions are extremely poor and vegetation does not tend to grow anyway.

- Use conservative mowing practices. This includes techniques such as raising mower blades to six or more inches, avoid night mowing and using flushing bars on mowing equipment. These techniques are useful for flushing birds out of grasses rather than killing or injuring birds which may be roosting or nesting in grasses.

- Manage multiple fields for conservation. If adjacent properties are small fields for agricultural operations, removing hedgerows or large trees along property lines can give the illusion of a larger, continuous landscape, and therefore attract birds which require greater habitat areas.
B. Grazing on Small Grasslands

Grazing can be beneficial to grassland wildlife because it can create a variety of grass heights throughout a site. However, like mowing, proper techniques must be used to avoid over grazing which leads to a loss of plant diversity and wildlife shelter. Experimentation is key to determine grazing patterns that work on any given site since plant material and wildlife present will vary. Recommendations are as follows:

-Keep 40 percent of vegetation cover at 8-12 inches in areas with nesting birds until August 1. In addition keep some areas un-grazed to improve nest success. Vegetation height can be managed by implementing rotational grazing, in which animals are rotated through several fields.

-Avoid overgrazing. Again this can be accomplished through the practice of rotational grazing. Overgrazing is harmful to both birds and the plants. Overgrazing of a field tends to lead to more nests being trampled by livestock and also leads to erosion and a reduction in plant and invertebrate diversity by creating excessive bare ground.

C. Prescribed Burns on Small Grasslands

Although not possible on all sites, prescribed burns are beneficial in removing built-up dead vegetation, increasing nutrients in the soil and controlling woody vegetation. Meadows that develop a thick layer of build-up, known as thatch, are not used by grassland birds because it inhibits movement on the ground to escape predators or forage for food. Recommendations are as follows:

- Burn every 2-6 years for best habitat. When possible provide adjacent unburned areas for nesting birds during burns.

- Burn in early spring. This is most beneficial to vegetation and occurs before the arrival of the birds on site.

- Plan the burn. Timing is important but to burn after snow melt and before the greening of vegetation and bird arrival, however other important factors such as relative humidity, wind conditions and direction, air temperature and fule conditions must be taken into account. It is also vital to incorporate firebreaks (existing or designed) in order to prevent the spread of fire to adjacent properties or undesired areas.

-Coordinate with the proper local authorities. Local fire departments can provide guidance and the required permits for prescribed burns.
D. Restoration Recommendations

Prior to implementing a management plan, restoration efforts may need to be utilized on areas that have been neglected and are starting to be overrun with woody vegetation or areas that have been used for row crops or alfalfa. In order to remove woody vegetation there are a variety of methods including mechanical, chemical or burning. Fire is the most effective at removing shrubs and encourages the growth of native species. Intensive burns may need to be conducted the first few years but can be reduced to once every 2-6 years once the site is under control, however controlled burns may not be possible in all areas. Spot treatment with herbicides on cut stems may also be necessary for difficult to remove tree and shrub species. It is especially important to remove any woody invasive plants from field edges which have the potential of overrunning open fields. In addition, clearing field edges that divide fields will increase the size of the restored grassland. Any intensive removal should occur outside breeding season to minimize disturbance to nesting birds.

Once areas have been cleared of woody vegetation, it may be necessary to replant the area with the proper warm-season grasses and forbs, especially if the land was used for row crops or alfalfa. The land should be disked in the fall and then once again in the early spring followed by seeding with native, warm-season grasses appropriate to the region and soil conditions (MAS “Grassland Birds”). Native grasslands contained warm season grasses as opposed to the cool-season grasses imported from Europe and grown for agricultural purposes. These cool-season grasses are preferred in agriculture because they begin their growing season earlier, allowing farmers to hay their fields 2-3 times per growing season. Warm-season grasses on the other hand begin growing later in the season and tend to grow in a bunching habit. This bunching habitat is important because it allows for native wildflowers to grow amongst the grasses and provides runways for the nesting birds. In addition the warm season grasses provide better perching posts for grassland birds, provide more seed and increase the amount of insects available as a food source due to the increase biodiversity of plants (Kress 2006).
5. Monmouth County Park Systems Field Management Program

Because this project site lies within, and is owned by Monmouth County, I have looked at their strategies for maintaining various grassland types. Monmouth County Park System recognizes the natural resource value of fields as both aesthetically pleasing and ecologically important, however, it should be noted that the county also groups athletic fields and lawn into this same “field” category. When a site is identified by the county as having substantial field resources, field management plans are devised to take inventory of specific cover type, a management plan depending on site objectives (open play, formal landscape, athletic fields, natural areas, agricultural), maintenance level and prescribed actions (schedules, specialty crews or equipment required). In terms of maintenance levels, there are 5 different levels depending on the type of area, with athletic fields and golf courses being level 1 or intensive maintenance, and receiving some form of maintenance every 1-5 days. Level 2 is routine maintenance such as open lawns in high visitation areas. Level 3 is low maintenance which requires mowing 1-3 times a year to control woody vegetation. Levels 4 is specific to agricultural land which is often leased to outside parties, there are maintenance requirements the county sets forth such as type of crop grown and the requirement of at least a 15’ grass buffer around the perimeter. Finally level 5, which applies most to this site, is for natural areas where there are specific wildlife and vegetation management objectives.

The County has a set of general prescriptions for natural areas. This includes a minimum annual mowing in early spring. The county does not conduct mowing in natural areas between May 1st and July 31st. The only exceptions are in wet areas which are cut during January when the ground is frozen and capable of supporting machinery or when specific management strategies are employed to control species composition. In order to achieve desired habitats the park system also uses disking, seeding, herbicide applications and burning. Frequency and methods of site disturbance are varied to create diversity in habitat conditions on site. Sites that have already been established with annual plants and grasses have the basic strategy of early spring mowing and are characterized by the park system as Old Field. Fields which have been converted from turf typically contain cool-season grasses and are maintained with more frequent mowing, twice in the spring and once in the Fall. Finally the park system also maintains shrublands and hedgerows in order to control invasive shrub and tree species which have the potential to overtake old field habitats. The preferred composition for these areas is a mix of small native trees such as flowering dogwood, and shrubs such as bayberry and winged sumac (Monmouth County Park System 2008).
Would this site work to attract grassland birds?

Grassland birds all require slightly different cover and site size requirements, therefore it is difficult to locate or manage a site which will work for all grassland birds species (Kress 2006). However, there are general requirements that the greater grassland bird guild will look for when choosing a site. Since this project is partly about conservation of grassland birds, I focused on 6 grassland obligates native to the Northeast and on the New Jersey Species Conservation Status List, the Bobolink, Eastern Meadowlark, Vesper Sparrow, Upland Sandpiper, Grasshopper Sparrow and Henslow’s sparrow. The general habitat and territory size requirements (below) for these species show that it is feasible to expect the site could handle all the species with the exception of the upland sandpiper which require a much larger habitat before it will nest.

In addition, when looking at the larger area of Marlboro Township (opposite page), there are many land use types such as agricultural fields, horticultural nurseries and other conservation areas which help to make a mosaic of grassland habitat types. In general, when trying to attract grassland birds, it is best to have larger sites; however, small sites are valuable in situations like this where they serve to connect other grassland patches in the region (Mattice et al 2004). According to Jennifer Mattice of the NJAS, “patches that are in close proximity to other open areas will tend to support more area-sensitive species than more isolated...
patches of equal size. The map above shows that there are many other grassland patches within Marlboro Township that are in close proximity. Also, in 2011, a study was conducted to determine if grassland birds would use small patches of grassland when they were available. The study used a 10.5 hectare site, roughly the same size as the Marlboro Airport, on a National Guard training site and found that despite its small size, it was still used by Eastern Meadowlarks, Savannah Sparrows and Bobolinks (Weidman 2011). Furthermore, the results of the study showed that 81% of Bobolink nests on-site were successful at fledging young, despite the large perimeter to interior ratio and small patch size. This study supports the idea that small, conservation lands are important in providing habitat and that the Marlboro Airport site could support a population of grassland birds.

Section I: Introduction & Background


1. Purpose of Case Studies

In order to inform the design process for the Marlboro Township site, six case studies were conducted using Mark Francis’s Case Study template. The purpose of the Case Studies was to examine what has been done on public parks created from former airfields, what ways public sites have blended the creation of various habitat types with recreation, and specific grassland management strategies on public sites. The case study sites vary in use (public park to wildlife refuge), scale (110 acres to over 2,000), location (West vs. East Coast), and intensity of site management (unstaffed to highly maintained). The first three case studies specifically focus on public parks created from land which was once a functioning airfield, and include Crissy Field in San Francisco, Warren G. Magnuson Park in Seattle, and Floyd Bennett Field in Brooklyn. The last three case studies specifically focused on sites which have grassland management as one of their main goals and include Big Brook Park, in Marlboro, NJ, Shawangunk Grasslands National Wildlife Reserve in Ulster County, NY, and Duke Farms in Hillsborough, NJ.
## 2. Crissy Field

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Crissy Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>1199 East Beach, Presidio, San Francisco, CA</td>
</tr>
<tr>
<td>Date Designed/Planned:</td>
<td>1990’s</td>
</tr>
<tr>
<td>Construction Completed:</td>
<td>2001 opened to public</td>
</tr>
<tr>
<td>Construction Cost:</td>
<td>34 million</td>
</tr>
<tr>
<td>Size:</td>
<td>130 acres</td>
</tr>
<tr>
<td>Landscape Architect/Designer:</td>
<td>Hargreaves Associates</td>
</tr>
<tr>
<td>Client/Developer:</td>
<td>National Park Service, Golden Gate National Parks Conservancy</td>
</tr>
<tr>
<td>Consultants/Architects:</td>
<td>ESA PWA (wetland engineers)</td>
</tr>
<tr>
<td>Managed By:</td>
<td>National Park Service, Golden Gate National Parks Conservancy</td>
</tr>
<tr>
<td>Context:</td>
<td>Former Army base and airfield, given to the National Park Service in the 90’s, converted into a park as part of the Golden Gate National Recreation Area.</td>
</tr>
</tbody>
</table>

View of expansive lawn, formerly runways

View of expansive lawn, formerly runways
Site Analysis: Crissy Field is located in San Francisco near the southern base of the Golden Gate Bridge. The Park is a thin strip which runs along the San Francisco Bay, bordered to the north by the bay and to the south by Mason Street and various historic buildings. The western end of the site is squeezed to a point and ends on the water, while the eastern end of the site ends at a marina. The layout of the park is broken into several distinct sections. On the west side is the West Bluff area featuring a wharf, an amphitheater and a picnic area tucked into sculptural earthwork. Just east of the West Bluff is the area where the runways of the historic airfield were located. This area remains completely flat and contains several sidewalks. The Golden Gate Promenade begins in the southwest corner of the airfield and follows the path of the old runway until it reaches the beach where it shifts course and follows the shoreline. There is a wildlife protection area which consists of reconstructed dune habitat on the north side of the airfield as well as a marine science center. East of the airfield is a restored tidal marsh which has limited access. The promenade continues on the north side of the tidal marsh and presents visitors with opportunities for wildlife observation. The park ends with the east beach and marina. This section features picnic areas, parking, beach access as well as marina access. In this section, there are also several sculptural earthwork mounds meant to mimic waves and bring contrast to the generally flat site. This area is also home to a bosque of trees at the eastern park entrance, one of the few areas with a rigid, formal planting design.

