



APPENDIX C: LISTED PLANT REPORT

State-Listed Plant Survey Report



Runway 11-29 Safety Improvements, Off Airport Tree Removal
and Airfield Pavement Rehabilitation Projects

Igor I. Sikorsky Memorial Airport
Stratford, Connecticut

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INTRODUCTION

Igor I. Sikorsky Memorial Airport (the Airport) is a public airport in the Town of Stratford owned and operated by the City of Bridgeport (see **Figure 1, Project Overview Map** and **Figure 2, USGS Map in Appendix A**). The City of Bridgeport is proposing runway safety area (RSA) improvements to the existing crosswinds runway known as Runway 11-29. An environmental Assessment (EA) is underway for the project. This survey for state-listed plant species has been undertaken in support of the EA.

The Airport has two asphalt runways, Runway 11-29 which is 4,761 feet long by 150 feet wide and Runway 6-24 which is 4,677 feet long by 100 feet wide. As neither end of Runway 11-29 currently satisfies Federal Aviation Administration (FAA) standards, several improvement alternatives have been identified to address its non-standard conditions. Specifically, the proposed project would undertake the following:

- At Runway 29, convert approximately 150 feet of the eastern end into a Runway Safety Area (RSA), and install a departure end Engineered Materials Arresting System (EMAS);
- Extend Runway 11 by 150 feet and install a 260-foot departure end EMAS.

The runway length would remain unchanged, but displaced thresholds would be implemented to provide additional RSA while providing a minimum of 4,550 feet of available landing distance. Other runway improvements include the replacement or addition of the runway turnarounds on both ends of Runway 11-29, grading within the RSA, pavement removal and drainage improvements. The removal of tree obstructions located both on off-Airport property within the runway end approach zones is also included in the proposed project.

ENVIRONMENTAL SETTING

The Airport is within the Southern New England Coastal Lowland ecoregion subset (Dowhan and Craig, 1976). This ecoregion includes lands lying within five miles of the coast and is characterized by coastlands, extensive tidal marshes, sand beaches, estuaries and relatively level but rolling nearshore lands. The Airport is in the vicinity of several major habitat complexes. Great Meadows Marsh, including Lewis Gut, are directly to the west of the Airport and the lower Housatonic River estuarine and marsh complex is to the east of the Airport. Lands to the north, south and east of the airport consist of a mix of residential, commercial and industrial development. The southwest undeveloped portion of the Airport property that is on the south side of Lordship Boulevard is directly adjacent to Long Island Sound.

Great Meadows Marsh is a large tidal marsh system that is part of the Stewart B. McKinney NWR (The Great Meadows Unit). The 421-acre Great Meadows Unit is the largest un-ditched tidal marsh in Connecticut. Lewis Gut, which channels water into the marsh from Long Island Sound, is located to the south of the Airport across Lordship Boulevard. Tidal wetlands associated with

Great Meadows Marsh abut the airport to the south, southeast, southwest, and west – all of which drain to Long Island Sound via Lewis Gut.

Wetlands associated with the Housatonic River ecosystem occur at the northeast corner of the airport within the secure active airfield, and on property outside of and east of the secure active airfield across State Route 113. These wetlands included bottomland habitats and overlying waters of the river’s lower main stem, specifically associated with the “Marine Basin” in Stratford. The shorelines of the Marine Basin and its tributaries consist of debris and rubble fill slopes which limit the extent of the tidal wetland vegetation in most areas. The remainder of the Marine Basin consists primarily of open water surrounded by a Smooth Cordgrass (*Spartina alterniflora*) fringe which gives way to dense monocultures of Common Reed (*Phragmites australis*) along the upper borders.

Built portions of the airport include taxiways, aprons, parking lots and access driveways and various buildings. Areas interior to and surrounding the runways and taxiways are comprised of level, mowed/maintained grasslands. Elevations across most of the Airport average less than 10 feet above sea level (Datum NGVD88), as determined from base mapping; portions of the RSA are below the Connecticut Coastal Jurisdiction Line (elevation 4.8 NGVD88 for Stratford and elevation 5.0 NGVD88 for the Housatonic River). Within the specific project areas surveyed on site, the majority of the area is mapped as udorthents by the Natural Resource Conservation Service (NRCS). Udorthents consist of earthy materials that have been shaped or otherwise disturbed by humans. Slopes range from 0 to 25 percent. Photos 1 through 3 below show typical conditions within the project area.



Photo No. 1:
Typical maintained RSA upland habitat



Photo No. 2:
Tidal wetlands adjacent to Runway 29 end

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Photo No. 3:
Narrow tidal wetland fringe adjacent to tidal creek

SURVEY HISTORY

Plant survey efforts have been conducted on the property in recent years in support of various activities. For instance, a comprehensive plant survey was conducted by William Moorhead III in 2013 in relation to Runway 6/24 improvements (Moorhead, 2013). As a result of these survey efforts, a number of listed plant species were noted growing on site proximal to Runway 6/24. These findings were reported to the CTDEEP NDDB upon their discovery and population distribution and quantification at that time. Wetland mitigation areas constructed as part of the Runway 6/24 improvements were also implemented. Requisite wetland monitoring associated with these mitigation areas was conducted during an ensuing five-year period which ended in 2020. Although no state ESA-listed species were discovered during this mitigation monitoring, the monitoring served to identify characteristic plant species growing on the airport property in both typical wetland areas and typical adjacent and associated uplands.

Another comprehensive plant survey effort conducted on the property was implemented by the Airport in 2020-2021, but it focused on specific areas of the airport that were located adjacent to the adjoining saltmarsh. This survey was conducted by Chris Mangels who conducted surveys in support of a management plan for *Phragmites australis* control within the wetlands bordering the active airfield. The CTDEEP NDDB shared the results of the Mangels study with FHI Studio. The Mangels study resulted in the confirmed identification of two state ESA-listed species (*Leptochloa fusca* and *Paspalum laeve*) and the tentative identification of a third (*Cirsium horridulum*). Based on a personal communication with Mr. Mangels, a potential occurrence of Sand Dropseed (*Sporobolus cryptandra*) was also documented as part of his survey.

METHODOLOGY

Planning

Prior to commencement of the formal plant survey, FHI Studio botanists reviewed the pertinent botanical surveys that had been completed for the airport and adjacent areas. These studies served as baseline reference documents and provided insight as to which species one might expect to encounter within the study area. We also utilized Connecticut Department of Energy and Environmental Protection (CTDEEP) Natural Diversity Database (NDDB) coordination for airport projects. From these sources, we were able to compose a target list of species designated as Special Concern, Threatened, or Endangered in the Connecticut Endangered Species Act that may occur, or formerly occurred, on or proximal to the airport. This list of species is presented in **Table 1**. While we completed and submitted a NDDB Request Form to the CTDEEP for the study area, we had not received a response at the time of the survey. In lieu of an NDDB response, we prepared listed-plant survey protocols that were reviewed and approved by the CT State Botanist prior to field surveys.

While the survey was underway, we were informed that CTDEEP would count *A. longespica* var. *longespica* as a listed species, even though it is not specifically listed in the CT ESA, as opposed to *A. longespica* var. *geniculata* which is listed. In addition to the species noted in **Table 1**, CTDEEP also requested the survey of *Aristida purpurascens*, *Plantago virginica*, and *Paspalum laeve*. The *Aristida purpurascens* and *Plantago virginica* were noted in general records for the Town of Stratford, but no specific locations were recorded. *Paspalum laeve* was found by others during a survey of the west end of 11/29 in 2020 during a separate project (C. Mangels, personal communication), and subsequently by FHI Studio in September 2021 at various locations on the airport during wetland delineations for the Runway 11-29 Safety Improvements, Off Airport Tree Removal, and Airfield Pavement Rehabilitation Project.

Therefore, four additional target species (**Table 2**) were requested by NDDB to be added to the original list of target species (**Table 1**) for this survey effort. *Aristida purpurascens*, *Sporobolus cryptandra*, and *Paspalum laeve* were included as target species of this survey effort, but it was too late in the season to survey for *Plantago virginica*. Searches for this species will be undertaken during the future permitting phase of the project.

Table 1: Original List of Plant Species Targeted for 2021 Field Survey for the Project

| Common Name (<i>Scientific Name</i>) | CTDEEP Status | Preferred Survey Timing | Reported Requisite Habitat |
|---|--|----------------------------|--|
| (Slender) Needlegrass* or Red Threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>) | Special Concern | September-November | Moist or dry, often sterile or sandy soil (Gleason and Cronquist, 1991). Dry, sterile, sandy soil (Magee and Ahles, 1999). Sandy fields, roadsides, woodland openings, disturbed sandy soils (Haines, 2011). |
| Beach Needlegrass (<i>Aristida tuberculosa</i>) | Endangered | August-September | Dry sterile soil especially on dunes along the coast (Gleason and Cronquist, 1991). Dry sandy soil especially beaches and dunes (Magee and Ahles, 1999). Coastal dunes, dry sandy soil near the coast (Haines, 2011). |
| Bracted Orache (<i>Atriplex glabriuscula</i>) | Special Concern | September-October | Sea beaches (Gleason and Cronquist, 1991). Sea beaches, saltmarshes, waste places (Magee and Ahles, 1999). Saline marshes, sea beaches, and strands (Haines, 2011). |
| Salt-marsh Bulrush (<i>Bolboschoenus novae - angliae</i>) | Special Concern | July-October | Brackish transitional zones of tidal river systems (Gleason and Cronquist, 1991). Brackish river shores (Magee and Ahles, 1999). Brackish-tidal river shores (Haines, 2011). |
| Stiff-leaved Rosette-panicgrass (<i>Dichanthelium ovale</i> var. <i>addisonii</i>) | Special Concern, (State Historic - believed to be extirpated) | July-October | Sandy soil (for <i>Panicum ovale</i> - Gleason and Cronquist, 1991). Dry open mixed Woodlands, thickets and sandy openings (for <i>Panicum ovale</i> - Magee and Ahles, 1999). Sandy soils of woodlands, coastal plain pond shores, and disturbed openings (Haines, 2011). |
| Sea-beach Sandwort (<i>Honckenya peploides</i>) | Special Concern | May-June | Sea beaches and sand dunes (Gleason and Cronquist, 1991; Magee and Ahles, 1999). Coast Beaches, commonly on sand and gravel substrate (Haines, 2011). |
| Saltpond grass (<i>Leptochloa fusca</i> ssp. <i>fascicularis</i>) | Endangered | August-September | Brackish or alkaline sites (Gleason and Cronquist, 1991). Brackish marshes along the coast and occasionally in waste places (Magee and Ahles, 1999). Saline marshes, coastal beaches, roadsides, disturbed ground (Haines, 2011). |
| Yellow-fringed Orchid (<i>Platanthera ciliaris</i>) | Endangered | August-September | Bogs, fields, and woods (Gleason and Cronquist, 1991). Bogs, wet to dry meadows, and deciduous or coniferous |

| | | | |
|--|-------------------|---|---|
| | | | woods (Magee and Ahles, 1999). Sandy and peaty meadows, wetland borders, lawns, sandy soils of swamps (Haines, 2011). |
| Coast Violet (<i>Viola brittoniana</i>) | Endangered | May (flowering); throughout growing season (leaves only) | Wet to dry, sandy, open soil near the coast (Magee and Ahles, 1999). Fields meadows, trail edges, and forest clearings adjacent to rivers and coastal marshes also peaty river shores (Haines, 2011). |

Bold text: species observed on airport during previous field work

* Species not previously identified by CTDEEP NDDb, but observed during previous field work

Table 2: Additional Species Requested by the CTDEEP to be Included in Field Surveys for the Project

| Common Name (<i>Scientific Name</i>) | CTDEEP Status | Preferred Survey Timing | Reported Requisite Habitat |
|---|----------------------|--------------------------------|---|
| Arrowgrass, Arrow-feather Threeawn <i>(Aristida purpurascens)</i> | Endangered | September - October | Moist or dry, often sterile or sandy soil (Gleason and Cronquist, 1991). Dry, sandy or gravelly soil (Magee and Ahles, 1999). Sandy fields, roadsides, woodland openings, grasslands (Haines, 2011). |
| Hoary Plantain <i>(Plantago virginica)</i> | Special Concern | Spring | Dry or sandy soil (Gleason and Cronquist, 1991). Fields, roadsides, waste places (Magee and Ahles, 1999). Fields, roadsides, waste areas, grasslands (Haines, 2011). |
| Field Beadgrass <i>(Paspalum laeve)</i> | Threatened | July - October | Various habitats (Gleason and Cronquist, 1991). Oldfields, tickets, lakeshores, pine or mixed woodlands and woods openings, and roadsides (Magee and Ahles, 1999). Mesic to wet-mesic fields, shorelines, meadows, riverbanks (Haines, 2011). |
| Sand Dropseed <i>Sporobolus cryptandra</i> | Threatened | July - October | Dry, especially sandy soil (Gleason and Cronquist, 1991). Dry sandy fields, shores and waste places (Magee and Ahles, 1999). Sandy soils of roadsides, railroads, and fields (Haines, 2011). |

Field Survey Methodology

Plant surveys were performed under this task by a qualified botanist with demonstrable knowledge of the target species and their ecological characteristics in Connecticut. The geographic extent of the survey encompassed the disturbance footprint within the larger project study area. The survey area included areas that are mowed repeatedly by airport maintenance staff; however, a normal mowing regime would have made it very difficult to detect certain rare plant species that might exist in the mowed areas. Consequently, the botanist coordinated with airport maintenance staff to minimize mowing of the survey area during that portion of the fall 2021 growing season when plant surveys would be conducted. Data collection included a review of literature and earlier project-specific documents, and consultation with CT DEEP regarding the adequacy and methodology of the proposed plant surveys.

The botanist performed field reconnaissance and survey tasks during the growing season window best suited for identification of the target plant species. However, since surveys could not be initiated until September, two of the early species identified in Tables 1 and 2 above (the Seabeach Sandwort and the Hoary Plantain) could not be surveyed for during the 2021 growing season. Field work was conducted during the growing season (September to October) of 2021. Survey dates and person hours spent searching are presented in **Table 3**.

Table 3: 2021 Survey Dates and Person Hours

| Survey Date | Time Spent Searching (Person hours) |
|--------------------|-------------------------------------|
| September 21, 2021 | 16.5 hours |
| September 29, 2021 | 15 hours |
| October 1, 2021 | 23.25 hours |
| October 6, 2021 | 18 hours |
| October 7, 2021 | 24.75 hours |
| October 13, 2021 | 16.5 hours |
| October 14, 2021 | 23.25 hours |

Note: hours reflect multiple staff each day

State-Listed Plants: The survey technique consisted of repeatedly traversing the habitats in a sufficiently fine pattern (i.e., a pattern of roughly parallel traverses) to allow visual detection of the survey target species in a given habitat; the distances between traverses depended on the

density of vision-obscuring ground layer vegetation within the habitat being surveyed. Generally, in mowed areas of the airport, transects were spaced approximately 8-12 feet apart. A cumulative total of field survey hours was recorded and documented (see **Table 3**). The survey was documented with route-of-survey and area surveyed maps (**See Appendix B – Plant Survey Track Routes**). Information was collected on the characterizations of plant communities encountered during the survey, and a comprehensive list of plant taxa observed during the survey efforts was compiled (**see Appendix D – Cumulative List of Vascular Plant Species**).

All state-listed plant populations were identified and mapped with a GPS unit, except in cases where the plants were found to be so common that mapping on an airport-wide basis was impractical. In that case, the prevalence and general distribution of the species was described and mapped. Population boundaries were documented with a sub-meter GPS unit in the field. Photographs were taken of populations in the field. CT DEEP Natural Diversity Database “Rare Plant Survey Forms” were prepared for each listed species encountered and are presented in **Appendix C**.

Since this survey was conducted in support of planning level documentation, the botanists did not count individual plants in the field for some extensive grass species populations. Instead, estimates of these listed plant populations were conducted based on limited plot surveys. More accurate population data will be generated under the future permitting phase of the project if needed.

A comprehensive list of plants identified by the botanist(s) while walking the transects was compiled and updated after each visit (**see Appendix D**). Scientific and common names are provided based upon the spreadsheet developed by Dreyer and Jones et al. (2014) who followed the taxonomy used by Haines (2011). Identifications were based largely on field observations, but supplemental voucher specimens of plants not suspected of being one of the candidate listed species reported to occur at the site were also collected when identification down to species level was best confirmed via the aid of minute morphological attributes as viewed through a binocular microscope. No formal mounted herbarium specimens were prepared, as it was beyond the scope of this field investigation.

Occurrences of State-listed plant taxa were documented using standard CT DEEP NDDDB “Special Plant Survey Reporting Forms” which includes, at a minimum, a basic ecological description of the occurrence, and a plot of the location of the occurrence on a 1:24000 USGS topographical map and/or on a 1:12000 aerial photo.