Site History: Originally, the site was occupied seasonally by the Ohlone Indians until the arrival of Spanish settlers in the late 18th century (NPS 2013). With the arrival of the Spanish, the site began to change uses frequently; first being the site of fortifications and missions, followed by horse stables, warehouses and then as a refuse disposal site. In the 1900’s, the tidal marshes were filled in for the 1915 Panama Pacific International Exhibition, an event to celebrate the completion of the Panama Canal. Following that event, barracks were constructed to house soldiers during WWI, followed by the construction of the airfield in 1919 (NPS 2013). From 1921 to 1933, the area was known as Crissy Army Airfield and was an important site for advancing aviation. Although it was no longer a primary airbase it was used for troop mobilization and aircraft still occasionally continued to use the site until 1974 (NPS 2013). After that the site remained in control of the military and was used as a hazardous waste disposal site (Landscape Voice “Crissy Field”).

Genesis of Project: In 1994, the Army handed over the site to the National Park Service, and in 1997 large-scale restoration efforts began to remove 90,000 tons of contaminated soil from the site. Starting in 1998, the NPS began to involve the community in planning the future of the site, listening to what the people desired from this public space. From 1998 to 2000, the extensive clean-up process continued with the restoration of 100 acres of park land, 16 acres of re-created dune habitat and 18 acres of re-created tidal marsh (NPS 2013).
**Design, Development & Decision-Making Process:** The physical design of the project was inspired by the ancient salt marshes that were originally there before man altered the landscape (NPS 2013). Hargreaves Associates also states on their project website that the earthwork was inspired by, “the convoluted landforms generated by bracing wind and wave attacks on an otherwise relentless flat site (“Crissy Field”).” The National Park Service involved the community in determining what uses the public wanted for the site (NPS 2013). These desired uses and the intent to restore the land to previously existing habitats were responsible for the development of the park. The Golden Gate National Park Conservancy was responsible for funding the project and also overseeing design and construction along with the NPS (Boland 2003).

**Role of Landscape Architect:** The landscape architect was responsible for the overall design of the park. ESA PWA was brought in to design the restored tidal marsh. ESA PWA continues to monitor the site to ensure that the tidal lagoon is functioning as intended (ESA PWA “Crissy Field Wetland Design & Management”).

**Program Elements:** The park offers a diversity of programming with many natural areas to observe natural processes (tidal wetlands, restored dune habitat) and to bird watch. It features several areas to picnic on the east and west ends of the park. In addition the West Bluff area features an amphitheater. There is beach access and marina access along the shoreline, as well as several fishing locations such as Torpedo Wharf in the West Bluff area. The park also features many pathways suitable for walking, running and biking. The large, flat area of the former airfield is ideal for activities such as kite flying or Frisbee throwing.

**Maintenance & Management:** The park is maintained by the National Park Service whose mission is to “preserve and enhance the natural, historic and scenic resources of the lands north and south of the Golden Gate for the education, recreation and inspiration of people today and in the future (NPS 2013).” The NPS provides a General Park Superintendent, Deputy Park Superintendent, as well as several operating and administrative positions responsible for maintaining the park. In addition, the park also relies on volunteers, and partners with non-profit organizations such as the Golden Gate National Park Conservancy. The GGNPC aids the NPS in acquiring funds and assistance to maintain and operate the park.

**User/Use Analysis:** It seems that many people use the site for exercise, socializing, fishing and other water sports and bird watching. Unless there is some type of special organized event, most of the activities occurring on site are unstructured.
Significance & Uniqueness of Project: The significance of this project lies in the restoration efforts on the site with the removal of contaminated soil and the restoration of previously existing habitats. While these sensitive habitat areas are off access to humans, Hargreaves did include signage to inform people of what is happening there and why humans are excluded from these areas. For instance the dunes are protected by a fence and on the fence there is a sign with an image of dune vegetation in bloom, explaining that while the plants are tolerant of harsh environmental conditions, they are fragile when it comes to being stepped on by human feet. There is another educational board near the tidal marsh, which contains images of several bird species which gives a brief explanation of how a coastal wetland works (Landscape Voice “Crissy Field”).

So What?: The thing I appreciate most about this site is the massive restoration efforts that were taken on to restore important habitat which had been degraded over the many years people have been using the site. Much care and research was given to the process to ensure that the habitats would function as naturally occurring ecosystem and also in the plant selection process.

Generalizable Features & Lessons: This park is a good example for restoration efforts and also for repurposing an industrial site. The remediation efforts and design elements pay homage to the natural conditions which once persisted before the influence of man. However it does not seem to reflect much on the airfield. The start of the Promenade follows the path of one of the former runways; however, there does not seem to have been a reuse of buildings such as hangars or materials.
### 3. Warren G. Magnuson Park

**Project Name:** Magnuson Park & Active Recreation Area  
**Location:** 7400 Sand Point Way NE, Seattle, Washington  
**Date Designed/Planned:** 1997 began planning, conceptual design approval in 2001, full approval in 2004  
**Construction Completed:** phase I-2006, phase II-2009, phase III-2012  
**Construction Cost:** 14.16 million  
**Size:** 350 Acres  
**Landscape Architect/Designer:** The Berger Partnership PS  
**Client/Developer:** Seattle Parks & Recreation  
**Managed By:** Seattle Parks & Recreation  

**Context:** Former Naval Airfield in Seattle converted to public park. Includes the creation of wetland and upland habitat as well as sports and recreational complexes (Berger Partnership “Magnuson Park”).

![Fin Art Display at Magnuson Park](image-url)
Site Analysis: The park is located on a former Naval base along the shores of Lake Washington in Seattle. The layout of the park groups active recreation into specific areas to the West and places for passive recreation and habitat creation to the East. The park is bordered on the western edge by Sand Point Way, to the north by facilities for the National Oceanic & Atmospheric Association, to the east by Lake Washington, and residential areas to the south. The western edge of the park contains many structures, some of which are owned by the University of Washington and some of which are used by the Parks Department for operational purposes. To the east of the buildings is the active recreation portion of the park containing many athletic fields, playgrounds, restroom and picnic facilities, a community garden and an amphitheater. East of the athletic fields are areas of the park which focus more on the creation of habitat (meadow, woodlands and wetlands) and opportunities for passive recreation. These areas include wetlands, an area known as kite hill, lake access, walking trails, open fields, an educational center and more wetlands to the south. There is also a public art installation simply known as fin art which uses fins from nuclear submarines to represent the dorsal fins of a pod of orca whales. Parking lots are located throughout the park and a roadway along the eastern side allows access to a boat launch. Facilities such as restrooms and picnic areas are located throughout the park (Seattle Parks & Recreation 2013).

Project Background & History: The area on the Sand Point Peninsula where the park is located was once a peat bog and forested hill prior to human development. In 1922, the Navy began construction of an airfield, leveling the site and filling in the bog; the navy base remained in operation for 50 years. In 1975, a large portion of the site was given to the City of Seattle for the creation of a public park (Rottle et al 2012).

Genesis of Project: The genesis of this project began when the land was transferred from the Department of Defense to the city in 1975. Eventually, additional land was transferred to the City and competing visions for what role the park should play in the community. The polarized views centered on either the design being envisioned as a place for people or as a place for restor-
ing the natural conditions which persisted on the site prior to the naval base. Proposed improvements to the park were challenged by neighbors of the park who took their issues with proposed designs to court; they were specifically against elements such as lighted athletic fields which they felt could be a possible nuisance, i.e. a source of light and noise pollution in a residential areas. The final design of the park won the people over by not making this a place specifically for recreation or specifically for ecological function, but by creating a symbiotic relationship between the two.

**Role of Landscape Architect:** The Berger Partnership was responsible for coordinating the team of various consulting firms to create the overall master plan, design and construction of the park (Rottle et al 2012).

**Program Elements:** The park contains many elements which cater to a variety of activities. In terms of active recreation such as organized sporting events, there are a total of 9 athletic fields in two different areas of the park, the sports meadow and the Mickey Merriam Sports Complex. These athletic fields allow for the play of sports ranging from organized sporting events to random, unstructured pick-up games. The park also offers 10 tennis courts, 6 indoor and 4 outdoor. There is also a community center located on the west side of the site which offers indoor basketball courts. The remainder of the site is dedicated to more passive activities such as walking, jogging, biking, kite flying, and birding. To accommodate these passive activities the park provides four miles of walking trails, open, un-programmed areas, and opportunities for nature observation. There is also a community garden area which, among planting beds, also contains an amphitheater for outdoor public performances and a tranquil garden dedicated to individuals with disabilities. Because of its location on Lake Washington, there are many opportunities for lakefront recreation. The park features boat launches as well as public swimming beaches and a wading pool for younger children. The park also features a fenced in dog run to the north where leashes are not required. The park features various nature programs for both children and adults. Programs centered around youth include school field trips, nature camps and service learning projects. Programs centered around adults and families include guided nature walks, “family backpacks” for self-guided tours, and special events such as “Celebrate Urban Nature” (Seattle Parks & Recreation 2013).

**Maintenance & Management:** In terms of controlling people from disturbing habitat, the park asks that visitors using walking trails remain on the trails in order to not disturb nesting birds or otherwise damage habitat. The Park also has a comprehensive vegetation maintenance plan (VMP). This plan gives specific management goals and maintenance techniques for the different areas of the park. The specific goals of the plan are listed as:

i. Maintain, preserve and restore the integrity of historic landscape elements within the Park.
ii. Regenerate the natural habitats of the Park. This includes the use of native plant material and the removal of invasive species.
iii. Promote stewardship and sustainability of the vegetation within the Park.
iv. Provide for active and passive recreation opportunities within the Park.
v. Integrate the diversity of landscapes and uses within the Park. This is mainly accomplished by providing limited access to habitat areas though walking trails.