RESULTS

The field survey of vegetation was conducted during the growing season within the preferred survey season of the majority of the target CT ESA-listed plants, except where noted. The majority of the habitat within the survey area is underlain by udorthents. Udorthents consist of earthy materials that have been shaped or otherwise disturbed by humans through grading, redistribution, filling, excavation or a combination thereof. As a result, most of the habitat on site in the upland portions of the survey area are ruderal. Those habitats matching ones included in the Vegetation Classification for Connecticut (Metzler and Barrett, 2006) are mainly wetland habitats such as the following:

- Smooth Cordgrass (*Spartina alterniflora*) tidally-flooded grasslands: Grassland areas vegetated with smooth cordgrass in comparatively low elevation marsh.
- Saltmeadow Cordgrass (*Spartina patens*) tidally-flooded grasslands: Grassland areas vegetated with saltmeadow cordgrass in comparatively higher elevation areas of the marsh
- Northern Marshelder (*Iva frutescens*) tidally-flooded shrubland areas vegetated with Northern marshelder and groundsel tree (*Baccharis halimifolia*) which occur along the edge of excavated, tidally influenced channels.

Within the uplands, remnants of the Switchgrass (*Panicum virgatum*) medium-tall grassland community described by Metzler and Barret (2006) can be found around the outer perimeter of less frequently mowed areas bordering the Runway Safety Areas. However, within the RSAs many of the vegetation communities are a mosaic of warm season and cool season grasses intermixed with various forbs, with occasional procumbent growing woody shrubs limited in height by routine mowing.

Survey efforts resulted in the cumulative identification of 141 species of vascular plants within the survey area. A comprehensive list of plants identified by FHI Studio on site as a result of this survey effort is presented in **Appendix D**.

Among the plants identified on site were five state ESA-listed species. One species - *Aristida longespica* - included two variants (var. *longespica* and var. *geniculata*, of which the latter is specifically listed in the CT ESA). This species and three others found on site, *Atriplex glabriuscula*, *Leptochloa fusca*, and *Paspalum laeve*, were on the cumulative target lists of species for the site (**Tables 1 and 2**). One additional CT ESA-listed species – the Eastern Prickly Pear Cactus (*Opuntia humifusa*), not on the original formal target species list, was also discovered in one location.

The following eight target species were not encountered in the various project areas surveyed on site:

- Arrow-feather Threeawn (*Aristida purpurascens*)
- Salt-marsh Bulrush (*Bolboschoenus novae – angliae*)
- Stiff-leaved Rosette-panicgrass (*Dichantherium ovale* var. *addisonii*)
- Seabeach Sandwort (*Honckenya peploides*)
- Hoary Plantain (*Plantago virginica*)
- Yellow Fringed Orchid (*Platanthera ciliaris*)
- Sand Dropseed (*Sporobolus cryptandrus*), and
- Coast Violet (*Viola brittoniana*).

The locations of all populations, subpopulations, or individuals of the ESA-listed species found on site were documented using an EOS Arrow 100® submeter, global navigation satellite system (GNSS) receiver. These locations were plotted on an aerial photograph base-mapping as depicted in **Figures 3 through 5**. A discussion of each listed species found is provided in the following subsections:

Aristida longespica

Aristida longespica is an annual grass of dry, sandy, upland soils (Magee and Ahles, 1999; Haines 2011) which grows “loosely tufted in small bunches” (Gleason and Cronquist, 2011). It is assigned a FACU indicator status on the National Wetland Inventory (NWI) National Wetland Plant List (NWPL) of 2018. Although not specifically listed in the CT ESA, another variant of this species (*A. longespica* var. *geniculata*) is listed as special concern in the CT ESA (CTDEEP, 2015). The two variants are distinguished largely by the relative lengths of their central and lateral awns of the spikelets. Both variants were searched for within the survey areas of the airfield with their respective results described as follows below.

Aristida Longespica var. longespica

Aristida longespica var. longespica (Photo No. 4) was identified by its characteristic long central awn averaging 14 mm, as compared to the two corresponding lateral awns which range from 0-5 mm. The base of the three awns is not coiled or tangled as in other *Aristida* species (e.g., *A. tuberculosa* or *A. dicotoma*).



Photo No. 4:
Aristida longespica var. longespica

Large populations of this plant were found and delineated at the western limits of Runway 11-29 on both the north and south sides of the Runway (**Figure 3**). These robust populations were found growing in mesic to meso-xeric soils where it was the dominant species in a maintained (i.e., routinely mowed) grassland community. These populations totaled approximately 83,070 square feet on the south side of the Runway 11 terminus and approximately 31,026 square feet

on the north side. Additional populations of *A. longespica* var. *longespica* were found growing in the following locations:

- Southwest of the intersection of Taxiway H with Taxiway D within an infield area bounded by Runway 11-29 to the south, Taxiway D to the north, and Taxiway H to the east (**Figure 4**) encompassing approximately 284 square feet; and
- Southeast of the Runway 29 approach where it was found in small, discrete, scattered patches (**Figure 5**) totaling approximately 88 square feet.

These areas tended to be xeric, thinly vegetated sites, where plant species diversity and abundance tended to be relatively depauperate. They were also found in what appeared to be old tire ruts and other shallow depressions which tended to be more moist due to seasonal or temporarily inundation from precipitation and stormwater runoff.

Plants found commonly associated with *A. longespica* var. *longespica* included the following: *Aristida oligantha*, *Aristida dichotoma*, *Schizachyrium scoparium*, *Panicum virgatum*, *Symphotrichum racemosum*, *Hypochaeris radicata*, *Kummerowia striata*, *Digitaria sanguinalis*, *Oxalis* sp., and *Paspalum setaceum*.

Aristida longespica var. *geniculata*

Aristida longespica var. *geniculata* (Photo No. 5) was identified by its characteristic long central awn 12-27 mm and the two corresponding lateral awns which range from 6-18 mm; all awns, especially the lateral awns, are longer than *A. longespica* var. *longespica*. The base of the three awns is not coiled or tangled as in other *Aristida* species (e.g., *A. tuberculosa* or *A. dichotoma*).

This variant was limited to one upland location within the project survey areas. It was found growing adjacent to the northern limit of Taxiway H, an infield area to the west which was bounded by Runway 11-29 to the south and Taxiway D to the north (**Figure 4**). This small population encompassed approximately 181 square feet. This population was noted growing in association with *Paspalum leave* and within about 20 feet of a population of *Aristida longespica* var. *longespica*. Other associates included White Clover, *Kummerowia striata*, *Digitaria sanguinalis*, and *Plantago lanceolata*.



Photo No. 5. *Aristida longespica* var. *geniculata*

Atriplex glabriuscula

Known by the common name of Bracted Orache in CT, this plant is a forb of salt marshes and sea beaches (Gleason and Cronquist, 1991; Magee and Ahles, 1999; Haines, 2011). It appears on the National Wetland Plant List (NWPL) of 2018 as “Scotland Orache” where it is assigned a Facultative Upland (FACU) indicator status for the north-central and northeast regions. It is listed in the CT ESA as a special concern species (CTDEEP, 2015).

A. glabriuscula was identified on site by plants that exhibited leafy bracteate spikes with the bracts occurring nearly to the end of the spike, (as opposed to leafy bracteate only near the base of the spike in other species), and concurrently, by the presence of the lower leaf blades exhibiting a pair of large, pointed lobes at or near the base of the leaf blade. These lobes are oriented either outward at a right angle to the blade axis or slightly forward-pointing (see Photo No. 6).



Photo No. 6. *Atriplex glabriuscula*

Twelve individuals of this plant were documented growing along the southern perimeter of Wetland No. 8 which is located north of the approach end of Runway 29 (**Figure 5**). The soils of this area are sandy and gravelly and may be subject to irregular inundation from either stormwater or spring tides. It was found growing in association with *Juncus gerardii* and *Atriplex patula* and *Leptochloa fusca*.

Leptochloa fusca

Known by the common name of Saltpond Grass in CT (CTDEEP, 2015), and as Bearded Sprangletop by other authors (Haines, 2011), this annual grass is found in brackish to saline marshes, sea beaches, and occasionally disturbed grounds such as waste places and railroad beds (Gleason and Cronquist, 1991; Magee and Ahles, 1999; Haines, 2011). It appears on the NWPL of 2018 under a former taxonomic synonym, *Diplachne fusca*, and by its common name of Bearded Sprangletop where it is assigned an obligate wetland (OBL) indicator status for the north-central and northeast regions. The subspecies "*fascicularis*" is listed in the CT ESA as Endangered (see

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Photo No. 7). Characteristics of this species include prostrate outer flowering stems, inflorescences which are partially enclosed in the subtending leaf sheaths with leaf blades (2-7 mm wide) mostly exceeding the inflorescence, long ligules (2 to 8 mm) with lacerate apices at the base of the leaf blade, five to 12 mm-long spikelets that bear six to twelve flowers each, and a dark spot at the base of each lemma.



Photo No. 7. *Leptochloa fusca*

Five disjunct sub-populations of this plant totaling 4,670 square feet were found centered in and around Wetland No. 5 south of the Runway 29 approach end. Two additional plants were found on the north side of Runway 29 approach, and another small sub-population totaling approximately 63 square feet was found at the northeast corner of Runway 29 at the northeastern limits of Wetland 8 (**Figure 5**). On site, it was typically found growing on sandy or muddy substrate exposed to some degree of saline influence but at the upper limits of any

apparent regular tidal regime (e.g., still upgradient from the tidal wrackline). It is likely subject to some degree of irregular flooding, followed by evaporation which would retain salt concentrations in the sparsely vegetated depressions it was noted growing in.

In most locations, associated plant species were lacking as the plant seemed to favor areas of sparse vegetation. In other areas, the plant was found growing with other grasses and graminoids such as *Spartina patens*, *Distichlis spicata*, *Juncus gerardii*, *Setaria pumila*, *Solidago sempervirens*, *Echinochloa sp.*, *Eleocharis sp.*, *Panicum virgatum*, and *Setaria pumila*.

Paspalum laeve

Paspalum laeve is a native grass species which produces two to six racemes of rounded spikelets, from which it receives its common name, Field Beadgrass (see Photo No. 8). This perennial grass forms tufts and typically flowers and sets seed from late July through early-October (USDA Plants Database). Unlike the more common Slender Paspalum (*Paspalum setaceum*) which occurs in sandy fields, roadsides, and forest edges across Connecticut, and which was also found at Sikorsky Airport, Field Beadgrass is primarily restricted to sites within CT's coastal zone such as Old Lyme, East Haddam, Groton (W. Moorhead, personal communication), in undisclosed sites in New Haven County (Magee and Ahles, 1999); and in a similar biogeographic zone in New York (e.g., on Fisher's Island and in various municipalities of Long Island), based upon FHI Studio's review of New York State Museum specimen labels. *Paspalum laeve* is distinguished from the similar *P. setaceum* by the arrangement of the spikelets on the spike-like branches, and by the size of the spikelets. *P. laeve* spikelets occur one per node on the pedicels, while spikelets occur two per node on the pedicels of *P. setaceum*. The spikelets of *P. laeve* are larger (2.3-3.3 mm long) than the spikelets of *P. setaceum* (1.4-2.5 mm long).



Photo No. 8. *Paspalum laeve*

Paspalum laeve was found at the following locations within the project site:

- Two subpopulations (1,244 and 2,457 square feet) south of Runway 11 and west of Taxiway K - totaling 3,701 square feet, plus three individual multi-culmed plants. All growing within and proximal to Wetland 3 (**Figure 3**).
- Two subpopulations (358 and 33 square feet) north of Runway 11 and west of Taxiway D - totaling 391 square feet. All growing within routinely mowed uplands (**Figure 3**).
- Six disjunct sub-populations north of Runway 11-29 and west of Taxiway H totaling 7,913 square feet plus multiple (approximately 22) multi-culmed individual plants. All growing within routinely mowed uplands (**Figure 4**).
- One individual plant growing within routinely mowed upland grassland just east of the intersection of Taxiways A and D (**Figure 5**).

Areas where *Paspalum laeve* was found tended to be characterized by more mesic to meso-hydric conditions. These areas tended to be colonized by robust forbs and cool-season grasses. Common associated plants included *Trifolium pratense*, *Plantago lanceolata*, and *Hypochaeris radicata*.

Opuntia humifusa

A plant of dry fields, ledges, coast dunes and beaches, the Eastern Prickly Pear Cactus occurs in various upland locations proximal to Sikorsky Airport, such as Short Beach Park to the east (personal observation); Stratford Point to the southeast (CAS, 2013); and Russian Beach (personal observation) and Long Beach (Metzler and Rosa 2013) to the south. Gleason and Cronquist (1991) include two other species of *Opuntia* to occur in the northeast – *O. macrorhiza* and *O. fragilis*. The range of *O. macrorhiza* is reported to reach as far northeast as “Wisconsin, southern Michigan, Illinois, and reputedly Ohio and Kentucky”, while that of *O. fragilis* reaches as far northeast as Illinois, Wisconsin, and northern Michigan. Among these three species, Gleason and Cronquist (1991) separate *O. humifusa* from the others in the first couplet of a dichotomous key via the number of spines borne at the areoles. For *O. humifusa*, they report “*Spines solitary or occasionally paired, borne at only a few areoles*” in contrast to “*spines usually several together, borne at most areoles*” for the other two species. The plants noted on site were armed with spines but they appeared to occur singly and were borne at only a few areoles (see Photo No. 9). This characteristic and the fact that *Opuntia humifusa* is the only cactus species listed by Haines (2011) to occur in New England, served as the basis for our identification of this plant to *O. humifusa*.



Photo No. 9. *Opuntia humifusa*

A cluster of Eastern Prickly Pear Cactus and two individual plants were found growing north of Runway 11-29 and east of Taxiway D (**Figure 4**). The cluster covered approximately 365 square feet in area.

Plants found associated with *Opuntia humifusa* at this location included *Aristida oligantha*, *Aristida dichotoma*, *Froelichia gracilis*, *Hypericum gentianoides*, *Schizachyrium scoparium*, and *Symphyotrichum racemosum*.

CONCLUSIONS AND RECOMMENDATIONS

Five listed plant species (one with two variants) were found growing within the limits of the survey areas. Among these five species, three are grasses, one is a forb, and one is a cactus. Routine mowing of the runway safety areas appears to keep the grasslands surrounding the runways in a dysclimax state, apparently benefitting *Aristida longespica* and *Paspalum laeve* by eliminating the establishment or proliferation of taller growing grasses, forbs, and woody shrubs. The large extent and distribution of *Aristida longespica* var. *longespica* on site precluded its

quantification under the scope of this survey effort. Quantification of this species on site would, therefore, need to be done in the future permitting stage to address potential impact from the Runway Safety Improvements.

Leptochloa fusca was found consistently in otherwise sparsely or minimally vegetated areas of the site within the influence of at least irregular brackish or saltwater inundation. It is not known to what effect mowing has on this species, but this species is likely benefitting to some extent by mowing which prevents competition with volunteer plants that could colonize the same ruderal habitat.

Atriplex glabriuscula distribution on site appears to be limited by routine mowing. The twelve plants noted on site were growing in a narrow zone along the edge of Wetland 8. As a predominantly upland plant, its distribution along the lower elevations of the toposequence is likely limited by soil saturation, while distribution in the upland is likely limited by routine mowing of the RSAs.

The requisite habitat for at least two of the target species does not occur directly in the project survey area which likely explains why they were not encountered. These include the Salt-marsh Bulrush, which is found along brackish-tidal river shores, and Seabeach Sandwort which occurs on coastal beaches and dunes.

Although we did not encounter Coast Violet within the project survey areas, we have a very high level of confidence it did not occur there. Its distinct leaf morphology would have made this plant hard to miss despite the fact that it was not in flower during the time of year we conducted the survey. As a quality control measure, the survey crew visited an area of the airport property outside of the survey area to confirm the plant was detectable during the time of year that we conducted this plant survey. Multiple individuals were easily found at this known location confirming their relative ease of detection during the survey period (see Photo No. 10).



Photo No. 10. Leaves of *Viola brittoniana* from a specimen at Sikorsky Airport outside of the project survey

Although we did not encounter Hoary Plantain, our survey period was not the optimal time of the year to search for this plant. Since the project survey areas do seem to match the habitat descriptions of this plant, additional searches for this species may be warranted and would thus be scheduled during the future permitting phase.

Although they were not found within the surveyed area, the requisite habitat descriptions for the following plants appear to be met. These plants should therefore be retained as target species in any subsequent plant surveys of the project area.

- Stiff-leaved Rosette-panicgrass (*Dichanthelium ovale* var. *addisonii*)
- Yellow Fringed Orchid (*Platanthera ciliaris*)
- Sand Dropseed (*Sporobolus cryptandrus*)

It should be noted that if site improvements resulting in ground disturbance do not occur within a year of this report, re-surveys for annual species will likely be necessary. Additionally, the CTDEEP List of Special Concern, Threatened, and Endangered species is scheduled to be updated in 2022. The pending changes associated with that update could affect the ESA listing status of one or more of the target species referenced in this report. The same pending changes may also generate additional target species requiring survey prior to future development and disturbance to the airport's existing habitats.

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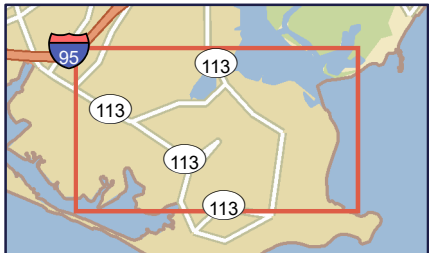
Mezler, K.J. and Rosza, R. (2013). Habitat Management Plan for Long Beach, Stratford CT with Emphasis on Invasive Species Control. Prepared for Town of Stratford Parks Department Stratford, CT. January 2013.