In terms of habitat and wildlife, the VMP aims to increase the wildlife and habitat on site, enhance existing habitats, and incorporate chances for educational opportunities involving wildlife and a resource inventory of wildlife on the site. Enhancement comes from managing the habitats existing on-site such as woodland, then assessing the health of that habitat type and then removing problem or invasive species while planting species from the native vegetation community. A specific example of habitat management at the park is their “bird friendly” landscape around the community center. Plant materials were selected which could provide shelter, food sources, nesting and perching sites for native and migratory birds. The goal was to make the idea of backyard habitat visible to park visitors so these same principles could be applied in their own backyards (Seattle Parks & Recreation 2013).
Parks & Recreation 2013).

**User/Use Analysis:** Magnuson is a large, highly designed park due to the variety of intended uses. The park has many athletic fields and courts to facilitate active, structured recreation, 1.5 miles of accessible shoreline and a boat launch for water-related recreation, walking paths and trails for people preferring passive recreation, a community garden, an outdoor community theater, habitat areas and areas specifically designated for use by dogs. This park facilitates a wide range of uses and users from people who simply want to exercise, people who want to enjoy pleasing views of Lake Washington and surrounding scenery, people who want to enjoy wildlife, people who wish to access the water, and finally to people who want to take advantage of the public events and educational opportunities offered.

**Significance & Uniqueness of Project:** The significance and uniqueness of this project lies in the design which focuses on enhancing and restoring ecological function to the site, most specifically with storm water. The grading plan focused on moving water eastward across the site where water would be stored and filtered in constructed wetlands (below) before finally being discharged into Lake Washington. Previously all storm water was collected into an underground storm sewer system where it flowed directly into the lake. In addition this project also focused on the use of native planting materials, which would require less maintenance than non-native species and provide habitat to native animal species. Rice paddies on site were designed specifically for the native Pacific chorus frog. Species specific requirements dictated size and shape of the paddies, in addition to trying to make the habitat inhospitable to the invasive bull frog (Rottle et al 2012). This project also made an effort to blend human and animal use of the site, designating certain areas as habitat and others as recreational.

**Limitations:** From the research I’ve done and the images I’ve viewed of the park, there seems to be a lack of interpretive signage to inform visitors about restoration efforts undertaken and about the ecology of the park in general. They may exist, I’ve been able to find one educational sign for the “bird friendly” habitat which leads me to think there may be more throughout the park and that people simply have not taken photos of them.

**Generalizable Features & Lessons:** The design of this park focuses on restoring this former naval airbase to something more useable to both humans and animals. Areas of the park are distinctly divided into zones for recreation and zones for ecological function. Although the park does not seem to take many design cues from the former airfield, in a way the history of the site lives on through the reuse of on-site materials. Many old infrastructural elements were used as planters and benches to give interest to the site, while light poles from the airfield were used as bollards. In addition, it seems like a large focus of the park design was on storm water management and wetland creation. 10 acres of impervious surface were removed and replaced with 10 acres of wetlands, while 4 acres of poorly functioning wetland were rehabilitated. In addition, the site is capable of stor-
ing 5 million gallons of storm water which would have previously been pumped directly into Lake Washington. The design also chose to preserve existing stands of mature trees on-site, incorporating them into the site plan rather than removing them (Rottle et al 2012). The lessons learned from the site demonstrate how a park design can be successful in meshing together ecological function with recreational opportunities.

**Future Issues/Plans:** According to Magnuson’s Parks future agenda plan, the park is looking to possible restore and preserve historic naval buildings, install interpretive signing to educate the public about the historic significance of the site, add another trail loop and park entrance and continue to enhance the park’s natural areas (Seattle Parks & Recreation 2013).

**So What?:** The main takeaway from this site is the great care given to incorporating ecological functions into the site with passive and active recreation. The park does a good job at allowing people to access these areas through trails, however as stated previously, there seems to be a lack of interpretive signage informing visitors of what is occurring. Allowing people to at least access these areas and see the constructed wetlands or stands of mature woodlands is a first step which could be further enhanced with additional information. Educating the public about why natural systems such as wetlands are important, helps ensure that in the future people will actually care about them. What the park seems to lack in terms of signage it makes up for with educational programs and guided tours which aim to educate visitors about the park’s ecosystem. I like that the park provides nature walks guided by naturalists, but also gives families the opportunity to take their own self-guided tours available from tour-backpacks offered at the community center. Another important takeaway from this site is the species specific design for the Pacific chorus frog, a similar approach to what I’m taking with managing habitats on the airport site for specific bird species.
4. Floyd Bennett Field

Project Name: Floyd Bennett Field

Location: Jamaica Bay, Brooklyn, New York

Date Designed/Planned: 1971

Construction Completed: N/A

Construction Cost: N/A

Size: 1,400 acres

Landscape Architect/Designer: N/A

Client/Developer: National Park Service

Consultants/Architects: N/A

Managed By: National Park Service, Gateway National Recreation Area

Context: Originally a Municipal airport, purchased by the navy during WWII, converted to public park, now part of the larger Gateway National Recreation Area.
**Site Analysis:** Floyd Bennett Field is located on Jamaica Bay in Brooklyn, New York. It is part of the larger 26,000 acre Gateway National Park System managed by the National Park Service. This Park system is similar to the Golden Gate Recreation Area in San Francisco. The site sits on a peninsula, surrounded by Jamaica Bay to the South and East and Dead Horse Bay to the west. The northern portion of the site is connected to the urban portion of Brooklyn by a thin strip of land which also contains Flatbush Avenue, the main viaduct access point to the park. Along this strip of land is a Golf Range which is bordered to the south by Aviator Sports Complex, Aviator Sports and Event Center, Floyd Bennett Field Ranger Station and the park Visitor Center. There is a marina to the west of the Sports and Event Center on Dead Horse Bay, there are additional opportunities for fishing and boat access along the park’s shoreline. Further south of the Event Center is a section of the park used as a Community Garden. Portions of the site on the southern tip and eastern edge remain closed to the public and are still used by the Marines and NYPD. The remainder of the site is dedicated to passive recreation and offers hiking trails, picnic areas and opportunities for camping in an urban setting. The airfield runways are still intact although not operational, visitors can use the runways for windsurfing and bike riding. Cycling is a very popular activity on the runways with races often held on the weekends. The grassy areas around the runways are managed for grassland habitat and are not accessible to visitors (RPA & NPCA 2010). The area to the North of the site is known as the North Forty and provides opportunities for hiking, horseback riding and camping (NPS 2013).

**Project Background & History:** The site was originally opened in 1931 because New York City wanted a municipal airport within its city limits. The airfield was named after Floyd Bennett, a Naval Air Pilot who was the first person to fly over the North Pole. After Bennett’s historical flight, the site continued to be a place where many trans-Atlantic flights took place and aeronautical records were set. In 1941, the site was sold to the Navy after the opening of La Guardia Airport. The airfield was used by the Navy during WWII, the Korean War, Cold War and Vietnam. In 1971, as Vietnam war efforts were scaled back, the site was no longer needed and the Navy transferred the site to the National Park Service as part of the Gateway National Recreation Area, so named because the New Jersey and New York portions create the threshold to the New York Harbor (NPS 2013).

**Genesis of Project:** The site was acquired by the NPS as part of the GNRA shortly after the Naval Air station was decommissioned in 1971. Further land acquisition occurred as the Coast Guard no longer needed land on the site and transferred it to the NPS (RPA & NPCA 2010).

**Role of Landscape Architect:** I was not able to find any information about Landscape Architects and Floyd Bennett Field. The National Park Service employs landscape architects and therefore any work requiring an LA was likely completed in-house.
**Program Elements:** The park features many areas for active recreation which are concentrated on the east side of the site. There is a Golf Range operated by the Brooklyn Golf Center, housing a golf course and driving range. South of this is the Aviator Sports Complex which is not operated by the National Park Service but offers indoor facilities for hockey, soccer, basketball as well as entertainment events. The Sports Complex along with several other buildings on site has been repurposed from existing hangars. The Sports Complex also contains outdoor, synthetic turf fields and swimming pools. The marina provides water access for boats, while fishing areas are located at several points around the shoreline. Camping is allowed in several areas throughout the park however permits are required by the NPS to camp. A portion of the existing runway on the north end of the site is allocated for flying model aircraft (right) and an Equestrian center, operated by an outside vendor is located on the northeast corner of the site. The National Park Service also maintains several historic aircraft (top) in a hangar near the visitor center. This is part of a restoration program for historic aircraft and allows visitors to the park the opportunity to learn about the aircraft and restoration process. The airfield history is preserved further by the reuse of the former air control tower and terminal building as the park’s visitor (NPS 2013).

**Maintenance & Management:** As with many airports, the constant mowing to suppress woody vegetation while the airfield was in operation attracted many grassland bird species. When the airfield was decommissioned in 1971, there was no longer a need to suppress woody vegetation and natural succession began to reclaim the grasslands. In 1985, a grassland management plan was put into place as a joint project between the NY Audubon and NPS. A large central portion of the site (130 acres) amongst the runways is managed as grassland bird breeding habitat. Maintenance includes routine maintenance of woody and invasive vegetation to sustain grassland conditions (RPA & NPCA 2010, NYCA “Floyd Bennett Field and Dead Horse Bay”). Further specifics of the plan could not be found, but properly detail specific times of mowing, probably in the early spring prior to breeding season or late summer after birds have migrated south.
**User/Use Analysis:** The site presents a unique mix of active and passive recreation opportunities in an urban context. There are numerous opportunities for active recreation such as golfing, equestrian and field and court athletics offered by private concession vendors on site. The NPS also provides educational opportunities with its HARP program and historic information available in the visitor center. There is also unstructured activity such as fishing, bike riding, bird watching and wind surfing. The site is also used for educational purposes with its eco village, a campsite which brings city youth to the park in order to learn about the local ecology. Organizations such as the Brooklyn Audubon Society, NYC Audubon and New York State Audubon also hold organized birding events on the site.

**Significance & Uniqueness of Project:** This park, like Crissy field and Magnuson Park was acquired from a deactivated military base. The uniqueness of this park lies in the opportunities it presents city dwellers to experience a natural setting so close to a highly urbanized area. The site is also massive at 1,400 acres and the fact that almost 10 percent (130 acres) is set aside for grassland bird habitat is impressive.