Moorhead, William (2013). Runway Safety Project Igor I. Sikorsky Memorial Airport. Stratford, CT. Vegetation Report. State Project No. 15-336. Prepared by URS Corporation, Fitzgerald and Halliday, Inc., and William Moorhead. Prepared for CT Dept. of Transportation. March 2013.

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Appendix A: Figures



Legend

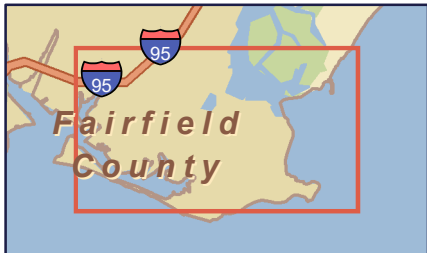
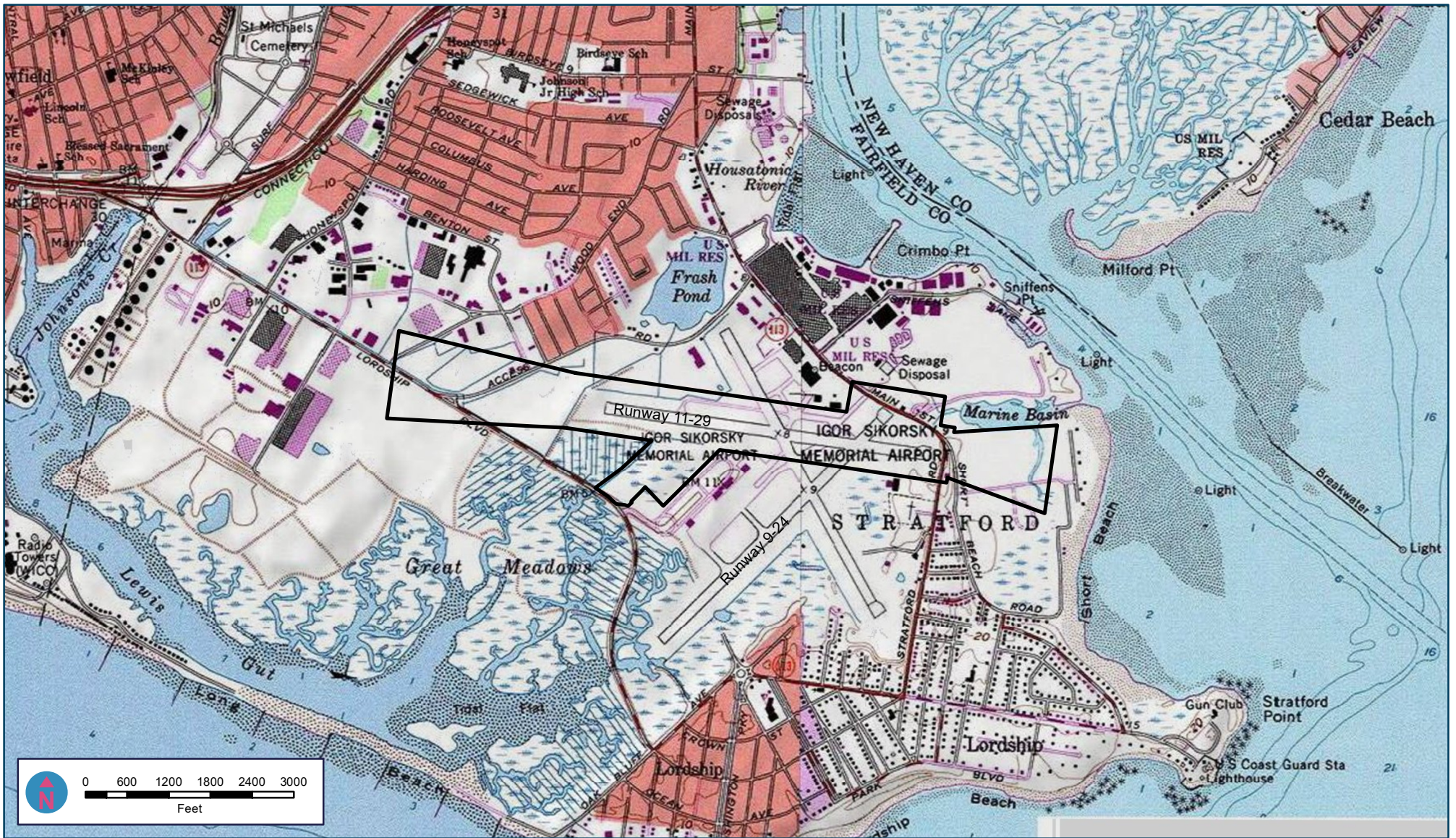
 Project Study Area

Igor I. Sikorsky Memorial Airport

Federal Environmental Assessment for Short-Term Projects: Runway 11/29 Safety Area Improvements; Off Airport Tree Removal; Airfield Pavement Rehabilitation

Map Produced 10/25/2021
Data Source: CTECO 2019 Aerial; FHI Studio 2021

Figure 1 - Overview Map



Legend

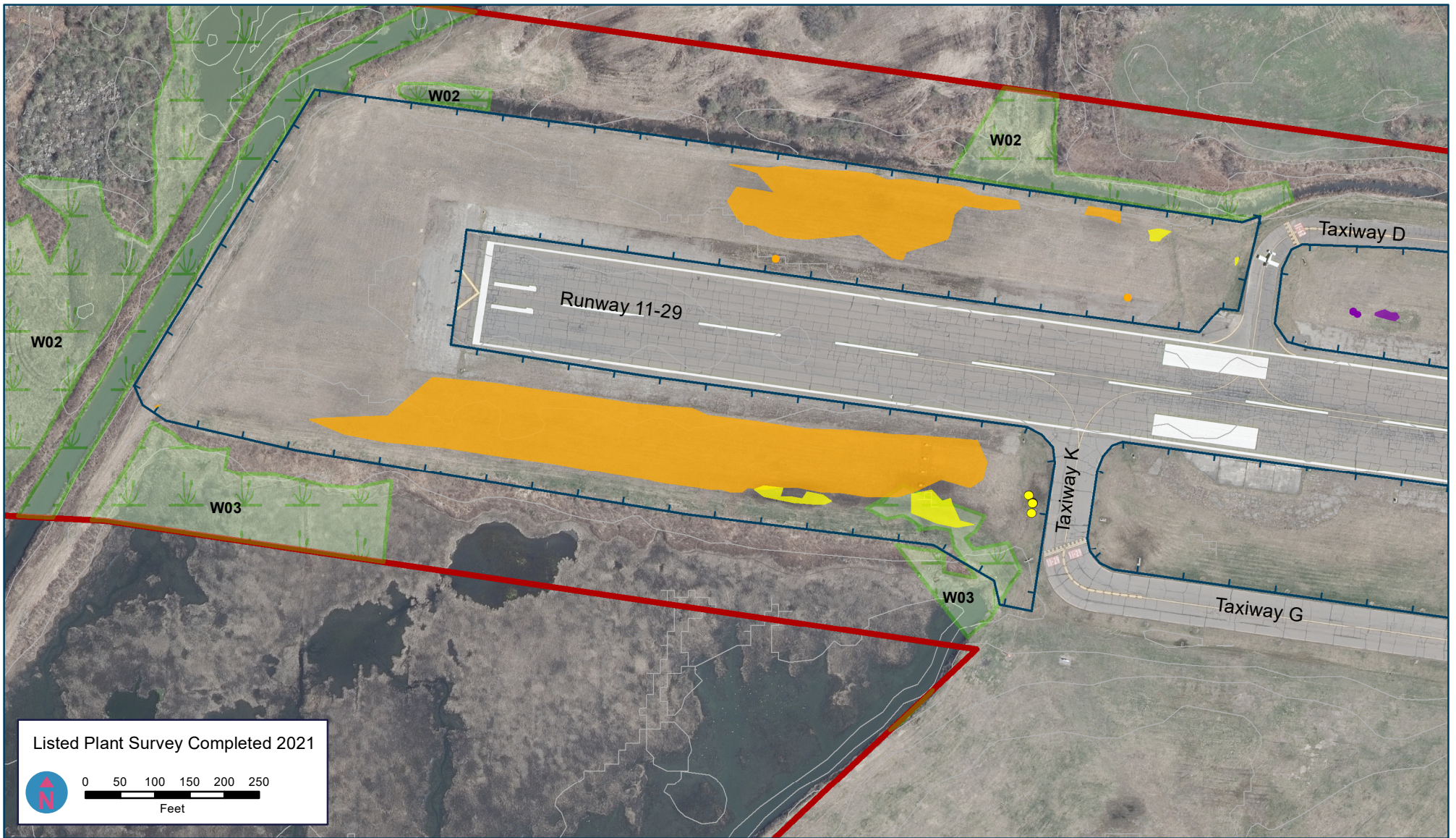
 Project Study Area

Igor I. Sikorsky Memorial Airport

Federal Environmental Assessment for Short-Term Projects: Runway 11/29 Safety Area Improvements; Off Airport Tree Removal; Airfield Pavement Rehabilitation

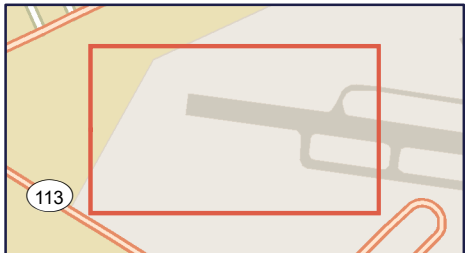
Map Produced 10/26/2021
Data Source: USGS 2021, FHI Studio 2021

Figure 2 - USGS Map



Listed Plant Survey Completed 2021

0 50 100 150 200 250
Feet



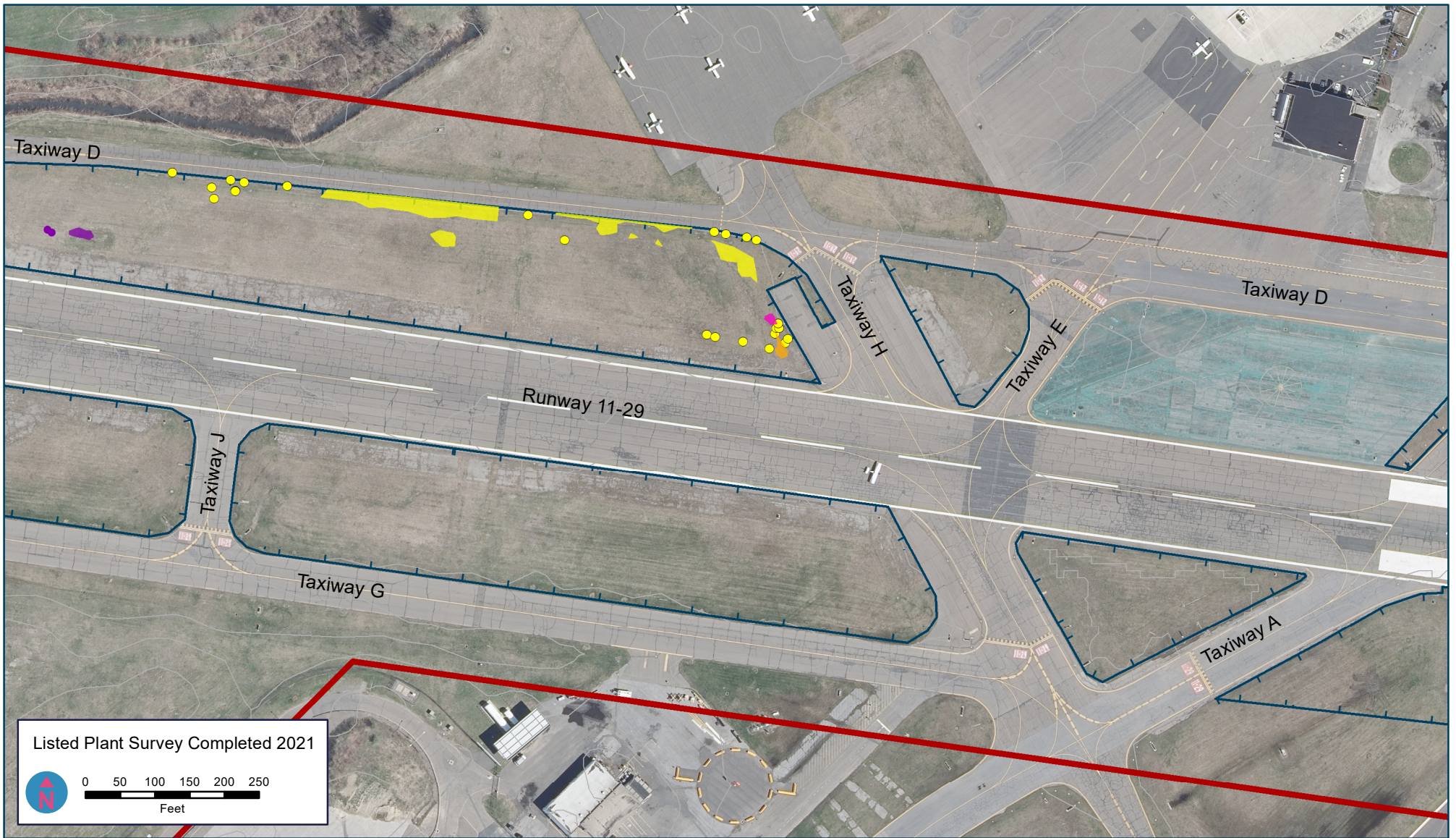
Map Produced 12/8/2021
Data Source: CTECO 2019 Aerial; FHI Studio 2021

- Aristida longespica* var. *geniculata* Population
- Opuntia humifusa* Population
- Leptochloa fusca* Population
- Paspalum laeve* Population
- Aristida longespica* var. *longespica* Population
- Opuntia humifusa* Individual
- Atriplex glabriuscula* Individual
- Aristida longespica* var. *longespica* Individual
- Leptochloa fusca* Population Individual
- Paspalum laeve* Individual
- Approximate Listed Plant Survey Limit
- Delineated Tidal Wetland
- Project Study Area

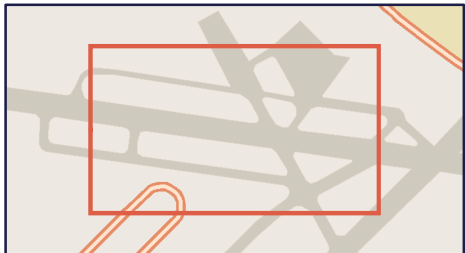
Igor I. Sikorsky Memorial Airport

Federal Environmental Assessment for Short-Term Projects: Runway 11/29 Safety Area Improvements; Off Airport Tree Removal; Airfield Pavement Rehabilitation