**Limitations:** One of the major limiting factors of the site seems to be access. The park is set on a man-made peninsula in Jamaica Bay and is therefore somewhat isolated from the surrounding neighborhoods. The isolation factor is further enhanced by the belt parkway, which cuts through the site, dangerously low to the ground and at high speeds. The parkway is also the only access point to the site.

**Generalizable Features & Lessons:** This site repurposes many of the former airfield buildings (right) for new uses, restores and displays historic airfields and has kept runways intact all of which help to preserve the history of the site. In addition, similar to Magnuson Park and Crissy field, certain areas have been designated for active recreation opportunities while others have been set aside as habitat areas. There also seems to be an adequate offering of guided educational programming about the park’s natural systems whether it’s offered by the NPS (eco-village) or from outside groups such as the Brooklyn Audubon Society.

**Future Issues/Plans:** A Blue Ribbon Panel Report was drafted in 2010 to set goals for management and improvement of the park. The aim of the report is to make the site a premier park within the Gateway National Park System. The plan seeks to further develop the meshing of human use and natural systems on the site, giving suggestions for future management and design (RPA & NPCA 2010).

**So What?:** Compared to Crissy Field and Magnuson Park, Floyd Bennett Field does the best job at preserving the history of the site as an airfield, keeping several hangar, the runways and terminal intact. There is also a balance between human use of the site and a desire to maintain and enhance habitats on the site with the GRAMP. Having 130 acres devoted to grassland bird conservation in such an urban setting provides a great amount of public exposure to grasslands, grassland birds and the need for conservation. With that said, I have not been able to determine if there is any type of educational signage on site or information in the Visitors Center to inform people that such a program even exists on site.
5. Big Brook Park

Project Name: Big Brook Park

Location: Route 520, Marlboro, NJ

Date Designed/Planned: Purchased by Monmouth County Parks in 1997

Construction Completed: N/A

Construction Cost: N/A

Size: 415 acres

Landscape Architect/Designer: Monmouth County Parks System

Client/Developer: Monmouth County Parks System

Consultants/Architects: N/A

Managed By: Monmouth County Parks System

Context: Large county park dedicated to grassland management, minimally programmed. Activities geared towards walking, running, biking, bird watching. Minimal signage, limited to park map near parking area, no educational signage.

Goldenrod emerging from Meadow
Site Analysis: Big Brook park is located in Marlboro Township, Monmouth County, New Jersey. The site is bordered by route 520 to the north, Route 79 to the west, Boundary Road to the east and Stevenson Drive to the south. The main entrance to the park is off rt. 520, this area also contains a small parking lot, and a kiosk with a large site map and park brochures. There is also an access road from this entrance which brings people to Camp Arrowhead, a YMCA camp located on a northeast portion of the site which is not operated or maintained by Monmouth County. From the parking areas there is a paved trail which cuts through the many meadows and takes visitors south. Near the center of the park the paved pathway splits towards the west, where it meets back up with the Henry Hudson Trail, and to the east where it meets up with boundary road. In addition to the paved pathways there are various mowed pathways through the meadows. The topography of the site slopes upward toward Camp Arrowhead with the uplands of the site containing woodlands with many mature tree species. There are various hedgerows and tree-lines intersecting the patchwork of meadows, remnants of the site’s agricultural past.

Project Background & History: The grounds on which the park lies were once used as agricultural lands to support the State Psychiatric Hospital (MCPS “Big Brook Park”). The former hospital was located directly across Rt. 520 from the park’s entrance. The land saw a variety of agricultural uses ranging from a piggery, to dairy farm to crop production. In 1997, Monmouth County Park Systems purchased 379 acres from the state once the hospital was closed to establish a new regional park. Following that, the County purchased an additional 36 acres in 2001, bringing the total acreage up to 415. The park received its name from Big Brook, a small stream which runs through the site and empties into nearby Swimming River Reservoir. Genesis of Project: Once the land was acquired from the state, Monmouth County began managing the site as grasslands for the primary purposes of habitat protection and passive recreation.

Design, Development & Decision-Making Process: There is not much design in terms of design at the park. That is, there are very few structures (an orienting kiosk
and a bridge), no athletic fields, no playgrounds, no seating areas and no obvious planting design. Monmouth County Park Systems has its own team of landscape architects, planners, engineers and ecologists who were responsible for developing site uses, programming and layout. Any plans have to be approved by the board of Freeholders.

**Role of Landscape Architect:** The team of Landscape Architects and Engineers for MCPS are responsible for the design and grading of park entrances, parking areas and any grading associated with the paved pathways. The County Ecologists are responsible for the actual layout of the trail system within the park.

**Program Elements:** Because the site focuses on passive recreation and habitat preservation, there is very limited programming. The site contains a main paved pathway and several mowed trails (bottom) which pass through grasslands, woodlands and wetlands. There mowed pathways are not marked; however, the park provides maps at a kiosk adjacent to the main parking area. The paved trail contains a few signs, but they mostly direct visitors toward the Henry Hudson Trail and warn people of possible hunting activity within the park. The variety of experiences offered by the trail are pleasing, however there is no signage or displays to educate visitors about what they seeing. As mentioned the kiosk at the entrance has a brochure with the park map, a brochure of various Monmouth County Parks and a brochure for the Henry Hudson Trail, however there is no specific information about animals, plants or habitats occurring at Big Brook.

**Maintenance & Management:** MCPS has its own Field Management Guide which sets guidelines for managing different types of field conditions ranging from formal, high use athletic fields to conservation areas with specific management goals (MCPS “Field Management Guide”). Big Brook Park falls under the category of Conservation Area and is therefore managed to provide grassland habitat. Under the management plan, sections of the field are mowed every year in the fall in order to control woody vegetation. The county has seed mixes which they use on their grasslands if needed. There is also a focus on removing invasive plant species on the site, typically invasive species are controlled by mowing; however, herbicides are also used. If necessary, heavy machinery is used to remove larger species such as deeply rooted shrubs or trees.
**User/Use Analysis:** Mostly people walking, jogging, biking, also used for bird watching, certain parts of the park are opened for deer hunting between October and February. The park also allows equestrian use of the parks trails.

**Significance & Uniqueness of Project:** The significance of this park is that is a large protected patch of grassland habitat, as well as a mosaic of woodland habitat in an area that is otherwise highly developed. The large, contiguous patches allow for bird species sensitive to small patch size to use the site, and the diversity of edge conditions and woodland allow for further species diversity.

**Limitations:** The site lacks interpretive and educational signage to inform visitors about ecology within the park. A self-guided tour pamphlet at the main entrance kiosk could be an easy way to educate visitors about the different habitats and species occurring within the park.

**Generalizable Features & Lessons:** This site offers a sensible strategy for the actual management of grasslands; however, it has a serious lack of programming. The takeaway lesson from this site is to make sure that you provide people with opportunities to learn about what is going on at the site, i.e. what animals might a person expect to observe, why grassland preservation is needed. People who are avid birders or nature lovers may not take issue with the lack of signage; however, if you are attempting to educate the general public about grassland conservation they would have no idea this was the focus of the park. For users who simply want a large area to walk, run or bike this park provides a paved pathway with a varied experience (both scenery and topography) as users traverse the site.

**So what:** As stated before in the significance portion, this site is valuable to the surrounding area because it offers a large contiguous grassland habitat. In addition it provides a chance for passive recreation in Marlboro Township, which mostly contains facilities geared towards active recreation. There is a large diversity of wildlife on the site ranging from butterflies, to birds, to insects and mammals; however the average person is not made aware of this. There is a serious lack of signage when it comes to explaining what is happening on the site in terms of the natural world. The site is very minimally programmed, no benches, bathroom facilities and minimal signage. MCPS has a “nature series” brochure program with various pamphlets focusing on insects, birds, mammals, reptiles and trees. Some of these pamphlets could be included at the kiosk which could enhance visitor experience as they walk along the trail ways and ID species.
### Shawangunk Grasslands NWR

<table>
<thead>
<tr>
<th><strong>Project Name:</strong></th>
<th>Shawangunk Grasslands National Wildlife Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>Ulster County, New York</td>
</tr>
<tr>
<td><strong>Date Designed/Planned:</strong></td>
<td>Established in 1999</td>
</tr>
<tr>
<td><strong>Construction Completed:</strong></td>
<td>Restoration Efforts On-going</td>
</tr>
<tr>
<td><strong>Construction Cost:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Size:</strong></td>
<td>566 acres</td>
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<tr>
<td><strong>Landscape Architect/Designer:</strong></td>
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<tr>
<td><strong>Client/Developer:</strong></td>
<td>U.S. Fish &amp; Wildlife Service</td>
</tr>
<tr>
<td></td>
<td>National Wildlife Refuge System</td>
</tr>
<tr>
<td><strong>Consultants/Architects:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Managed By:</strong></td>
<td>U.S. Fish &amp; Wildlife Service</td>
</tr>
<tr>
<td></td>
<td>National Wildlife Refuge System</td>
</tr>
<tr>
<td><strong>Context:</strong></td>
<td>Developed to support migratory grassland birds and wintering raptor populations. One of Two sites in Hudson Valley large enough to support the entire assemblage of grassland bird species. Before being transferred to the FWS the site was owned by the Army and contained the Galeville Military Airport. The site is part of the larger Wallkill River Wildlife Refuge Complex.</td>
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Transforming a former airfield for Grassland Bird Conservation and Education
Site Analysis: The 566 acre site is located in Ulster County, New York. The site is bordered to the west by Hoagerburgh Road, to the north by Long lane and to the east and south by residential and agricultural properties. Overall, the site sits amongst a larger mosaic of agriculture and woodlands with interspersed residential areas. The site itself contains woodland and shrubland portions to the west and in the northeast corner; the remainder of the site is managed as grassland. The site can either be accessed from Hoagerburgh Rd or Long Lane.

Project Background & History: The Shawangunk Grasslands NWR was formerly the site of Galeville Military Airport (FWS “Shawangunk Grasslands”). The army established a base on the land during WWII. The site was used by several different government agencies such as West Point Military Academy and the FBI before being turned into a wildlife refuge. In 1994, the Department of the Defense no longer had a need for the site and it was transferred to the Fish and Wildlife Service (FWS) in 1999. Since the transfer to the FWS the focus has been to maintain 400 of the 566 acre site as grassland habitat.

Genesis of Project: The project began to take shape shortly after the land was transferred to the FWS (FWS “Shawangunk Grasslands”). The goal was to maintain a majority of the site as grassland for migratory birds and wintering raptors. The site had been maintained as grassland while the airport was in operation through mowing and livestock grazing, however similar to Floyd Bennett Field, once the airfield was abandoned, woody shrubs and trees began to populate the site. Mowing and brush removal restored the core habitat of grassland. The latest project on the site has focused on removing or burying the concrete runways, followed by reseeding the areas with native grasses.

Design, Development & Decision-Making Process: The Fish and Wildlife Service along with the National Wildlife Refuge System were responsible for assessing the site and developing a management plan for future site use and habitat enhancement (FWS “Shawangunk Grasslands”). This plan focuses on maintaining the majority of the site as grassland for the various animal species reliant on this habitat type (scheduled mowing, woody and invasive species removal). Specific details of the management plan are found in the Maintenance & Management section.

Program Elements: The site is very minimally programmed. It lacks restroom facilities and potable water and is open daily from dawn until dusk. There are a total of 3.6 miles of hiking trails with an information kiosk at the trailhead and two observation/bird blind structures along the trail. The trails are minimally maintained, and the conditions vary with season. Visitors must stay on the provided trails, pets are not allowed, feeding wildlife and collection of plant or animal species are prohibited. The park is unstaffed, with the nearest FWS staff members located in Sussex, NJ as the Wallkill Refuge Head-
quarters. Beginning in 2013, the refuge will sell hunting permits for archery hunting of white-tailed deer. Most activity on the site is geared towards bird/nature observation and photography. Running, biking and horseback riding are prohibited on the site since these activities could be disruptive to target animals and plant species.

**Maintenance & Management:** The site is unstaffed and relies on signage to instruct visitors about the rules while visiting the site. There is a great deal of maintenance which occurs on the site in order to keep the majority of the land grassland. The refuge relies on regular mowing, brush-hogs, hydro-ax and prescribed burns to keep woody vegetation under control in the grasslands and to control invasive species such as purple loosestrife and phragmites. Specific species management plans focus on six grassland dependent birds that currently or historically occupied the site. These species include Bobolink, Savannah Sparrow, Grasshopper Sparrow, Upland Sandpiper, Northern Harrier, and Short-eared Owl. The focus of management is to maintain the core 400 acre grassland habitat with a secondary focus on maintaining the remaining 165 acres as woodland and shrubland. The FWS has removed the majority of trees and shrubs from the grassland; however several larger trees were left as singing perches for grassland songbirds and hunting perches for raptors.

**User/Use Analysis:** The use of the site is for the observation of wildlife and enjoyment of the natural scenery. The main goal of the site is to provide valuable grassland habitat for migratory bird species. Therefore the site is very minimally programmed and geared towards being more animal friendly than people friendly. This is a place where people interested in bird watching or nature photography come; it is not a place for walking a dog, playing football or having a family picnic. The refuge offers two bird blind structures to accommodate bird watchers and it has a general information kiosk to inform visitors of rules and regulations as well as to orient them to the site. Other than these two items the park is devoid of further program elements, lacks restroom facilities and has a carry-in/carry-out policy.
**Significance & Uniqueness of Project:** This project is not unique in the sense that there are many programs in place to serve as wildlife refuges; however, it is significant in the size and quality of protected grassland habitat it offers to migratory bird species. As stated on the refuge website, the reserve is one of two grasslands in the Hudson Valley large enough to support the entire assemblage of grassland birds.

**Limitations:** Because the site serves as a wildlife refuge, the amount of programming and activities allowed on the site is extremely limited. The site is unstaffed which creates use conflicts; with no one to police the site, it is very easy for people to carry out unapproved activities such as biking, horse-back riding, and dog walking. There is a lack of signage and educational/informational material to educate the general public that I am aware of. I was not able to find photographs of the bird blind/observation structures or kiosk to determine the exact type of information, if any is available. There may be information at the Wallkill Refuge Headquarters, however that is far from the site and the majority of people wishing to use the site would probably never make the drive.

**Generalizable Features & Lessons:** This site focuses on wildlife-based recreation. While people are allowed on the site, their use of the site is very limited to not disturb the wildlife residing on the site. Therefore, acceptable activities are seasonal hunting, walking, nature observation and photography; activities which are minimally disruptive during the critical summer breeding season.

**Future Issues/Plans:** According to the refuge website, the park is looking at other surrounding parcels to determine increased habitat size. The refuge is also looking to create a “friends of” group to help with outreach and maintenance on the site.

**So What?:** The most attractive feature of the site is the large, uninterrupted patch of grassland habitat. However there is a serious lack of educational and informational material once people access the site. Due to the fact that it is a wildlife refuge, and the main purpose is to provide quality habitat for local plant and animal species, and then allow limited recreation opportunities for humans. However the FWS is missing a great opportunity to educate the general public about conservation and getting them excited about the natural world. The “friends of” group is a good start but further public outreach could be enhanced by ranger guided tours or special birding events such as bird and nest counts during the breeding season.
### Duke Farms

- **Project Name:** Duke Farms  
- **Location:** 1112 Duke Parkway West, Hillsborough, N.J. (908) 722-3700  
- **Date Designed/Planned:** Designs of the property began in 1893 by J.B. Duke and use adapted over the next 100 years, current mission adopted in 2006.  
- **Construction Completed:** The most recent expansion and projects were completed in 2012  
- **Construction Cost:** 45 million  
- **Size:** 2,470 acres, 464 devoted to grassland habitat  
- **Landscape Architect/Designer:** Andropogon Associates  
- **Client/Developer:** Duke Farms Foundation  
- **Managed By:** Duke Farms Foundation  

**Context:**  
Originally the home to J.B. Duke and his family, eventually the property was repurposed after extensive renovation and restoration efforts “To be a model of environmental stewardship in the 21st century and to inspire visitors to become informed stewards of the land.”

![Old Hay Barn on Estate Grounds](transforming-a-former-airfield-for-grassland-bird-conservation-and-education)
Site Analysis: Duke Farms is a large site located off route 206 in Hillsborough, New Jersey with a variety of habitats and uses. The park contains a more formal park-like area, originally constructed by J.B. Duke as the grounds for his estate. This area, along with much of the remaining property has been restored and enhanced for ecological function. The park-like region is located on the north side of the site, across from the centrally located visitor center complex. The visitor center area contains the sites parking lot, offices and visitor center and serves at the arrival destination to the site. From the Visitor center there are many paved pathways in addition to trams which disperse people throughout the site on-foot and by bicycle. The remainder of the site is reserved for agriculture, habitat protection, education and horticultural research.

Project Background & History: The site was originally developed as the estate of tobacco tycoon J.B. Duke. Duke transformed the agricultural and wooded land into a picturesque style park, excavating 9 artificial lakes, building 2.5 miles of stone walls and 45 structures. After he passed away, the property was left to his daughter, Doris Duke, who protected the land from suburban sprawl by continuing to acquire surrounding land. While alive, Doris Duke stayed mostly isolated on her estate, but did allow occasional chaperoned tours of the property. Upon her death in 1993, she declared that the land be preserved to protect wildlife and used for horticulture, agriculture and research. This last will and testament lead to the development of Duke Farms’ primary objective of environmental stewardship (DFF “Duke Farms”).

Genesis of Project: The genesis of Duke Farms began with the passing of Doris Duke and her last will and testament to preserve the land for the environment. Restoration efforts began in 1998 and are on-going, ranging from installing deer fencing, removing invasive plant species, restoring wetlands, woodlands and grasslands, installing community gardens and improvements to make the site accessible to all visitors. The improvements also included repurposing existing buildings using sustainable design such as the main barn. This building now serves as a visitor orientation center, offering rest-rooms, information and food to visitors. Duke Farms has partnered with many organizations such as the National Resource Conservation Service, Audubon Society and Rutgers University to conduct research and restore habitats (DFF “Duke Farms”).

Eastern Bluebird House in Meadow
Design, Development & Decision-Making Process:
Although Doris Duke had passed away during the renovation of the site, her last will and testament dictated future use and helped shape the goals of the site as a premier example of environmental stewardship. The Duke Farms Foundation, in line with Doris Duke’s last wishes, is responsible for the operations, management and future plans of the site.

Role of Landscape Architect: Andropogon and Associates came up with a comprehensive master plan for the site which mainly focused on the orientation center area and formal landscaped portion of the site. Duke Farms has partnered with Rutgers in doing research on their grassland bird management. While there are smaller meadows in the park-like region of the site, the larger, core grassland habitats are located west of this area. Other partners include the Raritan Piedmont Habitat Partnership and New Jersey Audubon.

Program Elements: The goal of the site is to serve as an example of environmental stewardship toward the public. Therefore Duke Farms has done extensive restoration and renovation projects to the site, both to restore the land and to facilitate educating the public. The orientation center gives visitors background information on the site and provides educational information about programs set in place on the site. The orientation center gives visitors to the site the opportunity to customize their own tour. The Visitor Center also has several educational displays which summarize the various goals of Duke Farms, as well as introduce visitors to the types of plants, animals and habitats they can expect to see. There are many examples of green technology and techniques used on site, which also contain information on how the public can duplicate these practices at home. For example, just outside of the visitors center is a biological wastewater treatment installation with educational signage explaining how it functions. In addition to educating the public about environmental stewardship and sustainable practices, the site is also used for recreation. Many people come to the site to walk, run, bike, bird watch and cross country ski in the winter. To accommodate these activities there are many miles of paved trails and seasonal bike rentals offered at the orientation center. There are also public programs such as a community garden and guided tours throughout the grounds (DFF “Duke Farms”, Zernike 2012).
Bird Blind near One of the Many Artificial Lakes

**Maintenance & Management:** While the site contains 1,100 acres of agricultural and grasslands, 464 of those acres are specifically managed for breeding grassland bird management. The management of these grasslands includes delayed, rotational mows after the birds have migrated in the fall. The management plan also focuses on the removal of invasive plant species such as Japanese stilt grass (NJA “Duke Farms”). These conservation grasslands are used for research by Duke Farms, Rutgers, NJA and the Raritan Piedmont Habitat Partnership and are off limits to the public. However there are several smaller meadows within the portion of the property open to the public. Like the conservation areas, these smaller meadows are managed for the removal of invasive species and the control of woody vegetation.

**User/Use Analysis:** The site is used for a variety of activities ranging from recreational to educational. For some users, Duke Farms is simply a scenic place to run, walk, cycle, and roller blade. For others Duke Farms provides great opportunities for bird watching, nature photography or plein air painting. Still others come to the farm for the educational opportunities it presents. The Farm is a great place to learn about sustainable practices such as rainwater collection, solar energy, reclaimed building materials and the use of native plant materials. In addition, the trail ways located on the property have educational signage identifying habitats, animals, plants, historical buildings and horticulture.