Figure 3 - Listed Plant Species



Listed Plant Survey Completed 2021



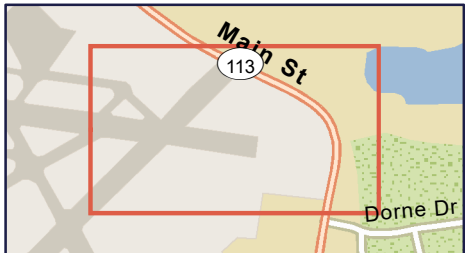
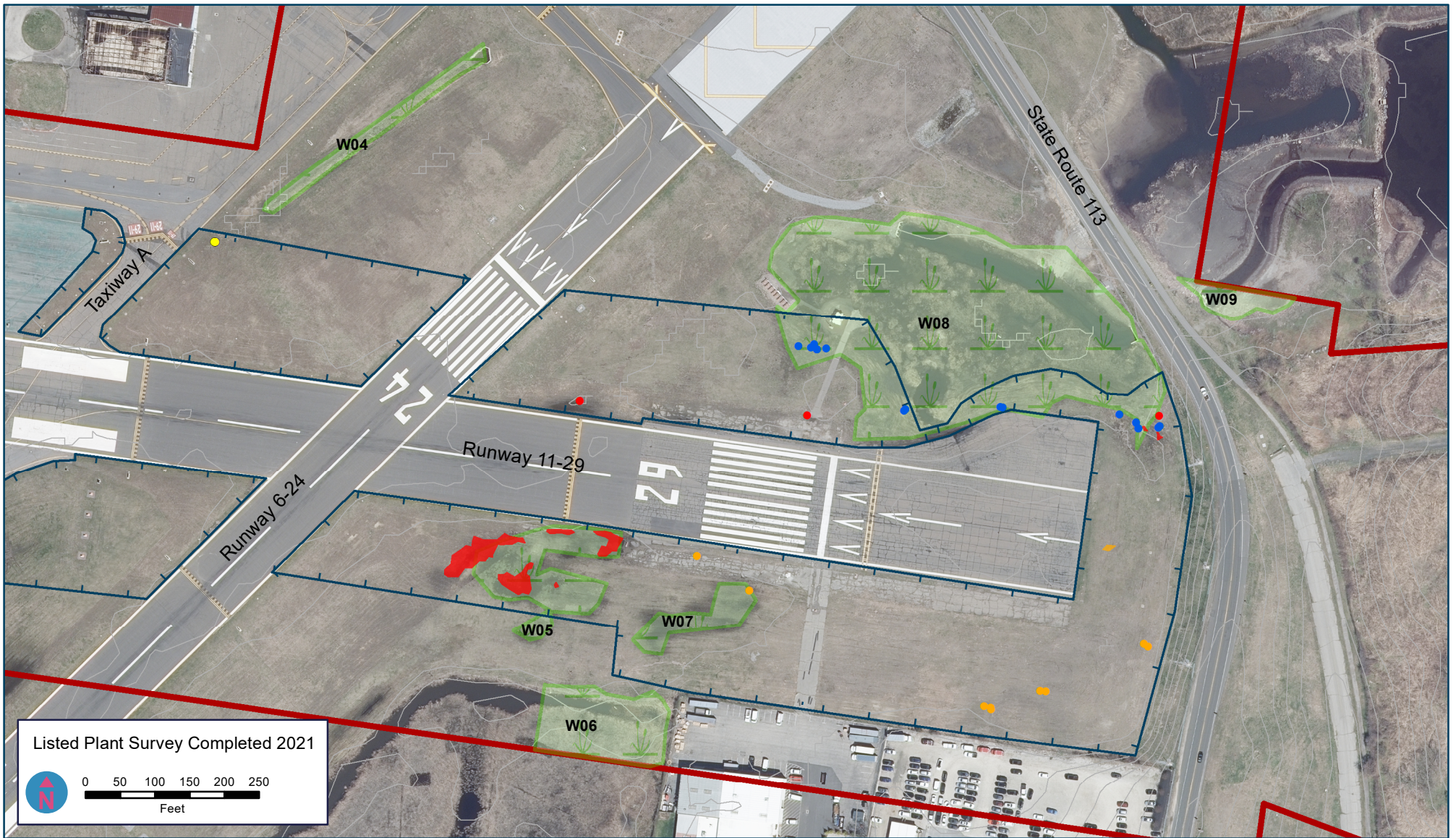
- *Aristida longespica* var. *geniculata* Population
- *Opuntia humifusa* Population
- *Leptochloa fusca* Population
- *Paspalum laeve* Population
- *Aristida longespica* var. *longespica* Population
- *Opuntia humifusa* Individual
- *Atriplex glabriuscula* Individual
- *Aristida longespica* var. *longespica* Individual
- *Leptochloa fusca* Population Individual
- *Paspalum laeve* Individual
- Approximate Listed Plant Survey Limit
- Delineated Tidal Wetland
- Project Study Area

Igor I. Sikorsky Memorial Airport

Federal Environmental Assessment for Short-Term Projects: Runway 11/29 Safety Area Improvements; Off Airport Tree Removal; Airfield Pavement Rehabilitation

Map Produced 12/8/2021
Data Source: CTECO 2019 Aerial; FHI Studio 2021

Figure 4 - Listed Plant Species



Map Produced 12/8/2021
 Data Source: CTECO 2019 Aerial; FHI Studio 2021

- Aristida longespica* var. *geniculata* Population
- Opuntia humifusa* Population
- Leptochloa fusca* Population
- Paspalum laeve* Population
- Aristida longespica* var. *longespica* Population
- Opuntia humifusa* Individual
- Atriplex glabriuscula* Individual
- Aristida longespica* var. *longespica* Individual
- Leptochloa fusca* Population Individual
- Paspalum laeve* Individual
- Approximate Listed Plant Survey Limit
- Delineated Tidal Wetland
- Project Study Area

Igor I. Sikorsky Memorial Airport

Federal Environmental Assessment for Short-Term Projects: Runway 11/29 Safety Area Improvements; Off Airport Tree Removal; Airfield Pavement Rehabilitation

Figure 5 - Listed Plant Species

Appendix B: Rare Plant Forms

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|---|--|
| *SPECIES SCIENTIFIC NAME: <i>Aristida longespica var. longespica</i> | Element Occurrence (EO) # (if known): |
|---|--|

| | |
|---|--|
| REPORTER INFORMATION | |
| Name(s): <i>Anthony Zemba, Daniel Hageman</i> | |
| Address: <i>416 Asylum Street</i> | Telephone No: <i>860-321-9018</i> |
| <i>Hartford, CT 06473</i> | E-mail address: <i>Azemba@fhstudio.com</i> |

| | |
|---|---|
| SURVEY/SITE INFORMATION | |
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21;9/29;10/1;10/6-7;10/13-14</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield</i> |
| <p>Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found). <i>From I-95 in New Haven, CT: Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South. Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113). Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport. Proceed to Airport Operations ("OPs") Office at 1000 Great Meadow Rd, Stratford, CT 06497. Park at OPs or</i></p> <p><i>From I-95 in Bridgeport, CT: Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd. Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>See attached map for locations of plant populations on the Airfield</i></p> | |
| GPS Coordinates | Method Used to Determine Coordinates: |
| Latitude <i>See attached table</i> N | <input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: W | <input type="checkbox"/> Mapping Software Software: |
| Coordinate system (NAD83 preferred): | <input type="checkbox"/> Online Maps Online site: |

POPULATION DATA

| Population Size | |
|---------------------|------------------|
| Actual No. Observed | <i>see table</i> |
| Estimated No./Range | <i>see table</i> |

| What was counted? |
|--|
| (e.g. stems, clumps, floating masses, etc.) <i>clumps</i> |

| Population Area | |
|-----------------|------------------|
| Length (units) | |
| Width (units) | |
| Area (units) | <i>see table</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|-----------|------------------|--|-------------------|
| | % In leaf | | % Mature fruit |
| | % In flower bud | | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|--------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| 75 | % Mature (established) |
| 25 | % Senescent |
| <input type="checkbox"/> | Age structure unknown |

| Vigor |
|---|
| <input type="checkbox"/> Very feeble |
| <input type="checkbox"/> Feeble |
| <input type="checkbox"/> Normal |
| <input type="checkbox"/> Vigorous |
| <input type="checkbox"/> Exceptionally vigorous |

Comments on above: *Most sub-populations very large, so populations estimated.*

HABITAT

| Aspect | | Slope | Light | Topographic Position | Moisture |
|--|-----------------------------|---|--|--------------------------------------|---|
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated |
| <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input type="checkbox"/> Tidally Inundated/Exposed |
| <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input type="checkbox"/> Lower-Slope | <input type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Moist (Mesic) |
| | ° re true N | Measured (° or %): | | Other: <i>plain</i> | <input type="checkbox"/> Dry-Mesic |
| | ° re mag N | Horizontal shape (as for next item): | | | <input type="checkbox"/> Dry-Xeric |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | Other: <i>meso-xeric</i> |

Elevation: to feet meters

Soil/substrate name/description(give source): *Udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *Area or portions of the area appear(s) to be routinely mowed; Artemisia vulgaris and Kummerowia striata have significant coverages on the airfield and could invade Aristida populations.*

Associated natural/plant communities: *N/A = found in ruderal habitat on site*

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Aristida oligantha, Aristida dichotoma, Schizachyrium scoparium, Panicum virgatum, Symphyotrichum racemosum, Hypochaeris radicata, Kummerowia striata, Digitalia sanguinalis, Oxalis sp., and Paspalum setaceum*

IDENTIFICATION

| | | | |
|--------------------------|---|--|--|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Identified by its characteristic long central awn averaging 14 mm, as compared to the two corresponding lateral awns which range from 0-5 mm. The base of the tree awns is not coiled or tangled as in other Aristida species.</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|--|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Invasive plant species; airport development; sea level rise</i> | | |
| Conservation/ management needs: | <i>Conservation mowing regime</i> | | |
| Research needs: | <i>Habitat requirements in comparison to A. longespica var. geniculata</i> | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Aristida longespica var. *longespica*

Aristida longespica var. longespica Population

| Subpopulation ID | Population Estimated | Population Actual | Area (SF) | Lat | Long | I=Individual P=Population |
|------------------|----------------------|-------------------|-----------|----------|----------|------------------------------|
| P1 | 50,000+ | | 30399 | 41.16658 | -73.133 | |
| P2 | 1,000+ | | 627 | 41.16656 | -73.1317 | |
| P3 | | 6 | 11 | 41.16578 | -73.1366 | |
| P4 | 100,000+ | | 83070 | 41.16565 | -73.134 | |
| P5 | 50+ | | 88 | 41.16444 | -73.1177 | |
| P6 | 250+ | | 284 | 41.16572 | -73.1266 | |
| I1 | | 1 | Point | 41.16638 | -73.1334 | |
| I2 | | 1 | Point | 41.16623 | -73.1316 | |
| I3 | | 1 | Point | 41.1644 | -73.1198 | |
| I4 | | 1 | Point | 41.16427 | -73.1196 | |
| I5 | | 1 | Point | 41.16381 | -73.1183 | |
| I6 | | 1 | Point | 41.16381 | -73.1183 | |
| I7 | | 1 | Point | 41.1638 | -73.1183 | |
| I8 | | 1 | Point | 41.16387 | -73.118 | |
| I9 | | 1 | Point | 41.16387 | -73.118 | |
| I10 | | 1 | Point | 41.16406 | -73.1175 | |
| I11 | | 1 | Point | 41.16405 | -73.1175 | |

Aristida longespica var. longespica
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

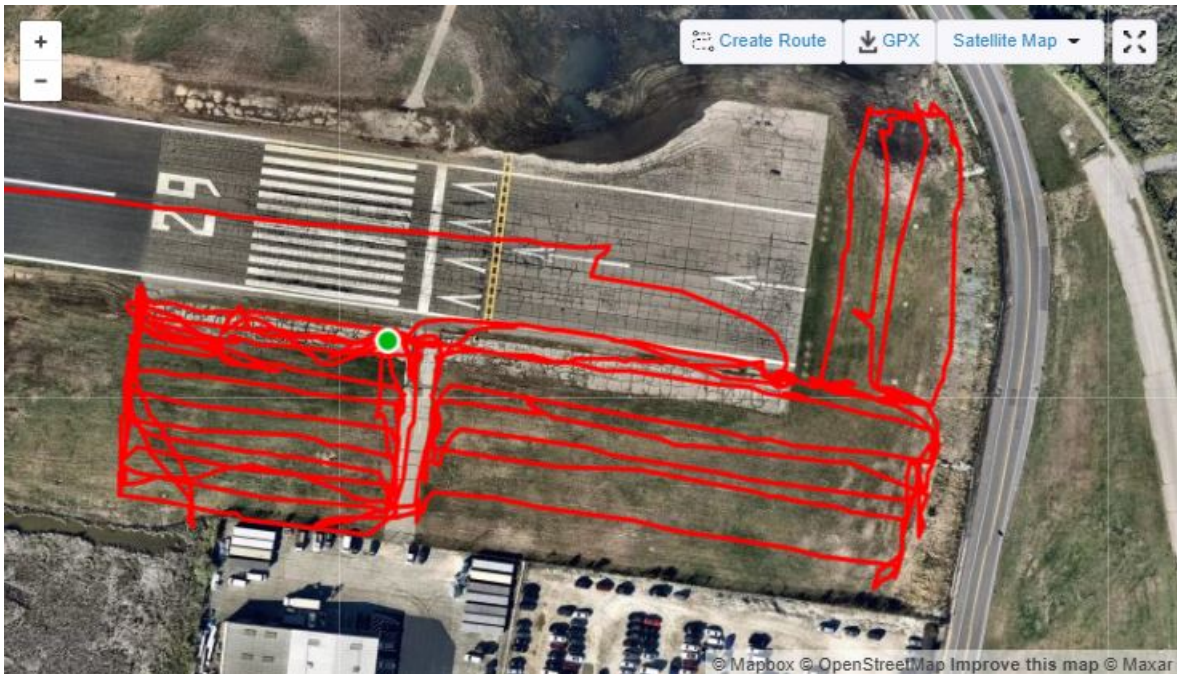


Photo 4. Survey route for work completed 10/6/21; one of three botanists

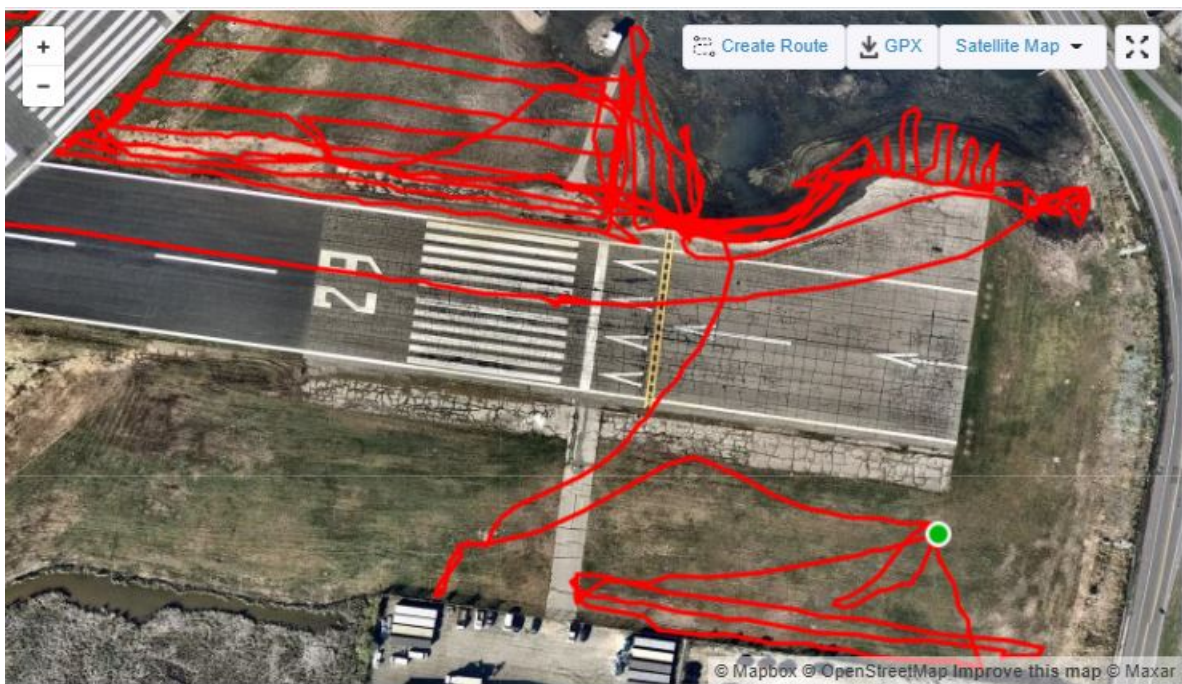


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|---|--|
| *SPECIES SCIENTIFIC NAME: <i>Aristida longespica var. geniculata</i> | Element Occurrence (EO) # (if known): |
|---|--|

| | |
|-----------------------------------|--|
| REPORTER INFORMATION | |
| Name(s): <i>Daniel Hageman</i> | |
| Address: <i>416 Asylum Street</i> | Telephone No: <i>860-383-3652</i> |
| <i>Hartford, CT 06473</i> | E-mail address: <i>Dhageman@fhstudio.com</i> |

| | |
|--|---|
| SURVEY/SITE INFORMATION | |
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21;9/29;10/1;10/6-7;10/13-14</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield</i> |
| <p>Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found). <i>From I-95 in New Haven, CT: Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South. Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113). Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport. Proceed to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>From I-95 in Bridgeport, CT: Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd. Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>See Map for locations of plant populations on the Airfield</i></p> | |
| GPS Coordinates | Method Used to Determine Coordinates: |
| Latitude <i>41.165838</i> N | <input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: <i>-73.126614</i> W | <input type="checkbox"/> Mapping Software Software: |
| Coordinate system (NAD83 preferred): | <input type="checkbox"/> Online Maps Online site: |

POPULATION DATA

| Population Size | |
|---------------------|-----------|
| Actual No. Observed | <i>35</i> |
| Estimated No./Range | |

| What was counted? |
|--|
| (e.g. stems, clumps, floating masses, etc.) <i>clumps</i> |

| Population Area | |
|-----------------|---------------|
| Length (units) | |
| Width (units) | |
| Area (units) | <i>181 sf</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|-----------|------------------|--|-------------------|
| | % In leaf | | % Mature fruit |
| | % In flower bud | | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|--------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| <i>60</i> | % Mature (established) |
| <i>40</i> | % Senescent |
| <input type="checkbox"/> | Age structure unknown |

| Vigor |
|---|
| <input type="checkbox"/> Very feeble |
| <input type="checkbox"/> Feeble |
| <input type="checkbox"/> Normal |
| <input type="checkbox"/> Vigorous |
| <input type="checkbox"/> Exceptionally vigorous |

Comments on above: *small population in disturbed area.*

HABITAT

| Aspect | | Slope | Light | Topographic Position | Moisture |
|--|-----------------------------|---|--|--------------------------------------|---|
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated |
| <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input type="checkbox"/> Tidally Inundated/Exposed |
| <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input type="checkbox"/> Lower-Slope | <input type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Moist (Mesic) |
| | ° re true N | Measured (° or %): | | Other: <i>plain</i> | <input type="checkbox"/> Dry-Mesic |
| | ° re mag N | Horizontal shape (as for next item): | | | <input type="checkbox"/> Dry-Xeric |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | Other: <i>Meso-xeric</i> |