**Significance & Uniqueness of Project:** This site is significant for the amount of habitat and open space which is preserves in an area which is highly developed; one of the largest privately owned land parcels in the State. This project is also significant for its educational components which include interpretive displays, educational programs offered to the public and research programs involving university groups and organizations such as the Audubon Society which specifically focus on grassland birds and grassland management.

**Limitations:** It was difficult to find any limitations with Duke Farms, they have the size and resources to create useable grassland habitats and also the resources needed to educate the public through signage, displays and tours.

**Generalizable Features & Lessons:** Duke Farms is an excellent example of trying to convey a message to the public. The purpose of the site is to promote environmental stewardship which it does by educating the public with abundant signage and information about the ecology of the site, green technologies and site history.

**So what?:** Duke Farms does a lot with grassland management; however the main takeaway from Duke Farms is not so much the grassland management aspect but the educational aspect. Duke Farms applies a great deal of effort in to ensuring people are educated about what is happening around them from the moment they step out of their cars. Inside the Visitors Center are informational displays about the animals, habitats, plants and sustainable practices occurring on-site which continue throughout the site along the 18 miles of trail ways.
All six case studies had some similarities despite the fact that half focused on former airfields converted to public parks and half focused on sites with grassland management programs in place. The two main lessons I learned from the case studies are that:

1. It is possible to design a site with goals to create/enhance native habitats and still provide recreational opportunities for humans.
2. Interpretive displays are vital to communicate ideas/information to the public regarding the site.

In terms of finding a balance between wildlife and human site use, each site was different and employed different strategies. Crissy Field and Magnuson Park had clearly designated zones for habitat preservation and zones for human use. At Crissy Field, humans were not granted access to the dune and tidal marsh habitats, but still had opportunities to observe from the edge. The remainder of the park was completely open for typical park activities such as exercise and socializing. Magnuson Park was similar to Crissy Field, concentrating active recreation on one portion of the site while leaving the remainder of the site for passive recreation and designated habitat zones. Unlike Crissy Field, users of Magnuson have access to these habitat zones via trails and pathways; however, they are expected to remain on the provided pathways. Floyd Bennett Field was also similar to Magnuson Park in that it concentrated active recreation in one specific area, while leaving the remainder of the site minimally programmed. These areas, such as the North 40 and grasslands surrounding the runway are dedicated towards providing habitat for wildlife. Visitors are still allowed to use the runways for recreational activities such as windsurfing and bike riding; however, they are not permitted to enter the grasslands. Similar to Magnuson Park, there are hiking trails on the north side of the site, making the woodlands more accessible to humans.

Duke Farms, Big Brook Park and Shawangunk

Grasslands differ from the above sites in that their goals are mostly towards the preservation of habitat, specifically grassland, and do not focus on incorporating as many recreational opportunities, with the exception of Duke Farms. Duke Farms offers many opportunities for passive recreation; that is, walking, running, and bike riding, and facilitates those activities with trails, pathways and bike rentals. At Duke Farms the site also functions somewhat like a museum, making education much more recreation-like. While Duke Farms does not allow access to the grassland bird breeding management area, users of the site’s trail system encounter grasslands and other habitat types on a slightly smaller scale as the travel around the property. At Big Brook Park, there are no recreational facilities such as baseball fields or tennis courts, the focus of recreation here is simply to allow people the enjoyment of experiencing the large meadows and woodland patches of the site. Shawangunk is very similar to Big Brook Park in that its main purpose is providing protected habitat for grassland dependent species. Big Brook Park and Shawangunk both supply trails and pathways to move through the site, with Shawangunk also supplying two bird blind structures. At each park visitors are expected to stay on pathways, especially at Shawangunk, so as not to disturb breeding birds. All of these sites allow access or at least opportunities to view habitat, making these areas important for wildlife and for recreational/educational for human users.

What most of the sites lack, with the exception of Duke Farms and Crissy Fields, are interpretive displays about the site, whether it is about animals, plants, habitats, or history. Duke Farms is fortunate because it is heir to the wealth of a former tobacco magnate and therefore has money to spend on public programs, improving the grounds, and providing various ways of explaining what is happening. Since it is also Duke Farms’ objective to be a model of environmental stewardship, the Duke Farms Foundation has made certain that the sustainable design techniques they use are evident. The idea is that people can learn about these lessons at Duke Farms and apply them at home. Crissy Field also has signage explaining what is happening in the Dune habitat area and why it is not accessible to people. In addition, there is also signage explaining how a tidal marsh functions and some
displays regarding site history. Since I've never been to Magnuson Park and I could not find graphic evidence of signage existing on the park other than one about the “bird friendly” habitat, I can only speculate that it is lacking. I have also based this information off the fact that in their plan for the future of the park, interpretive signage is on the list of desired improvements. Big Brook Park is almost completely devoid of any signage other than a few way-finding signs and a kiosk with park map at the entrance. This is also very similar to the situation at Shawangunk. Signage could also be useful in describing the history of sites as well, especially for Magnuson Park and Crissy Field. Floyd Bennett Field repurposed hangars and the flight terminal, restores historic aircraft and has kept runways intact. When people are visiting Floyd Bennett Field, they can immediately recognize that it was a former airfield. This does not seem to be the case at Crissy Field or Magnuson Park.

The lessons from these case studies can inform the site design at Marlboro airport by finding that right balance of human recreation and habitat enhancement on site. This includes determining what activities are acceptable on site and during which times of the year. Since the majority of grassland species are migratory, certain behaviors and access to breeding habitat would be off limit during the spring and summer months. However, during those months there will still be opportunities for recreation such as nature photography and bird watching. Designing a varied experience in terms of moving through the site and what happens along pathways will also aid in keeping people out of wildlife sensitive areas by keeping them interested in the programming offered. Educational signage will play a great role in informing users as to why they may be asked to stay out of certain areas during certain times or why certain activities are not permitted. Signage is also key in communicating messages such as a need for conservation, across to users who may otherwise be unaware. Educating the public about the meadow, birds and other wildlife on the site aids in making a connection so that when those people leave the site, they will care more about what they have witnessed. The average person, not an avid birder, may use the site, observe some nice wildflowers and birds, but be completely oblivious to the site’s importance in conserving a specific type of habitat and group of animals without the appropriate information. Finally repurposing existing airfield infrastructure on the site is a way to keep the historic significance of the site alive. Magnuson Park did this by using old infrastructure as planter boxes, seating and site artwork, while Floyd Bennett Field has kept many structures intact, continuing to use them for educational programs and visitor amenities.
1. Site History

The history of the site’s use as an airfield dates back to 1954. The owner of the property, Rhea Preston was a flight enthusiast and inquired to the township about restrictions on opening an airfield after the closure of Hazlet airport. When the township told him that there were no restrictions he traveled to Trenton to obtain the proper permits and opened a grass runway on a flat portion of his property. Initially it was mainly a hobby that garnered some extra income for Preston however with time the small airport began to expand in size and use with additional hangars and structures being added. In 1970 the property was purchased by Everett and Dorothy Fenwick who continued to grow the business, adding a paved runway sometime between 1970 and 1972. Personal accounts paint the airfield as a popular general aviation airport with its users who would have BBQ’s and socialize around the hangars after flights. The airport was renamed at some point between 1975 and 1979 to Marlboro Airport and was purchased by new owners Leornard and Aletta Genova in 1986. The Airport seemed to be at its height of operation between 1985 and 1990 with as many as 80 to 100 aircraft using the site.

The situation on the site began to go downhill beginning in the 1990’s when the Leornard Genova’s health began to decline. The owners searched for potential buyers for the site and began a deal with Lino Fassio in 1997, however the Genova’s ended up backing out of the contract. At this point Fassio, also a pilot who used the site, claimed someone was sabotaging his plane. In 1998, Fasio and a passenger were involved in a fatal aircraft accident near Hillsborough. The next year Leornard Genova passed away and his wife again searched for a new buyer. In 2000 the property was purchased by Marlboro Holdings LLC, a company formed by a former pilot and two Staten Island residents (Freeman 2013).

The story of this airfield takes an interesting turn with the acquisition of the property by this new ownership group. When Marlboro Holdings took control of the airfield, they had told the concerned users of the site that they had intentions of maintaining the site as an operational airport. However in January of 2002 the group said it was interested in phasing out operations at the airport due to safety and security concerns, citing previous crashes at the site and the incidents of 9/11. Marlboro Holdings desired to have the land rezoned for...
the development of a 300 home active adult community. With this news a grass-roots movement campaign, The Committee to Save Marlboro Airport, formed to oppose the rezoning of the airfield. A petition was circulated which was able to gain 1,000 signatures in support, however this was not enough to save the site (Vilacoba 2002).

In August of 2002 pilots were notified that they needed to remove all property from the site. The township zoning board was voting in favor of the rezoning of the site for residential purposes. Eventually through FBI investigations it was discovered that the Mayor had actually taken bribes in order to speed up the zoning process. With the exposure of this scandal, the development zoning was repealed and the area was rezoned as “special conservation zone”, meaning that there could only be one residential structure per 5 acres (Cullinane 2007).

The site then sat unused for several years until finally Monmouth County Park Systems acquired the property some time after 2007. The majority of the structure which once stood on site have been demolished and the few that remain are in very poor conditions.

2. Recreational Opportunities in Marlboro Township

An inventory of recreational amenities offered in Marlboro Township reveals an abundance of active recreational opportunities and a lack of passive recreational opportunities (map on following page). The township lists a total of 12 recreational sites which all contain some type of athletic field or court. Of the 12 listed facilities, only the municipal complex lists a walking path which could be considered a passive recreation amenity.

Two other sites, Hawkins Road Park and Faison Road Park contain open lawns, which could also be used for unstructured, passive recreation; however these features are not listed on the municipal website (Marlboro Township “Parks and Facilities”). Within the township there are two facilities owned and maintained by Monmouth County which offer opportunities for passive recreation, the Henry Hudson Trail and Big Brook Park. The Henry Hudson Trail is a 24 mile, 10 foot wide linear strip of land converted as part of the National Rails-to-Trails network.

This trail system connects Freehold, NJ to Highlands, NJ on the coastline, a portion of which borders the Marlboro Airport site. The trail is primarily used for walking, running, biking and inline skating as it passes through a range of surrounding landscapes (MCPS “Henry Hudson Trail”). Big Brook Park is located about 1.75 miles south-east of the Airport and provides one main, paved trailway through the site as well as several unpaved pathways mowed through the surrounding meadows. Like the HHT, which also connects to the site, many people use this site for biking, walking, and jogging. This site also allows horseback riding and seasonal hunting (MCPS “Big Brook Park”).

Currently Monmouth County lists the Marlboro Airport site as a recreation area. By their definition, a recreation area primarily serves the function of providing outdoor active recreation facilities, however may also provide indoor facilities for athletics or special programming. As of the County’s 2006 open space plan, there was a total of 897 acres of recreation areas; this does not include Deep Run (Marlboro Airport). In the 2006 plan, Marlboro Airport was listed as a new county park site with the key assets as, “Large open flat site suitable for recreation development, Located to serve heavily populated northern portion of county, Adjacent to Henry Hudson Trail for easy bicycle/pedestrian access.” The county also states that suitable uses would include athletic fields/courts and possible indoor facilities. The stipulation is that recreation areas are required to be a minimum of 75 acres, which currently the Marlboro Airport site is not (MCPS 2006).

I feel this land would better serve the community, both animal and human, by remaining a predominately passive use space which capitalizes on enhancing the existing grassland conditions for animal species. Although MCPS does not have facilities within Marlboro Township which offer active recreation, the Township makes up for this deficit by offering 12 different parks and facilities geared towards active recreation. This makes the need for a recreation area focusing on athletic fields and courts unnecessary because the local community is already served in this capacity by the township’s facilities.
Recreational Opportunities within Marlboro Twp.
<table>
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<tr>
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<th>Name</th>
<th>Active Recreation Facilities</th>
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<td>3</td>
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<td>Marlin Estates Park</td>
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**Section III: Site Design**
3. Site Inventory

A. Soils & Topography:

USDA soil maps list the soil conditions in the area as Klej-Keyport-Urban Land and as having somewhat poorly drained and moderately well drained, sandy and clayey soils. Observed on-site soil conditions support this data. The site is generally flat, and slopes slightly downward from the eastern side to the western side with micro-topography varying throughout. Although detailed topographic data for the site could not be obtained, USGS topo quads showed the grade change to be less than 20 feet across the entire site. The area between the between the runway and the parallel taxiway seems to have been graded as a shallow swale to collect runoff from paved surfaces. Towards the western end of the site the grade slopes gently to the southwest toward Deep Run, a small stream which cuts through the west end of the property and continues along the southern border. This area must have somewhat poorly drained soil, as it has often contained standing water during site visits.
B. Vegetation:

The location of this site sits on the edge of the Piedmont Plains and Pinelands Regions of the state and therefore contains plant species common to both. Vegetation on the site is varied with mostly Little Bluestem and some cool season grasses covering the open areas around the runway and taxiways. Other native warm-season grasses such as Switch grass and Indian grass were also identified although they were not common. There were several native trees species beginning to emerge in the grass-dominated regions of the site including Pitch Pines, Sweet Gums and Atlantic Red Cedars. The wet meadow areas of the site were mainly dominated by bull rush with some sporadic little blue-stem and sphagnum moss. The surrounding woodlands on the south and west ends of the site contained a mixture of native tree species including sweet gum, red maple, red oak, white oak, beech, river birch and paper white birch. The woodlands on the west end of the site also contain clusters of pitch pine while the edges are mostly dominated by river and paper birch trees. It was also noticed that many of the birch trees seemed to be planted in several organized rows, leading me to believe that part of this property was once owned by the adjacent nursery. The edge condition here is very dense, with small trees spaced at close distances and thickets of shrubs and green briars.

C. Invasives:

Invasive plant species were observed throughout the site and are of particular concern in the grass-dominated areas. If left unchecked, the woody vegetation could quickly overtake these areas. The species which pose the greatest threat to this area are multi-flora rose and callary pear which are emerging throughout. Russian olive was also observed growing around the 3 remaining structures on the south side of the site, however, it is not nearly as numerous as the multi-flora rose and callary pear. The reason for the great number of callary pears is due to the neighboring cemetery which contains a monoculture of these invasive tree species, which are used to line the cemetery’s access road. Towards the western end of the site Phragmites are beginning to emerge in the wet areas. Currently the Phragmites is concentrated in a relatively small portion of the site, but could potentially spread if given the opportunity. Oriental bittersweet was spotted along the woodland edge near the parking area. Upon inspection it appeared to only be growing over a few birch trees near a foot bridge where the HHT crosses the Access Road, however it is likely that more bittersweet persists along the wooded edge.
Existing Vegetation Zones

- Turf Grass
- Grass Dominated
- Wetland
- Invasives
- Pitch Pines
- Mixed Oak Forest
- Impervious Surface

*Little Bluestem (Schizachyrium scoparium)
Fescue (Fescue spp.)
Switch Grass (Panicum virgatum)

*Bulrush (Scirpus L.)
Sphagnum Moss (Sphagnum spp.)

*Callery Pear (Pyrus calleryana)
*Multiflora Rose (Rosa multiflora)
Common Reed (Phragmites communis)
Oriental Bittersweet (Celastrus orbiculatus)
Autumn Olive (Elaeagnus umbellata)

Red Oak (Quercus rubra)
White Oak (Quercus alba)
Sweet Gum (Liquidambur styraciflua)
Beech (Fagus grandifolia)
River Birch (Betula nigra)
White Birch (Betula papyrifera)
D. Animal Species:

Unfortunately site visits have occurred during the fall and winter seasons when grassland birds have migrated south, therefore any presence of these birds could not be confirmed. With that said a variety of other bird species have been observed on site including turkey vultures, red-tail hawks, killdeer, eastern bluebirds, grey catbirds, mocking birds, American woodcock, blue Jays, Northern Cardinal, robins and several unidentified species. In addition to avian species, several deer were spotted in the woodlands on the western side, while a woodchuck, red fox and feral cat were observed on the east end of the site near the Henry Hudson Trail. A surprise sighting included one amphibian species, the New Jersey Chorus Frog, in the swale between the runway and taxi-way.
E. Adjacent Properties:

The site is bordered to the north by a cemetery of which only a very small portion has grave plots with the remainder being an expanse of highly maintained turf grass. The cemetery contains one access road which runs parallel to the northern border of the site and contains a row of approximately 40 callary pear trees and two mausoleum type structures which are highly visible from the site. To the east of the site is the Henry Hudson Trail followed by a residential property, which upon observation, appears to have some agricultural activity (evidence of row crops). The southern end of the site is primarily bordered by privately owned woodland and contains several homes. Deep Run, for which Monmouth County Parks has named the site, flows parallel to the southern border a few feet off the property line. The west side of the site is bordered by the same woodlands and extends out to Harbor Road. In addition there is/was a nursery operation to the northwest which could be a potential source for invasive species depending on what is grown there.
F. Access & Circulation:

Currently the site is accessible one of two ways, from an unmarked entrance off route 79 and from the Henry Hudson Trail on the eastern edge. Because there is no signage on route 79 it is very difficult to find the access drive or even know the site exists. Vehicles that do manage to find the entrance will travel down a short asphalt road, cross the HHT, and immediately find themselves in a gravel parking area. Once parked there are no signs to inform a person that they are actually in a public open space; the only clues that the area is somewhat maintained are a trash can with attached 5-gallon bucket serving as a recycle bin. There is wooden post and rail fence bordering the parking area with an opening and pathway that leads to the east end of the runway. Access from the Henry Hudson Trail brings a person to the same parking area. There is a steep, 5 foot grade change from the HHT at the northeast corner of the site making access difficult. Again there is no signage identifying the site from the trail, only signs at the trail access point identifying it. Once people have accessed the site, circulation occurs on the existing runway and taxiways. There was a single mowed cut diagonally from the east end of the runway toward the cemetery but it didn’t seem to serve a purpose.

**Existing Site Circulation**

- Pedestrian Circulation
- Vehicular Circulation
- Site Entrance
- Parking Area
- Wooded Area

Transforming a former airfield for Grassland Bird Conservation and Education
Site Entrance Traveling Southbound on Rt. 79

Site Entrance Traveling Northbound on Rt. 79

Parking Area

Looking North From the HHT Entrance near the Parking Area

Former Taxi-way now used for Circulation

Mowed Pathway through Grasses

Section III: Site Design
G. Current Uses:

From site visits it would appear that most people are unaware the site is open and accessible to the public. Of the four site visits, only two people were spotted using the site on two separate occasions. Both users were simply using the runway and taxiway as a walking loop. While people were not using the site directly, several individuals were observed, biking, running and walking past the site on the HHT. There are traces of human use from the trash scattered around the site and the graffiti on the few remaining structures.

F. Analysis:

There are major issues with the site when it comes to access, invasive plant species and views. Beginning with access, there needs to be some type of signage on route 79 to inform visitors to the site of its existence as well to inform them of the entrance location. These could be solved very simply by installing a park sign (below) on Rt. 79, similar to the park signs Monmouth County already uses. The same can be said for those individuals accessing the site from the HHT, when walking on the trail a person must cross the access road leading to the parking area; however there is no signage informing people they are walking past a public space. Also the sense of arrival to the space could be improved upon. A person entering the site by car is first confronted with a dilapidated building which detracts from the pleasing grasses beyond it. The best solution would be to simply raze the structure. Although the building, which I believe was a series of hangars, adds to the aesthetic of an abandoned airfield, it is unsafe and may appear menacing to some. If the structure was demolished, materials could be harvested from it, such as the corrugated metal sheeting and used to construct new elements on the site. Also removing the structure would immediately give visitors an unobstructed view of the meadow/site upon arrival.

The invasive species on site would need to be addressed through a site maintenance plan, similar to what Monmouth County already has in place. Most of the woody species currently growing in the grassland area are small enough that with regular mowing they could be kept under control. Regular monitoring of the site would be necessary to
validate this. If necessary, larger specimens may need to be removed mechanically. It would also be necessary to take a more comprehensive look at the species growing along the edge in order to identify invasives, which pose a threat and would therefore require removal. The third major issue with the current site conditions, is the view toward the cemetery. Generally speaking, once on the site the views are wide open and generally pleasant, especially when standing on either end of the runway gazing down its entire length. Unfortunately Visitors looking toward the northeast corner are forced to observe a mausoleum structure at the cemetery. The structure is not necessarily unpleasant to look at, but in context with the site conditions and woodland behind it, its design makes it a stark and unwanted contrast to the site. Currently there are dead trees on the edge of the site border which do not do a sufficient job at blocking the view. The best option would be to block the view through vegetation.