Elevation: to feet meters

Soil/substrate name/description(give source): *Udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *Area or portions of the area appear(s) to be routinely mowed*

Associated natural/plant communities: *N/A*

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Aristida longespica var. longespica, Trifolium repens, Kummerowia striata, Digitaria sanguinalis, and Plantago lanceolata.*

IDENTIFICATION

| | | | |
|--------------------------|---|--|---|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Identified by its characteristic long central awn 12-27 mm and the two corresponding lateral awns which range from 6-18 mm; all awns, especially the lateral awns, are longer than A. longespica var. longespica. The base of the three awns is not coiled or tangled as in other Aristida species.</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|--|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Invasive plant species; airport development; sea level rise</i> | | |
| Conservation/ management needs: | | | |
| Research needs: | | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Aristida longespica var. *geniculata*

Aristida longespica var. geniculata Population

| Subpopulation ID | Population Estimated | Population Actual | Area (SF) | Lat | Long | I=Individual P=Population |
|------------------|----------------------|-------------------|-----------|----------|----------|------------------------------|
| P1 | | 35 | 181 | 41.16584 | -73.1266 | |

Aristida longespica var. *geniculata*
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

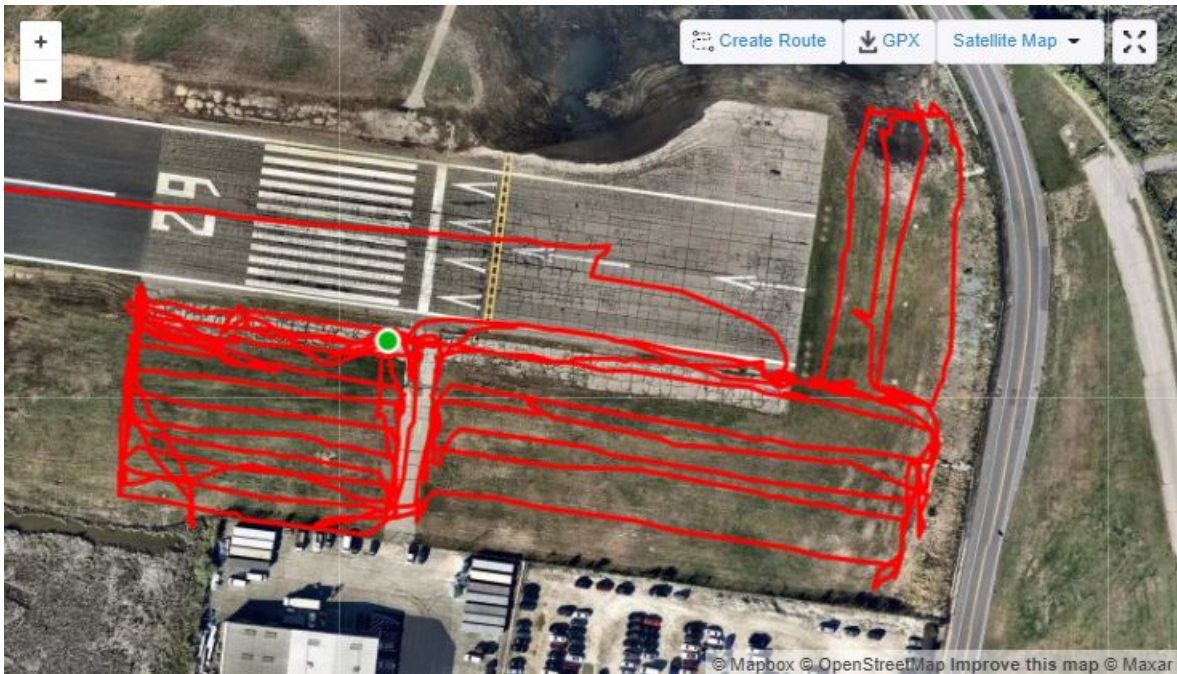


Photo 4. Survey route for work completed 10/6/21; one of three botanists

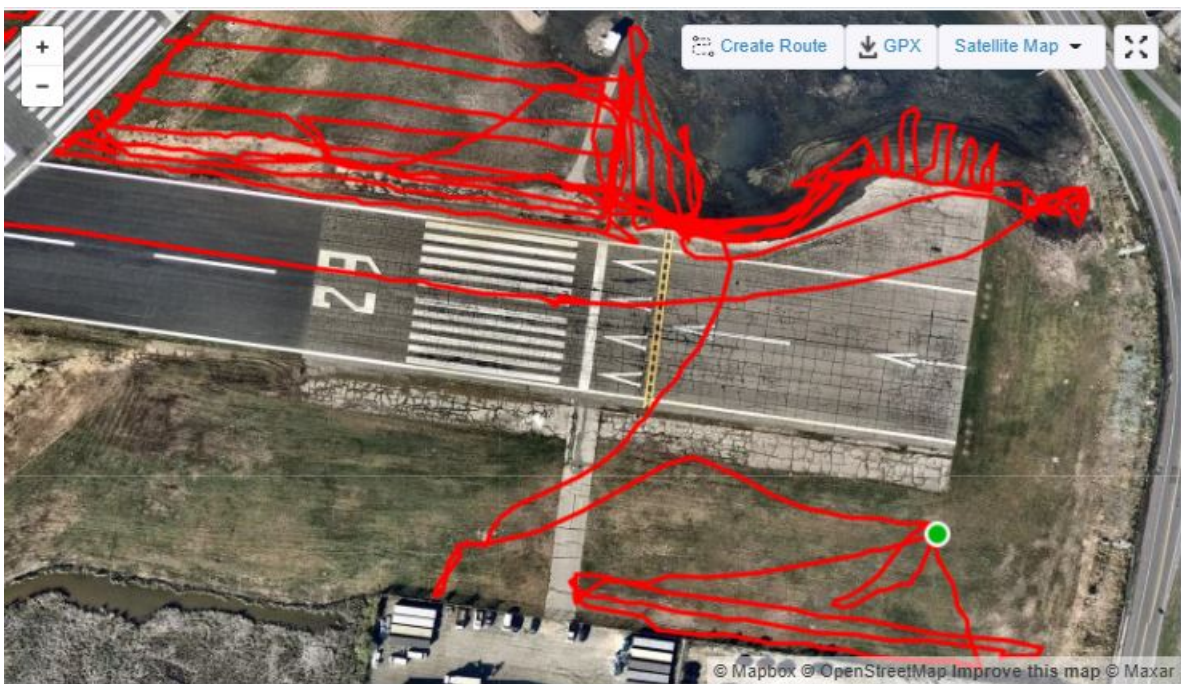


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|---|--|
| *SPECIES SCIENTIFIC NAME: <i>Atriplex glabriuscula</i> | Element Occurrence (EO) # (if known): |
|---|--|

| REPORTER INFORMATION | |
|--|---|
| Name(s): <i>Anthony Zemba</i> | |
| Address: <i>416 Asylum Street</i> <i>Hartford, CT</i> | Telephone No: <i>860-321-9018</i> E-mail address: <i>Azemba@fhstudio.com</i> |

| SURVEY/SITE INFORMATION | |
|------------------------------------|---|
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21,9/29,10/1;10/6-7;10/13-14;10/19</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield, CT</i> |

Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found).

From I-95 in New Haven, CT:

Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South.

Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113).

Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport.

Proceed to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497

From I-95 in Bridgeport, CT:

Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd.

Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT

Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497

See Map for locations of plant populations on the Airfield

| GPS Coordinates | | Method Used to Determine Coordinates: | |
|--------------------------------------|---|--|---------------------------------------|
| Latitude <i>see attached table</i> | N | <input checked="" type="checkbox"/> GPS Unit | GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: | W | <input type="checkbox"/> Mapping Software | Software: |
| Coordinate system (NAD83 preferred): | | <input type="checkbox"/> Online Maps | Online site: |

POPULATION DATA

| Population Size | |
|---------------------|------------------|
| Actual No. Observed | <i>see table</i> |
| Estimated No./Range | |

| What was counted? |
|---|
| (e.g. stems, clumps, floating masses, etc.) <i>stems</i> |

| Population Area | |
|-----------------|------------------|
| Length (units) | |
| Width (units) | |
| Area (units) | <i>see table</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|------------|------------------|--|-------------------|
| <i>100</i> | % In leaf | | % Mature fruit |
| | % In flower bud | | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|--------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| <i>100</i> | % Mature (established) |
| | % Senescent |
| <input type="checkbox"/> | Age structure unknown |

| Vigor |
|---|
| <input type="checkbox"/> Very feeble |
| <input type="checkbox"/> Feeble |
| <input checked="" type="checkbox"/> Normal |
| <input type="checkbox"/> Vigorous |
| <input type="checkbox"/> Exceptionally vigorous |

Comments on above: *All individual plants*

HABITAT

| Aspect | | Slope | Light | Topographic Position | Moisture |
|--|-----------------------------|---|--|---|---|
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated |
| <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input checked="" type="checkbox"/> Tidally Inundated/Exposed |
| <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input checked="" type="checkbox"/> Lower-Slope | <input type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Moist (Mesic) |
| | ° re true N | Measured (° or %): | | Other: | <input type="checkbox"/> Dry-Mesic |
| | ° re mag N | Horizontal shape (as for next item): | | | <input type="checkbox"/> Dry-Xeric |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | Other: |

Elevation: to feet meters

Soil/substrate name/description(give source): *udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *periodic mowing*

Associated natural/plant communities:

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Juncus gerardii, Distichlis spicata, Symphiotrichum subulatum, Atriplex patula, Iva frutescens, Leptochloa fusca.*

IDENTIFICATION

| | | | |
|--------------------------|---|--|--|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Identified plants by leafy bracteate spikes with the bracts occurring nearly to the end of the spike, (as opposed to leafy bracteate only near the base of the spike in other species), and concurrently, by the presence of the lower leaf blades exhibiting a pair of large, pointed lobes at or near the base of the leaf blade. These lobes are oriented either outward at a right angle to the blade axis or slightly forward-pointing.</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|--|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Runway Safety Area mowing, invasive species, Sea Level Rise</i> | | |
| Conservation/ management needs: | <i>Established conservation mowing regime, invasive species control and management</i> | | |
| Research needs: | <i>Niche partition requirements in relation to other species of co-occurring Atriplex; confirmation of wetland indicator status in NENC region</i> | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Atriplex glabriuscula

Atriplex glabriuscula Individual

| Subpopulation | Population | Population | | | | |
|---------------|------------|------------|-----------|----------|----------|------------------------------|
| ID | Estimated | Actual | Area (SF) | Lat | Long | I=Individual P=Population |
| I1 | | 1 | Point | 41.16523 | -73.1193 | |
| I2 | | 1 | Point | 41.16524 | -73.1192 | |
| I3 | | 1 | Point | 41.16523 | -73.1193 | |
| I4 | | 1 | Point | 41.16522 | -73.1192 | |
| I5 | | 1 | Point | 41.16522 | -73.1192 | |
| I6 | | 1 | Point | 41.16522 | -73.1192 | |
| I7 | | 1 | Point | 41.16522 | -73.1192 | |
| I8 | | 1 | Point | 41.16522 | -73.1192 | |
| I9 | | 1 | Point | 41.16498 | -73.1188 | |
| I10 | | 1 | Point | 41.16498 | -73.1188 | |
| I11 | | 1 | Point | 41.16499 | -73.1183 | |
| I12 | | 1 | Point | 41.16499 | -73.1182 | |
| I13 | | 1 | Point | 41.16497 | -73.1176 | |
| I14 | | 1 | Point | 41.16492 | -73.1174 | |
| I15 | | 1 | Point | 41.16492 | -73.1174 | |
| I16 | | 1 | Point | 41.16494 | -73.1176 | |
| I17 | | 1 | Point | 41.16494 | -73.1176 | |
| I18 | | 1 | Point | 41.16491 | -73.1175 | |
| I19 | | 1 | Point | 41.16491 | -73.1175 | |
| I20 | | 1 | Point | 41.16491 | -73.1175 | |

Atriplex glabriuscula
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

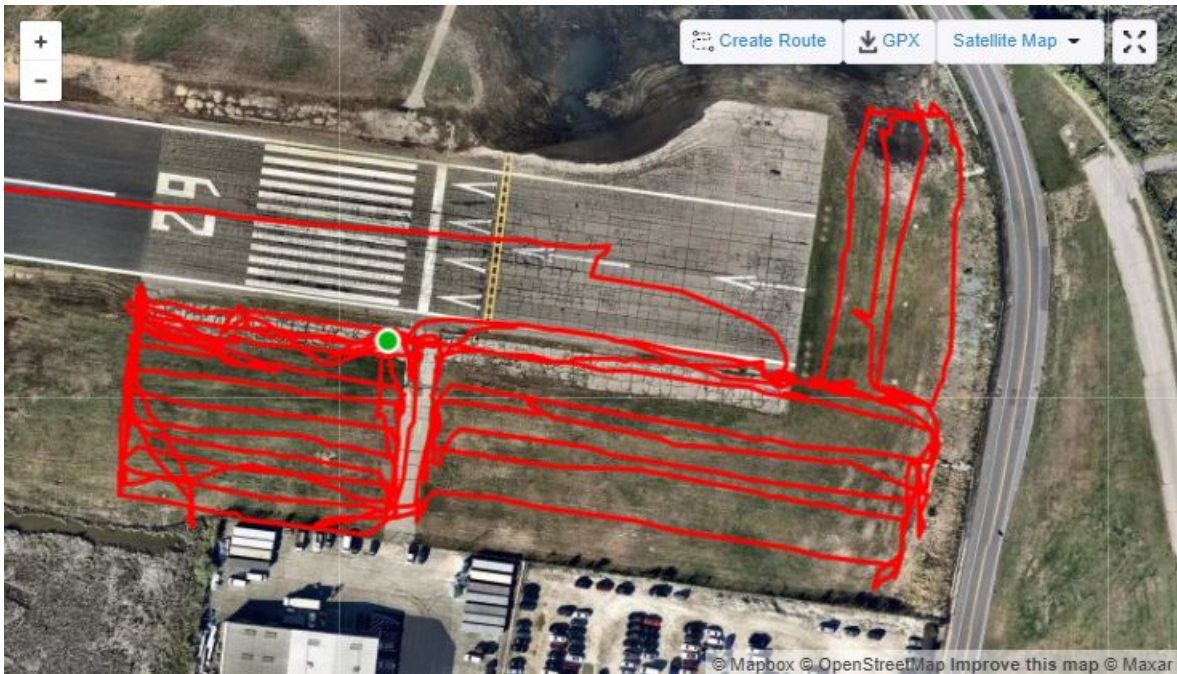


Photo 4. Survey route for work completed 10/6/21; one of three botanists

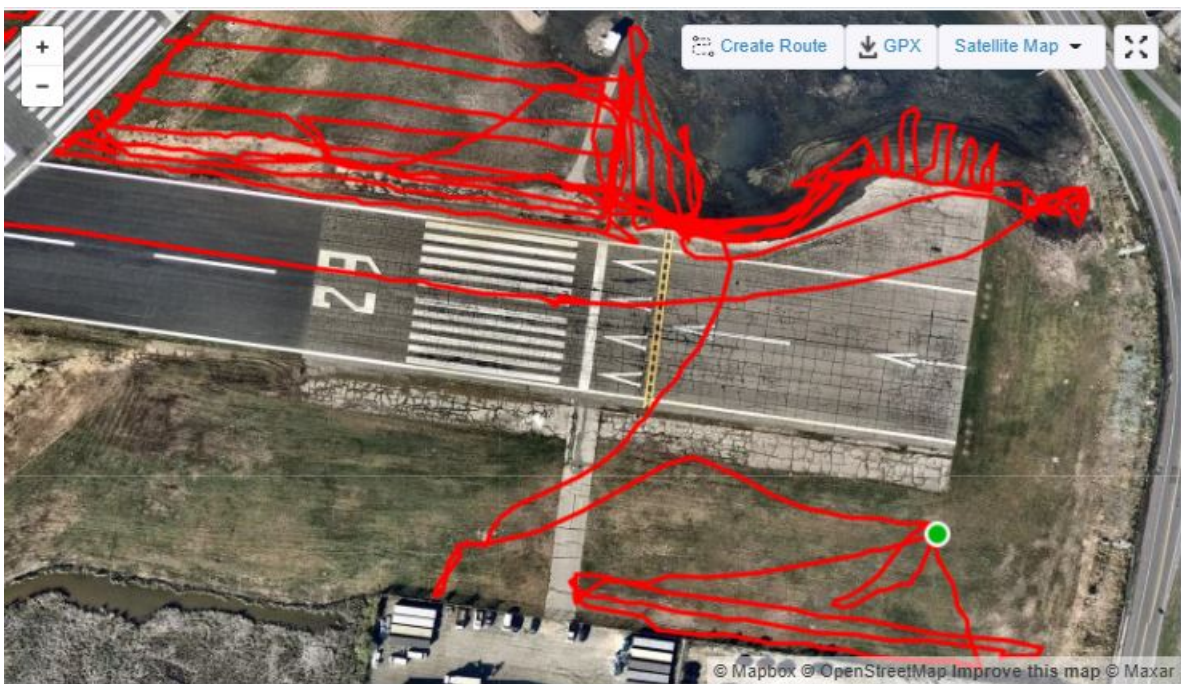


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|--|--|
| *SPECIES SCIENTIFIC NAME: <i>Leptochloa fusca</i> | Element Occurrence (EO) # (if known): |
|--|--|

| REPORTER INFORMATION | |
|--|---|
| Name(s): <i>Anthony Zemba, Daniel Hageman</i> | |
| Address: <i>416 Asylum Street</i> <i>Hartford, CT 06473</i> | Telephone No: <i>860-321-9018</i> E-mail address: <i>Azemba@fhstudio.com</i> |

| SURVEY/SITE INFORMATION | |
|--|---|
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21;9/29;10/1;10/6-7;10/13-14</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield</i> |
| <p>Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found). <i>From I-95 in New Haven, CT: Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South. Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113). Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport. Proceed to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>From I-95 in Bridgeport, CT: Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd. Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>See Map for locations of plant populations on the Airfield</i></p> | |
| GPS Coordinates | Method Used to Determine Coordinates: |
| Latitude <i>see attached table</i> N | <input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: W | <input type="checkbox"/> Mapping Software Software: |
| Coordinate system (NAD83 preferred): | <input type="checkbox"/> Online Maps Online site: |

POPULATION DATA

| Population Size | |
|---------------------|------------------|
| Actual No. Observed | <i>see table</i> |
| Estimated No./Range | |

| What was counted? |
|---|
| (e.g. stems, clumps, floating masses, etc.) <i>clumps, sub-populations</i> |

| Population Area | |
|-----------------|------------------|
| Length (units) | |
| Width (units) | |
| Area (units) | <i>see table</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|-----------|------------------|--|-------------------|
| X | % In leaf | | % Mature fruit |
| | % In flower bud | | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|--------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| X | % Mature (established) |
| | % Senescent |
| <input type="checkbox"/> | Age structure unknown |

| Vigor | |
|-------------------------------------|------------------------|
| <input type="checkbox"/> | Very feeble |
| <input type="checkbox"/> | Feeble |
| <input checked="" type="checkbox"/> | Normal |
| <input type="checkbox"/> | Vigorous |
| <input type="checkbox"/> | Exceptionally vigorous |

Comments on above:

HABITAT

| | | | | | | | | | | | |
|--|-----------------------------|---|--|------------------------------------|---|-----------------------------|-----------------------------|---------------------------------|----------------------------------|---|--|
| Aspect | | Slope | | Light | | Topographic Position | | Moisture | | | |
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated | <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input checked="" type="checkbox"/> Upper Slope | <input checked="" type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input checked="" type="checkbox"/> Tidally Inundated/Exposed | <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input type="checkbox"/> Lower-Slope | <input checked="" type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | <input checked="" type="checkbox"/> Moist (Mesic) | | | | | | <input type="checkbox"/> Dry-Mesic |
| | ° re true N | Measured (° or %): | | Other: <i>plain</i> | | | | | | | <input type="checkbox"/> Dry-Xeric |
| | ° re mag N | Horizontal shape (as for next item): | | | | | | | | | Other: |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | | | | | | | |

Elevation: to feet meters

Soil/substrate name/description(give source): *Udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *Area or portions of the area appear(s) to be routinely mowed*

Associated natural/plant communities: *Spartina patens tidally flooded grasslands (either Spartina patens - Distichlis spicata community or functionally equivalent similar community (portions mowed for Runway Safety area)*

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Spartina patens, Distichlis spicata, Juncus gerardii, Symphiotrichum subulatum, Atriplex glabriuscula, Atriplex patula, Iva frutescens, Setaria pumila, Solidago sempervirens, Eleocharis sp. Pluchea odorata, Salicornia sp.*

IDENTIFICATION

| | | | |
|--------------------------|---|--|---|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Characteristics of this species include prostrate outer flowering stems, inflorescences which are partially enclosed in the subtending leaf sheaths with leaf blades (2-7 mm wide) mostly exceeding the inflorescence, long ligules (2 to 8 mm) with lacerate apices at the base of the leaf blade, five to 12 mm-long spikelets that bear six to twelve flowers each, and a dark spot at the base of each lemma.</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|--|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Invasive plant species; airport development; sea level rise</i> | | |
| Conservation/ management needs: | <i>Conservation mowing regime plan</i> | | |
| Research needs: | <i>Soil parameters (nutrients, physical properties, etc.)</i> | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Leptochloa fusca

Leptochloa fusca Population

| Subpopulation | Population | Population | | | | | |
|---------------|------------|------------|-----------|----------|----------|--------------|--------------|
| ID | Estimated | Actual | Area (SF) | Lat | Long | I=Individual | P=Population |
| P1 | 500+ | | 2545 | 41.16441 | -73.121 | | |
| P2 | 200+ | | 1167 | 41.1643 | -73.1208 | | |
| P3 | 50+ | | 30 | 41.16428 | -73.1206 | | |
| P4 | 100+ | | 210 | 41.16449 | -73.1206 | | |
| P5 | 200+ | | 718 | 41.16445 | -73.1203 | | |
| P6 | | 15 | 25 | 41.16491 | -73.1175 | | |
| P7 | | 43 | 38 | 41.16488 | -73.1174 | | |
| I1 | | 1 | Point | 41.16501 | -73.1205 | | |
| I2 | | 1 | Point | 41.16501 | -73.1205 | | |
| I3 | | 1 | Point | 41.16501 | -73.1205 | | |
| I4 | | 6 | Point | 41.16496 | -73.1193 | | |
| I5 | | 1 | Point | 41.16496 | -73.1174 | | |

Leptochloa fusca
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

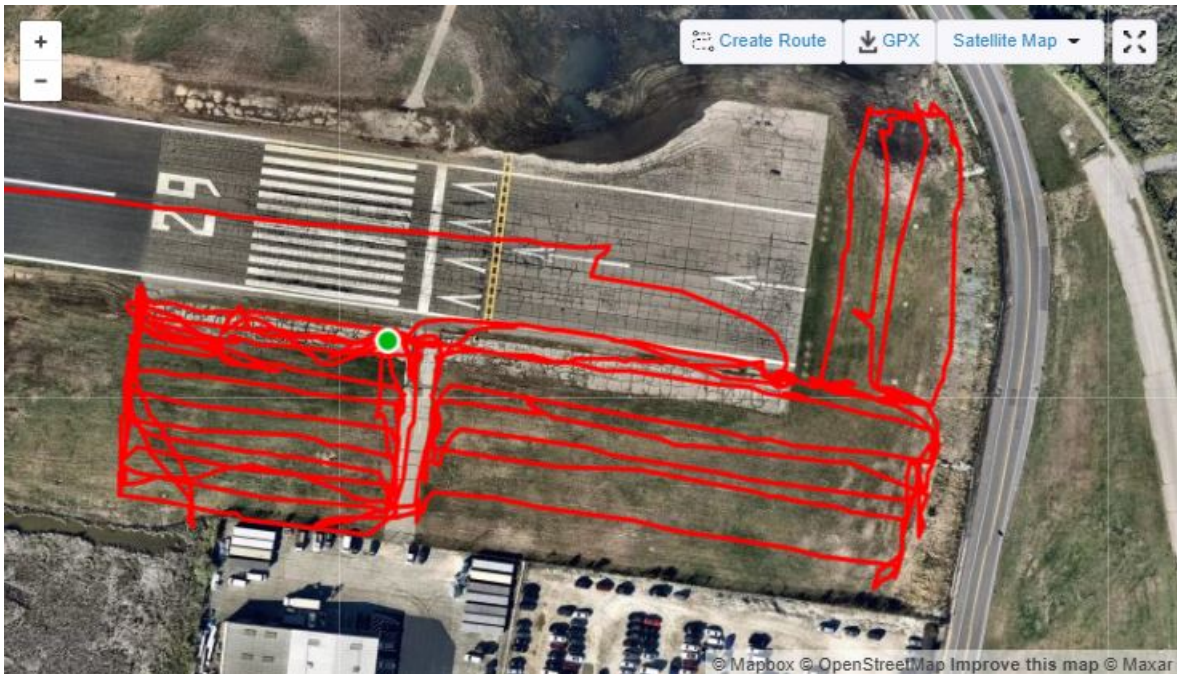


Photo 4. Survey route for work completed 10/6/21; one of three botanists

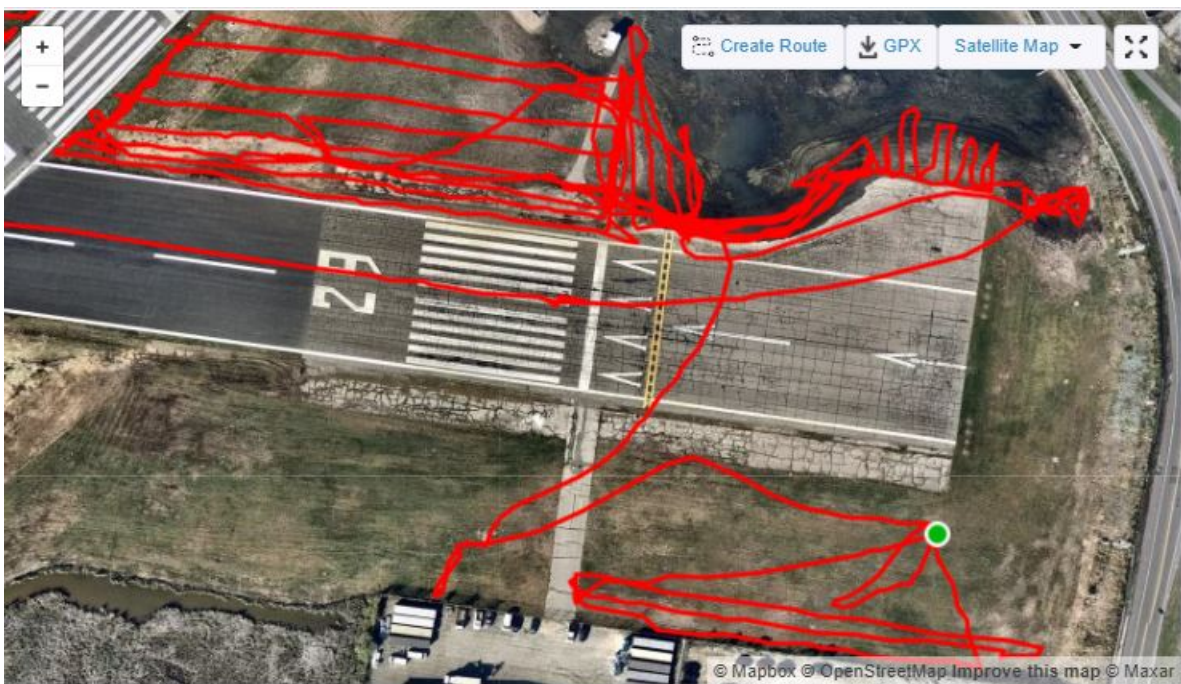


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|---|---------------------------------------|
| *SPECIES SCIENTIFIC NAME: <i>Opuntia humifusa</i> | Element Occurrence (EO) # (if known): |
|---|---------------------------------------|

| REPORTER INFORMATION | |
|--|---|
| Name(s): <i>Anthony Zemba</i> | |
| Address: <i>416 Asylum Street</i> <i>Hartford, CT</i> | Telephone No: <i>860-321-9018</i> E-mail address: <i>Azemba@fhstudio.com</i> |

| SURVEY/SITE INFORMATION | |
|--|---|
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21;10/1;10/6-7;10/13-14;10/19</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield</i> |
| <p>Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found). <i>From I-95 in New Haven, CT: Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South. Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113). Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport. Proceed to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>From I-95 in Bridgeport, CT: Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd. Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>See Map for locations of plant populations on the Airfield</i></p> | |
| GPS Coordinates | Method Used to Determine Coordinates: |
| Latitude <i>See attached table</i> N | <input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: W | <input type="checkbox"/> Mapping Software Software: |
| Coordinate system (NAD83 preferred): | <input type="checkbox"/> Online Maps Online site: |

POPULATION DATA

| Population Size | |
|---------------------|------------------|
| Actual No. Observed | <i>see table</i> |
| Estimated No./Range | |

| What was counted? |
|--|
| (e.g. stems, clumps, floating masses, etc.) <i>One large clump, two smaller clumps or individuals</i> |

| Population Area | |
|-----------------|--------------------|
| Length (units) | <i>36.5</i> |
| Width (units) | <i>10 feet</i> |
| Area (units) | <i>365 sq. ft.</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|-----------|------------------|-----------|-------------------|
| <i>90</i> | % In leaf | <i>10</i> | % Mature fruit |
| | % In flower bud | | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|-------------------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| | % Mature (established) |
| | % Senescent |
| <input checked="" type="checkbox"/> | Age structure unknown |

| Vigor |
|---|
| <input type="checkbox"/> Very feeble |
| <input type="checkbox"/> Feeble |
| <input checked="" type="checkbox"/> Normal |
| <input type="checkbox"/> Vigorous |
| <input type="checkbox"/> Exceptionally vigorous |

Comments on above: *Population mostly recumbent as taller pads appeared to have been sheared by the mower*

HABITAT

| Aspect | | Slope | Light | Topographic Position | Moisture |
|--|-----------------------------|---|--|---|---|
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input checked="" type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated |
| <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input type="checkbox"/> Tidally Inundated/Exposed |
| <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input type="checkbox"/> Lower-Slope | <input type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Moist (Mesic) |
| | ° re true N | Measured (° or %): | | Other: | <input type="checkbox"/> Dry-Mesic |
| | ° re mag N | Horizontal shape (as for next item): | | | <input checked="" type="checkbox"/> Dry-Xeric |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | Other: |

Elevation: to feet meters

Soil/substrate name/description(give source): *udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *Periodic mowing (routine mowing throughout the growing season)*

Associated natural/plant communities: *meso-xeric to xeric ruderal habitat that has formed on udorthents and subjected to routine periodic mowing to meet FAA compliance. No natural plant communities*

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Aristida oligantha, Aristida dichotoma, Froelichia gracilis, Hypericum gentianoides, Schizachyrium scoparium, and Symphyotrichum racemosum.*

IDENTIFICATION

| | | | |
|--------------------------|---|--|---|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Gleason and Cronquist (1991) separate O. humifusa from other Opuntia in the first couplet of a dichotomous key via the number of spines borne at the areoles. For O. humifusa, they report "Spines solitary or occasionally paired, borne at only a few areoles" in contrast to "spines usually several together, borne at most areoles" for the other two species. The plants noted on site were armed with spines but they appeared to occur singly and were borne at only a few areoles. This characteristic and the fact that Opuntia humifusa is the only cactus species listed by Haines (2011) to occur in New England, served as the basis for our identification of this plant to O. humifusa.</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|---|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Invasive species competition, sea level rise, improper mowing regime</i> | | |
| Conservation/ management needs: | <i>Prevent spread of invasive species into element occurrence; implement conservation mowing regime</i> | | |
| Research needs: | <i>Confirmation of taxonomy</i> | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Paspalum leaf

Opuntia humifusa

| Subpopulation | Population | Population | | | | |
|---------------|------------|------------|-----------|----------|----------|------------------------------|
| ID | Estimated | Actual | Area (SF) | Lat | Long | I=Individual P=Population |
| P1 | | 58 | 364 | 41.16617 | -73.1302 | |
| I1 | | 1 | Point | 41.16618 | -73.1304 | |
| I2 | | 1 | Point | 41.16617 | -73.1304 | |