Section III: Site Design
4. Design

Since the intent of this site is to provide habitat for grassland birds but still allow for human use, the best solution would be to develop a trail system throughout the site. The design would include educational displays and structures meant to enhance the user’s experience, allowing them to both observe and learn about grassland birds (in addition to many other species). The educational components and trail system will help guide visitors throughout the site during the sensitive breeding season, providing minimally invasive recreation without disturbing nesting and brood rearing. From late summer to early spring a greater portion of the site would be open to humans when the birds have migrated south. During this time portions of the meadow would be mowed allowing for a greater range of human activities. It is clear that the airfield aspect of the site has some value to the community since a grassroots movement campaign was attempted to save it from development in the past. In order to keep previous site use relevant, materials will be recycled from the remaining structures for use in blinds and signage, concrete slabs and runways will be incorporated into the trail layout and educational signage will be used to inform visitors of the airfield’s history. The carrying out of the design could be broken down into three phases.

The overall layout of the trail system serves to bring people through the 4 main habitat conditions on the site: Upland Meadow, Wet Meadow, Woodland and Shrubland Edge. Various walks throughout the site were used to gather visual data (what’s visually appealing about the site) as well as physical walkability data (where is the best point to access the woods, where to place trails to maximize bird summer breeding habitat). This data was then used to configure the actual layout of the trail.
SIGNAGE AND BLIND STRUCTURES

NEW CIRCULATION PATTERN

Pedestrian
Vehicular

SECTION III: SITE DESIGN
Transforming a former airfield for Grassland Bird Conservation and Education
1. New Kiosk in Parking Area
2. Mowed Pathway to Blind
3. Kite Flying in Mowed Upland Meadow
4. Joggers on Runway

TRANSFORMING A FORMER AIRFIELD FOR GRASSLAND BIRD CONSERVATION AND EDUCATION
Showy Northeast Native Wildflower & Grass Mix

- Little Bluestem
  *Schizachyrium scoparium*
- Side oats Grama
  *Bouteloua curtipendula*
- Virginia Wildrye
  *Elymus verrucosus*
- Indian Grass
  *Sorghastrum nutans*
- Partridge Pea
  *Chamaecrista fasciculata*
- Black-eyed Susan
  *Rudbeckia hirta*
- Ohio Spiderwort
  *Tradescantia ohiensis*
- Tall White Beardtongue
  *Penstemon digitalis*
- Mars Blazing Star
  *Liatris spicata*
- Zigzag Aster
  *Aster neglectus*
- Hairy Beardtongue
  *Penstemon rubrotinctus*
- Autumn Bentgrass
  *Agrostis partimens*
- New England Aster
  *Aster novae-angliae*
- Oxeye Sunflower
  *Helianthus annuus*
- Wild Senna
  *Senna virgata*
- Blue False Indigo
  *Baptisia australis*
- Butterfly Milkweed
  *Asclepias tuberosa*
- Maryland Senna
  *Senna marilandica*
- Early Galax
  *Galax urceolata*
- Wild Bergamot
  *Monarda fistulosa*
- Orange Coneflower
  *Rudbeckia hirta var. fulgida*
1. Birding Group at Bird Blind
2. Old Tie-down in Meadow

Transforming a former airfield for Grassland Bird Conservation and Education
TRANSFORMING A FORMER AIRFIELD FOR GRASSLAND BIRD CONSERVATION AND EDUCATION

THE WOODLAND

Woodland Habitat
Birding Area
Information
Walking Trail

**Woodland Plant Species**

- Red Maple
  - *Acer rubrum*
- Sweet Gum
  - *Liquidambar styraciflua*
- River Birch
  - *Betula nigra*
- White Birch
  - *Betula papyrifera*
- White Birch
  - *Pinus rigida*
- Red Oak
  - *Quercus rubra*
- White Oak
  - *Quercus alba*
- Virginia Creeper
  - *Parthenocissus quinquefolia*
Section III: Site Design

1. Recycled Concrete Stepping Stones crossing Deep Run

2. Woodland Blind

3. Pitch Pine Stand
1. Picnic Area in Crabapple Grove
2. Crack Garden in Old Circular Concrete Slab
Additional Plant Species for Edge and Screening

Flowering Crabapple  
*Malus* spp.

Hawthorn  
*Crataegus* spp.

Serviceberry  
*Amelanchier canadensis*

Blackhaw Viburnum  
*Viburnum prunifolium*

Winterberry  
*Ilex verticillata*

Highbush Blueberry  
*Vaccinium corymbosum*

Eastern Red Cedar  
*Juniperus virginiana*
5. Phasing

Phase I.

The initial phase would focus on demolition and construction. During this phase the few remaining structures would be demolished removing most of the unusable material, but harvesting the large amount of corrugated metal sheeting for future use. There is also a large amount of impervious surface on the site which could be reduced. The majority of the concrete slabs on site would be broken and removed with the exception of three which will serve as building pads for bird blinds. Furthermore, while the runway and parallel taxiway will be utilized as part of the future site circulation plan, at 50 and 25 feet wide, they take up much more space than is necessary. These areas could be reduced to 25 feet for the runway and 10 feet for the taxiway. The length of each will be maintained, preserving the long, linear views across the site. There are several other paved surfaces which could be removed or milled for use as trail paving material. Once this has occurred the portions of the trail not using remaining runway and taxiways can be laid out and the building of structures (bird blinds, seating areas, sign placement) can occur.

Phase II.

The next phase would focus on habitat enhancement, both of edge conditions and the grassland. First would be the removal of any larger woody vegetation which requires extraction by machinery, followed by mowing and application of herbicides if necessary. With the removal of asphalt and concrete there would be a need to re-seed these areas. I feel it is more appropriate to seed the areas with native grasses and wildflowers than wait for the grasses which currently exist to establish themselves in these areas; waiting for these grasses also gives time for invasive and unwanted species to grow. In areas to the west where conditions are more hydric, a native wet meadow mix from Ernst Seed would be used. For the more mesic region of the site, a showy native upland wildflower and grass mix would be used, also from Ernst seed.
These mixes were chosen because they contain species that are both native to the region and should therefore do well on site, and also contain grass species used by the target grassland bird species. In addition, these mixes contain a diverse mix of wildflowers which will attract native pollinators such as bumble bees and butterflies. These pollinators serve as a major food source for bird species during the breeding season. In addition, this showy display of colors, textures and movement will provide interest for users of the site from spring until fall.

In addition to the enhancement of the grassland, there is also the opportunity for edge enhancement, specifically on the southern edge and southwest corner. Plant species chosen for these areas include small flowering trees such as crabapple and service berry with fruit producing shrubs such as winterberry holly and high bush blueberry. These plant species provide shelter, food sources, nesting sites and perching sites for a variety of bird species. Currently these edges go abruptly from low grass vegetation to large trees with no intermediate transition. These species will help to soften that transition, while providing varying seasonal interests (spring flowers, fall foliage) and habitat enhancement. Finally in order to screen the structures located on the cemetery and a residential property at the west end of the runway, Atlantic Red Cedars would be planted in the northeast corner and at the west end of the runway. Atlantic Red Cedars would effectively screen these areas year-round, also the fruits of red cedar are consumed by at least 54 species of bird and it has already been observed growing on-site (Kress 2006).

**Phase III.**

Phases I and II are much more invasive in terms of the types of activities occurring on site but necessary for habitat enhancement. Once completed, the focus can be shifted to the routine maintenance for managing the grassland. This would include yearly mows to control woody vegetation which would occur in September after breeding season has ended. By this point there should be no risk of destroying nests or disturbing brood rearing activities. The hydric portions of the site to the west would require winter mowing when conditions are cold to freeze the soil, and thus support the weight of a tractor. Every 4 to 6 years prescribed burns would be recommended. The prescribed burns would remove the layer of thatch accumulated from mowing and at the same time remove any invading trees or shrubs. This process would of course have to occur under controlled circumstances with local fire officials and trained experts.

With the trail system in place and habitat enhancements carried out, the site will hopefully be at the point where it will attract the desired grassland bird species as well as people. People have already been observed using the runways as a walking loop, with the expansion of a trail system off of these main pathway, people will have access to explore more of the site. The various staged signage will serve to educate users about specifics such as animal species, plant species, habitats and airfield history. The hope is that by making visible the birds and workings of grassland habitats, people will develop an attachment to these things and take action in some way to protect them. This sort of educational trail way provides a passive recreation opportunity during breeding season and at the same time exposes people conservation, whether they went to the site with the intent to learn something or simply enjoy a walk through a meadow. Furthermore, when the breeding season is over, there is no longer a need for people to stay on pathways or to keep their dogs at home. During the Fall and Winter the site is open for more active activities such as flying kites which would otherwise be intrusive during the breeding season. Public outreach through special events such as a kite festival after the fall meadow cutting, is a great way to bring people to the site and inadvertently expose them to the message of conservation, “Come here for this fun kite festival, while you’re here check out this cool educational trail.” Further public outreach could occur through guided tours by Monmouth County Park Naturalists, Bird counts with the NJ Audubon, or volunteer days focusing on site clean-up and invasive species removal. Finally Monmouth County Parks System has their Nature Series educational pamphlets; one could be specifically designed for this site and offered at the main entrance kiosk which could supplement the self-guided tour offered by the trail system.

**Section III: Site Design**
Certain species persist year-round, providing birding opportunities when grassland species are absent.

Dogs allowed on site during the fall and winter months when birds are off-site.

Grassland birds begin to arrive on site in early spring.

Site use timeline:
- January
- February
- March
- April
Section III: Site Design

- Birds nest from Mid-April to August, during which human activities are restricted to limit disturbance to nesting birds.
- Native Wildflowers attract various invertebrates which serve as an important food source for birds.
- Grassland birds begin to migrate south in late summer and mowing can begin.

May  | June  | July  | August | September
It is possible to combine recreation with habitat creation; it just has to be done in careful consideration with the desired habitat and targeted species. In Crissy Field it was the creation of a Tidal Marsh and Dune Habitat and in Magnuson Park it was the creation of habitat for a specific frog species. While people are not specifically allowed in these habitats, they are allowed to pass through and observe them through controlled access. This access is important because while it is great that these habitats were created, if people are not allowed to see them or are not told why they are important then they are not going to care. Managing the grasslands is relatively simple in theory; make sure there is always some form of disturbance, whether it is from grazing or mowing, to control woody growth. It is the management of the people that is more difficult; however, I feel that with the appropriate educational displays this could be accomplished simply. Habitat is being created through a routine maintenance plan for this specific group of birds threatened by development and land use changes, and the public is given a form of passive recreation and guided to the appropriate activities for that time of year through signage.


2. Photo Credits

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