Opuntia humifusa
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

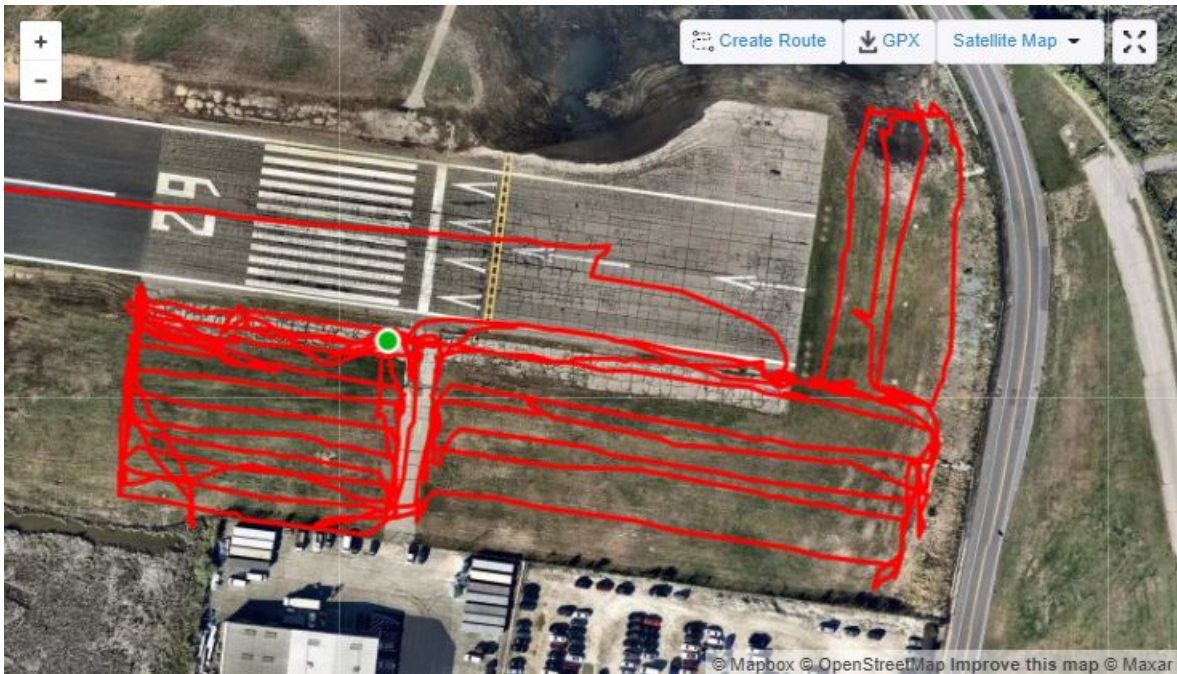


Photo 4. Survey route for work completed 10/6/21; one of three botanists

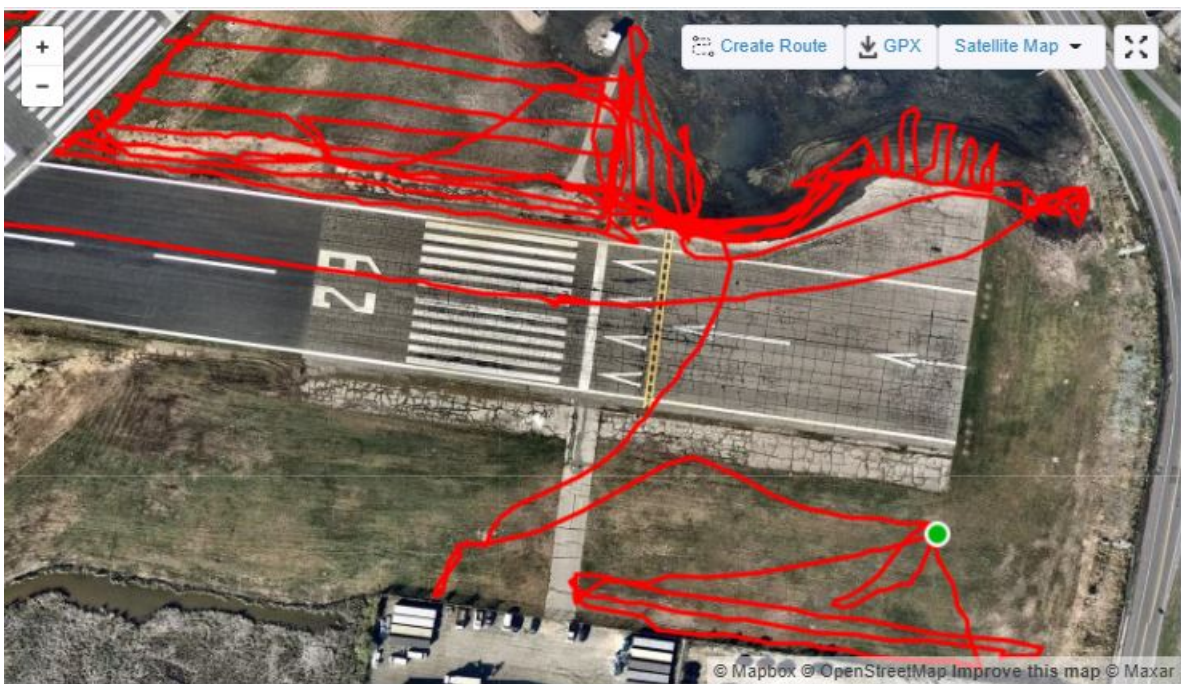


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

| | | |
|------------------------|-------|--------------|
| OFFICE USE ONLY | | EO#: |
| SNAME: | SITE: | SURVEY DATE: |
| | TOWN: | ENTERED BY: |

- New record
 Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

*Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above.*

| | |
|--|--|
| *SPECIES SCIENTIFIC NAME: <i>Paspalum laeve</i> | Element Occurrence (EO) # (if known): |
|--|--|

| REPORTER INFORMATION | |
|--|---|
| Name(s): <i>Anthony Zemba, Daniel Hageman</i> | |
| Address: <i>416 Asylum Street</i> <i>Hartford, CT 06473</i> | Telephone No: <i>860-321-9018</i> E-mail address: <i>Azemba@fhstudio.com</i> |

| SURVEY/SITE INFORMATION | |
|--|---|
| Site Name: <i>Sikorsky Airport</i> | Survey Date(s): <i>9/21;10/1;10/6-7;10/13-14;10/19</i> |
| Town(s): <i>Stratford, CT</i> | County: <i>Fairfield</i> |
| <p>Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found). <i>From I-95 in New Haven, CT: Proceed on I-91 S to Stratford. Take Exit 30 from I-95 South. Take a left onto Surf Ave and follow Surf Avenue to Lordship Blvd (State Route 113). Take a left onto Lordship Blvd and proceed approximately 1.7 miles to Great Meadow Rd which is the entrance to Sikorsky Memorial Airport. Proceed to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>From I-95 in Bridgeport, CT: Proceed on I-91 N to Exit 30 - Stratford Ave and Lordship Blvd. Take a right off of the exit onto Stratford Avenue and proceed 3.2 miles to Great Meadow Rd in Stratford, CT Turn left onto Great Meadow Rd and proceed 305 ft to Airport Operations Office at 1000 Great Meadow Rd, Stratford, CT 06497</i></p> <p><i>See Map for locations of plant populations on the Airfield</i></p> | |
| GPS Coordinates | Method Used to Determine Coordinates: |
| Latitude <i>see attached table</i> N | <input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>EOS Arrow 100®</i> |
| Longitude: W | <input type="checkbox"/> Mapping Software Software: |
| Coordinate system (NAD83 preferred): | <input type="checkbox"/> Online Maps Online site: |

POPULATION DATA

| Population Size | |
|---------------------|------------------|
| Actual No. Observed | <i>see table</i> |
| Estimated No./Range | |

| What was counted? |
|--|
| (e.g. stems, clumps, floating masses, etc.) <i>clumps</i> |

| Population Area | |
|-----------------|------------------|
| Length (units) | |
| Width (units) | |
| Area (units) | <i>see table</i> |

Evidence of disease, predation or injury? Yes No Explain:

| Phenology | | | |
|-----------|------------------|-----------|-------------------|
| | % In leaf | <i>5</i> | % Mature fruit |
| | % In flower bud | <i>95</i> | % Seed dispersing |
| | % In flower | | % Dormant |
| | % Immature fruit | | % Senescent |

| Age Structure | |
|--------------------------|------------------------|
| | % Seedlings |
| | % Immature |
| <i>80</i> | % Mature (established) |
| <i>20</i> | % Senescent |
| <input type="checkbox"/> | Age structure unknown |

| Vigor |
|---|
| <input type="checkbox"/> Very feeble |
| <input type="checkbox"/> Feeble |
| <input type="checkbox"/> Normal |
| <input type="checkbox"/> Vigorous |
| <input type="checkbox"/> Exceptionally vigorous |

Comments on above:

HABITAT

| | | | | | | | | | | | |
|--|-----------------------------|---|--|------------------------------------|--|-----------------------------|-----------------------------|---------------------------------|----------------------------------|---|---|
| Aspect | | Slope | | Light | | Topographic Position | | Moisture | | | |
| <input type="checkbox"/> N | <input type="checkbox"/> NE | <input checked="" type="checkbox"/> 0-3% | <input checked="" type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Permanently Inundated | <input type="checkbox"/> E | <input type="checkbox"/> NW | <input type="checkbox"/> 3-8% | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input type="checkbox"/> Seasonally Inundated/Exposed |
| <input type="checkbox"/> S | <input type="checkbox"/> SE | <input type="checkbox"/> 8-15% | <input type="checkbox"/> Filtered | <input type="checkbox"/> Mid-Slope | <input type="checkbox"/> Tidally Inundated/Exposed | <input type="checkbox"/> W | <input type="checkbox"/> SW | <input type="checkbox"/> 15-35% | <input type="checkbox"/> Shade | <input checked="" type="checkbox"/> Lower-Slope | <input type="checkbox"/> Saturated (Hydric) |
| <input checked="" type="checkbox"/> Flat | | <input type="checkbox"/> 35% - vertical | | <input type="checkbox"/> Bottom | | | | | | | <input type="checkbox"/> Moist (Mesic) |
| | ° re true N | Measured (° or %): | | Other: | | | | | | | <input type="checkbox"/> Dry-Mesic |
| | ° re mag N | Horizontal shape (as for next item): | | | | | | | | | <input type="checkbox"/> Dry-Xeric |
| | | Vertical shape (ie. Convex, concave, straight, variable): | | | | | | | | | Other: |

Elevation: to feet meters

Soil/substrate name/description(give source): *Udorthents*

Estimated # of acres of potential habitat in the immediate area: _____

Evidence of disturbance: fire logging disease insect damage windthrow invasives

Comments: *Area or portions of the area appear(s) to be routinely mowed*

Associated natural/plant communities:

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Plantago lanceolata, Trifolium pratense, Hypochaeris radicata,*

IDENTIFICATION

| | | | |
|--------------------------|---|--|--|
| Photograph taken? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | Photo ID: |
| Specimen taken* | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | If yes, provide: Collector: Repository: Collection #: |
| Identification problems? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | Explain: <i>Paspalum laeve is distinguished from the similar P. setaceum by the arrangement of the spikelets on the spike-like branches, and by the size of the spikelets. P. laeve spikelets occur one per node on the pedicels, while spikelets occur two per node on the pedicels of P. setaceum. The spikelets of P. laeve are larger (2.3-3.3 mm long) than the spikelets of P. setaceum (1.4-2.5 mm long).</i> |

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: *City of Bridgeport*

| | | | |
|---|--|---|--|
| Owner aware of EO? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | |
| Threats to EO: | <i>Invasive plant species and the control of same with herbicides; airport development; sea level rise</i> | | |
| Conservation/ management needs: | <i>Suitable mowing regime and protection and maintenance of supporting hydrology</i> | | |
| Research needs: | | | |

SUPPORTING DOCUMENTS (please attach)

- Sketch map (showing finer detail than topo or aerial photo)
- Aerial photo map
- Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoappl.uconn.edu/advancedviewer/>)
- Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
- Photos Slides Field notes Route of survey map



Opuntia humifusa

Paspalum laeve

| Subpopulation | Population | Population | | | | |
|---------------|------------|------------|-----------|----------|----------|------------------------------|
| ID | Estimated | Actual | Area (SF) | Lat | Long | I=Individual P=Population |
| P1 | | 45 | 358 | 41.16648 | -73.1314 | |
| P2 | 50+ | | 1244 | 41.16544 | -73.1333 | |
| P3 | 100+ | | 2457 | 41.16539 | -73.1326 | |
| P4 | | 23 | 33 | 41.16638 | -73.131 | |
| P5 | 50+ | | 4665 | 41.16628 | -73.1285 | |
| P6 | | 15 | 587 | 41.16615 | -73.1283 | |
| P7 | | 4 | 31 | 41.16614 | -73.1272 | |
| P8 | | 8 | 49 | 41.16616 | -73.1273 | |
| P9 | | 14 | 1160 | 41.16621 | -73.1274 | |
| P10 | | 22 | 1421 | 41.16607 | -73.1268 | |
| I1 | | 1 | Point | 41.16563 | -73.1224 | |
| I2 | | 1 | Point | 41.16545 | -73.1321 | |
| I3 | | 1 | Point | 41.16538 | -73.1321 | |
| I4 | | 1 | Point | 41.16542 | -73.1321 | |
| I5 | | 1 | Point | 41.16542 | -73.1321 | |
| I6 | | 1 | Point | 41.16541 | -73.1321 | |
| I7 | | 1 | Point | 41.16541 | -73.1321 | |
| I8 | | 1 | Point | 41.16545 | -73.1321 | |
| I9 | | 1 | Point | 41.16538 | -73.1321 | |
| I10 | | 1 | Point | 41.16542 | -73.1321 | |
| I11 | | 1 | Point | 41.16542 | -73.1321 | |
| I12 | | 1 | Point | 41.16541 | -73.1321 | |
| I13 | | 1 | Point | 41.16541 | -73.1321 | |
| I14 | | 1 | Point | 41.16641 | -73.1297 | |
| I15 | | 1 | Point | 41.16635 | -73.1295 | |
| I16 | | 1 | Point | 41.1663 | -73.1295 | |
| I17 | | 1 | Point | 41.16638 | -73.1294 | |
| I18 | | 1 | Point | 41.16637 | -73.1294 | |
| I19 | | 1 | Point | 41.16634 | -73.1294 | |
| I20 | | 1 | Point | 41.16634 | -73.1294 | |
| I21 | | 1 | Point | 41.16633 | -73.1294 | |
| I22 | | 1 | Point | 41.16636 | -73.1291 | |
| I23 | | 1 | Point | 41.16636 | -73.1291 | |
| I24 | | 1 | Point | 41.16625 | -73.1279 | |
| I25 | | 1 | Point | 41.16615 | -73.1277 | |
| I26 | | 1 | Point | 41.16618 | -73.1269 | |
| I27 | | 1 | Point | 41.16617 | -73.1269 | |
| I28 | | 1 | Point | 41.16616 | -73.1267 | |
| I29 | | 1 | Point | 41.16615 | -73.1267 | |
| I30 | | 1 | Point | 41.16577 | -73.1269 | |
| I31 | | 1 | Point | 41.16577 | -73.1269 | |
| I32 | | 1 | Point | 41.16575 | -73.1268 | |
| I33 | | 1 | Point | 41.16572 | -73.1266 | |
| I34 | | 1 | Point | 41.16578 | -73.1266 | |
| I35 | | 1 | Point | 41.1658 | -73.1266 | |
| I36 | | 1 | Point | 41.1658 | -73.1266 | |
| I37 | | 1 | Point | 41.1658 | -73.1266 | |
| I38 | | 1 | Point | 41.1658 | -73.1266 | |
| I39 | | 1 | Point | 41.1658 | -73.1266 | |
| I40 | | 1 | Point | 41.16582 | -73.1266 | |
| I41 | | 1 | Point | 41.16582 | -73.1266 | |
| I42 | | 1 | Point | 41.16582 | -73.1266 | |
| I43 | | 1 | Point | 41.16574 | -73.1265 | |
| I44 | | 1 | Point | 41.16576 | -73.1265 | |

Paspalum laeve
Plant Survey Track Routes

Igor I. Sikorsky Memorial Airport
Runway 11-29 Runway Safety Area Improvements

Stratford, Connecticut



Photo 1. Survey route for work completed 9/21/21; one of three botanists



Photo 2. Survey route for work completed 9/29/21; one of two botanists



Photo 3. Survey route for work completed 10/1/21; one of three botanists

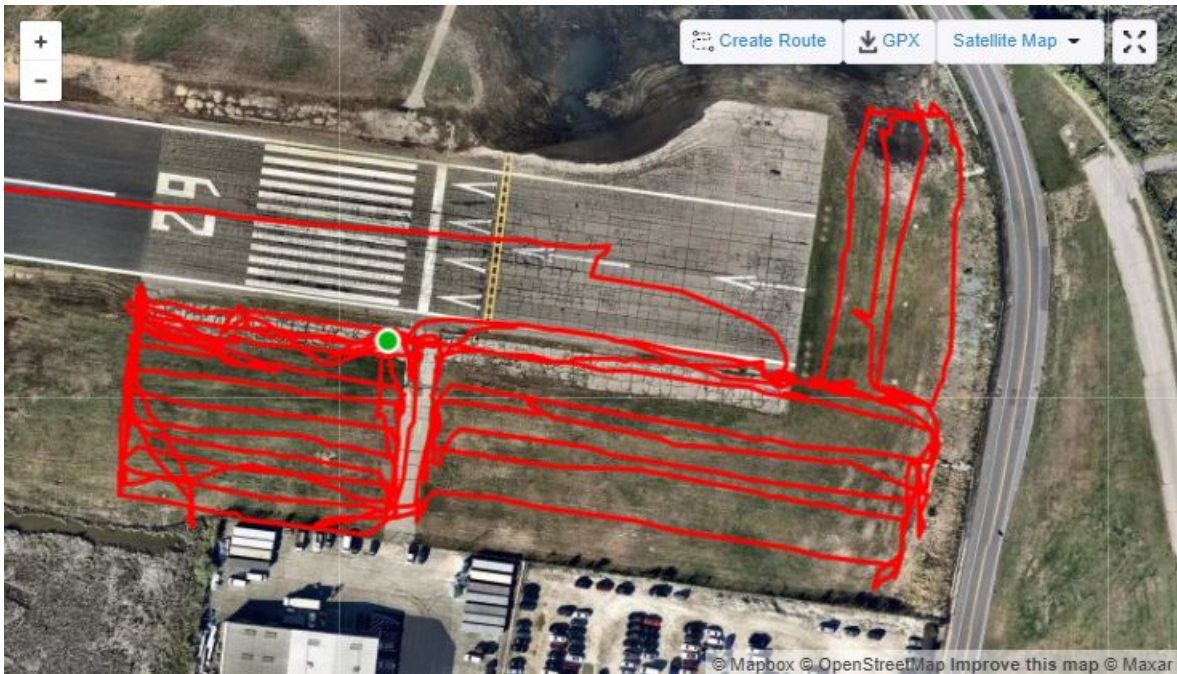


Photo 4. Survey route for work completed 10/6/21; one of three botanists

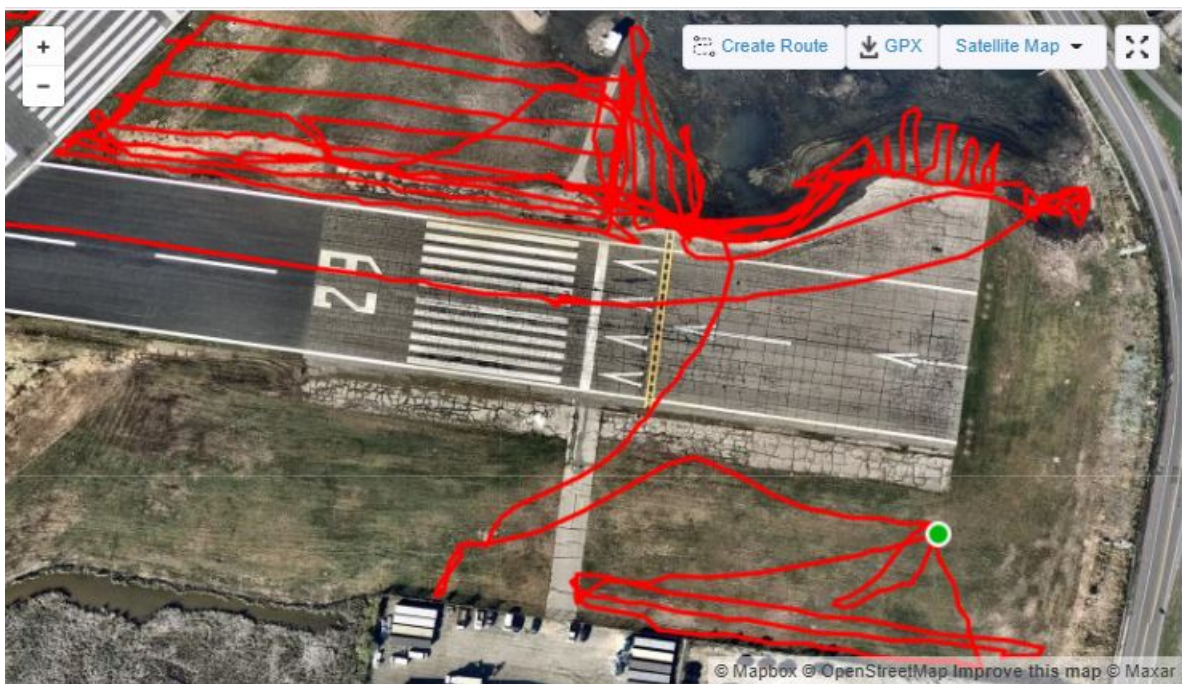


Photo 5. Survey route for work completed 10/7/21; one of three botanists



Photo 6. Survey route for work completed 10/7/21; one of three botanists



Photo 7. Survey route for work completed 10/13/21; one of two botanists



Photo 8. Survey route for work completed 10/14/21; one of three botanists



Photo 9. Survey route for work completed 10/14/21; one of three botanists

Appendix C: Comprehensive Plant List

APPENDIX D

Plant Species Observed At Sikorsky Airport - Runway 11-29 Safety Improvements, Off Airport Tree Removal and Airfield Pavement Rehabilitation Projects

| Current Family | Current Scientific Name | Dowhan Family | Name in Dowhan 1979 | Common Name(s) | Origin | Conservation Status | Connecticut (sources used by Haines) | Notes | Other synonyms |
|-----------------|--|----------------|---|--|--------|---------------------|--|--|---|
| Euphorbiaceae | <i>Acalypha rhomboidea</i> Raf. | same | same | common three-seeded mercury | N | | Seymour (1982); Kartesz (2008) | | |
| Sapindaceae | <i>Acer platanoides</i> L. | Aceraceae | same | Norway maple | I | | Seymour (1982); Kartesz (2009) | | |
| Sapindaceae | <i>Acer rubrum</i> L. | Aceraceae | <i>Acer rubrum</i> L. var. <i>rubrum</i> ; <i>Acer rubrum</i> L. var. <i>trilobum</i> | red maple | N | | Seymour (1982); Kartesz (2009) | | |
| Asteraceae | <i>Achillea millefolium</i> L. ssp. <i>lanulosa</i> (Nutt.) Piper | Compositae | <i>Achillea lanulosa</i> Nutt.; <i>Achillea millefolium</i> L. | common yarrow | N | | Seymour (1982); Kartesz (1999) | Old World ssp. <i>millefolium</i> appears to NOT be naturalized in New England | |
| Simaroubaceae | <i>Ailanthus altissima</i> (P. Mill.) Swingle | same | same | tree-of-heaven | I | | Seymour (1982); Kartesz (2009) | | |
| Alismataceae | <i>Alisma triviale</i> Pursh | Alismataceae | same | northern water-plantain | N | | Haynes and Hellquist (2000) | | <i>Alisma brevipes</i> Greene; <i>Alisma plantagoaquatica</i> L. var. <i>americanum</i> J.A. Schultes |
| Brassicaceae | <i>Alliaria petiolata</i> (Bieb.) Cavara & Grande | Cruciferae | same | garlic-mustard | I | | Seymour (1982); Kartesz (2008) | | |
| Alliaceae | <i>Allium</i> sp. | Liliaceae | | | | | | | |
| Asteraceae | <i>Ambrosia artemisiifolia</i> L. | Compositae | <i>Ambrosia artemisiifolia</i> L. var. <i>artemisiifolia</i> ; <i>Ambrosia artemisiifolia</i> L. var. <i>elatior</i> (L.) Descourtils | common ragweed | N | | Seymour (1982); Kartesz (1999) | | |
| Vitaceae | <i>Ampelopsis glandulosa</i> (Wallich) Momiy. var. <i>brevipedunculata</i> (Maxim.) Momiy. | same | <i>Ampelopsis brevipedunculata</i> (Maxim.) Trautv. | porcelainberry; Amur peppervine; heartleaf ampelepis | I | | Seymour (1982); Kartesz (2009) | | |
| Fabaceae | <i>Amphicarpa bracteata</i> (L.) Fern. | Leguminosae | <i>Amphicarpa bracteata</i> (L.) Fern. var. <i>bracteata</i> ; <i>Amphicarpa bracteata</i> (L.) Fern. var. <i>comosa</i> (L.) Fern. | American hog-peanut | N | | Seymour (1982); Kartesz (2008) | | |
| Poaceae | <i>Andropogon gerardii</i> Vitman | Gramineae | <i>Andropogon gerardii</i> Vitman var. <i>gerardii</i> ; <i>Andropogon gerardii</i> Vitman var. <i>chrysocomus</i> (Nash) Fern. | big bluestem | N | | Campbell (2003) | | |
| Fabaceae | <i>Apios americana</i> Medik. | Leguminosae | <i>Apios americana</i> Medic. | common ground-nut; wild bean | N | | Seymour (1982); Kartesz (2008) | | |
| Apocynaceae | <i>Apocynum cannabinum</i> L. | Apocynaceae | <i>Apocynum cannabinum</i> L. var. <i>cannabinum</i> ; <i>Apocynum cannabinum</i> L. var. <i>pubescens</i> (Mitchell) A. DC.; <i>Apocynum sibiricum</i> Jacq. var. <i>coridigerum</i> (Greene) Fern.; <i>Apocynum sibiricum</i> L. var. <i>sibiricum</i> | hemp dogbane; Indian hemp | N | | Seymour (1982); Kartesz (1999) | <i>Apocynum sibiricum</i> Jacq. var. <i>sibiricum</i> - apparently not an accepted synonym. | |
| Poaceae | <i>Aristida dichotoma</i> Michx. var. <i>dichotoma</i> | Gramineae | <i>Aristida dichotoma</i> Michx. | churchmouse threeawn; poverty grass | N | | Angelo and Boufford (1998); Kartesz (1999) | | |
| Poaceae | <i>Aristida longispica</i> Poir. var. <i>geniculata</i> (Raf.) Fern. | Gramineae | same | red threeawn | N | SC | Angelo and Boufford (1998); Kartesz (1999) | | |
| Poaceae | <i>Aristida longispica</i> Poir. var. <i>longispica</i> | Gramineae | same | red threeawn | E | | MASS! | not exotic in JD | |
| Poaceae | <i>Aristida oligantha</i> Michx. | Gramineae | same | oldfield threeawn; prairie three-awn | E | | Angelo and Boufford (1998); Kartesz (1999) | | |
| Rosaceae | <i>Aronia melanocarpa</i> (Michx.) Ell. | same | same | black chokeberry | N | | Seymour (1982); Kartesz (2009) | | |
| Asteraceae | <i>Artemisia vulgaris</i> L. var. <i>vulgaris</i> | Compositae | same; <i>Artemisia vulgaris</i> L. var. <i>glabra</i> Ledeb.; <i>Artemisia vulgaris</i> L. var. <i>latiloba</i> Ledeb. | common wormwood; common mugwort | I | | Seymour (1982); Kartesz (1999) | | |
| Apocynaceae | <i>Asclepias syriaca</i> L. | Asclepiadaceae | same | common milkweed | N | | Seymour (1982); Kartesz (1999) | | |
| Amaranthaceae | <i>Atriplex glabriuscula</i> Edmondston | Chenopodiaceae | same | bracted orache | N | SC | Kartesz (1999); Seymour (1982) | | |
| Amaranthaceae | <i>Atriplex patula</i> L. | Chenopodiaceae | <i>Atriplex patula</i> L. var. <i>patula</i> ; <i>Atriplex patula</i> L. var. <i>hastata</i> (L.) Gray | spearscale orache | E | | Seymour (1982) | includes inland specimens; probably but not certainly from both varieties | |
| Asteraceae | <i>Baccharis halimifolia</i> L. | Compositae | same | eastern false willow; groundsel-tree; groundsel-bush | N | | Seymour (1982); Kartesz (1999) | | |
| Betulaceae | <i>Betula populifolia</i> Marsh. | same | same | gray birch | N | | Seymour (1982); Kartesz (1999) | | |
| Asteraceae | <i>Bidens connata</i> Muhl. ex Willd. | Compositae | <i>Bidens connata</i> Muhl. ex Willd. var. <i>connata</i> ; <i>Bidens connata</i> Muhl. ex Willd. var. <i>fallax</i> (Warnst.) Sherff.; <i>Bidens connata</i> Muhl. ex Willd. var. <i>gracilipes</i> Fern.; <i>Bidens connata</i> Muhl. ex Willd. var. <i>petiolata</i> (Nutt.) Farw. | purple-stemmed beggar-ticks; swamp beggar-ticks | N | | Seymour (1982); Kartesz (1999) | It is possible that <i>B. heterodoxa</i> var. <i>monardaefolia</i> fits here - but not certain | |
| Convolvulaceae | <i>Calystegia sepium</i> | same | same | hedge false bindweed; trailing hedge-bindweed | N | | | | |
| Cyperaceae | <i>Carex vulpinoidea</i> Michx. | same | same | common fox sedge | N | | Standley (2002) | | |
| Bignoniaceae | <i>Catalpa speciosa</i> (Warder) Engelm. | same | <i>Catalpa speciosa</i> Warder | northern catalpa; western catalpa | E | | Seymour (1982); Kartesz (1999) | | |
| Celastraceae | <i>Celastrus orbiculatus</i> Thunb. | same | same | Asian bittersweet; Asiatic bittersweet; Oriental bittersweet | I | | Seymour (1982); Kartesz (2008) | | |
| Cannabaceae | <i>Celtis occidentalis</i> L. | Ulmaceae | <i>Celtis occidentalis</i> L. var. <i>occidentalis</i> ; <i>Celtis occidentalis</i> L. var. <i>pumila</i> (Pursh) Gray | hackberry | N | | Seymour (1982); Kartesz (1999) | | |
| Asteraceae | <i>Centaurea stoebe</i> L. ssp. <i>micranthos</i> (Gugler) Hayek | Compositae | <i>Centaurea maculosa</i> Lam. | spotted knapweed | I | | Seymour (1982); Kartesz (1999) | | |
| Fabaceae | <i>Chamaecrista fasciculata</i> (Michx.) Greene | Leguminosae | <i>Cassia fasciculata</i> Michx. | partridge sensitive-pea | N | | Seymour (1982); Kartesz (2008) | | |
| Amaranthaceae | <i>Chenopodium album</i> L. | Chenopodiaceae | <i>Chenopodium album</i> L. var. <i>album</i> ; <i>Chenopodium album</i> L. var. <i>lancoelatum</i> (Muhl.) Coss. & Germ. | white goosefoot; lamb's quarters; pigweed | E | | Kartesz (1999); Seymour (1982) | | |
| Asteraceae | <i>Cirsium arvense</i> (L.) Scop. | Compositae | <i>Cirsium arvense</i> (L.) Scop. var. <i>arvense</i> ; <i>Cirsium arvense</i> (L.) Scop. var. <i>integrifolium</i> Wimm. & Grab.; <i>Cirsium arvense</i> (L.) Scop. var. <i>mite</i> Wimm. & Grab.; <i>Cirsium arvense</i> (L.) Scop. var. <i>vestitum</i> Wimm & Grab. | creeping thistle; Canada thistle | I | | Seymour (1982); Kartesz (1999) | | |
| Clethraceae | <i>Clethra alnifolia</i> L. | same | same | coastal sweet-pepperbush; sweet-pepperbush | N | | Seymour (1982); Kartesz (2008) | | |
| Convolvulaceae | <i>Cuscuta gronovii</i> Willd. ex J.A. Schultes var. <i>gronovii</i> | same | <i>Cuscuta gronovii</i> Willd. | common dodder; goldthread vine | N | | Seymour (1982); Kartesz (2008) | | |
| Cyperaceae | <i>Cyperus strigosus</i> L. | same | <i>Cyperus strigosus</i> L. var. <i>strigosus</i> ; <i>Cyperus strigosus</i> L. var. <i>robustior</i> Britt. | straw-colored flatsedge | N | | Tucker et al. (2002) | | |
| Poaceae | <i>Dactylis glomerata</i> L. | Gramineae | <i>Dactylis glomerata</i> L. var. <i>glomerata</i> ; <i>Dactylis glomerata</i> L. var. <i>ciliata</i> Peterm.; <i>Dactylis glomerata</i> L. var. <i>detonsa</i> Fries | orchard grass | E | | Angelo and Boufford (1998); Kartesz (1999) | | |
| Apiaceae | <i>Daucus carota</i> L. | Umbelliferae | same | wild carrot; Queen Anne's lace | E | | Seymour (1982); Kartesz (1999) | | |
| Fabaceae | <i>Desmodium</i> | Leguminosae | | | | | | | |
| Caryophyllaceae | <i>Dianthus armeria</i> L. | same | same | Deptford pink | E | | Seymour (1982); Kartesz (2008) | | |

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|----------------|--|------------------|--|--|---|--|
| Poaceae | <i>Dichanthelium clandestinum</i> (L.) Gould | Gramineae | <i>Panicum clandestinum</i> L. | deer-tongue rosette-panicgrass; broad-leaved panic-grass | N | Angelo and Boufford (1998); Kartesz (1999) |
| Poaceae | <i>Digitaria sanguinalis</i> (L.) Scop. | Gramineae | same | hairy crabgrass; crab-grass | E | Angelo and Boufford (1998); Kartesz (1999) |
| Poaceae | <i>Distichlis spicata</i> (L.) Greene | Gramineae | same | saltgrass; salt-grass; spike-grass | N | Angelo and Boufford (1998); Kartesz (1999) |
| Poaceae | <i>Echinochloa walteri</i> (Pursh) Heller | Gramineae | same | coast barnyard grass; water millet | N | Angelo and Boufford (1998); Kartesz (1999) |
| Elaeagnaceae | <i>Elaeagnus umbellata</i> Thunb. var. <i>parvifolia</i> (Royle) Schneid. | same | <i>Elaeagnus umbellata</i> Thunb. | autumn-olive | I | Seymour (1982); Kartesz (2008) |
| Cyperaceae | <i>Eleocharis</i> | | | | | |
| Poaceae | <i>Eragrostis spectabilis</i> (Pursh) Steud. | Gramineae | <i>Eragrostis spectabilis</i> (Pursh) Steud. var. <i>spectabilis</i> ; <i>Eragrostis spectabilis</i> (Pursh) Steud. var. <i>sparsihirsuta</i> Farw. | purple lovegrass; tumble grass | N | Angelo and Boufford (1998); Kartesz (1999) |
| Asteraceae | <i>Erechtites hieracifolius</i> (L.) Raf. ex DC. var. <i>hieracifolius</i> | Compositae | <i>Erechtites hieracifolia</i> (L.) Raf. | American burnweed; pilewort | N | Seymour (1982); Kartesz (1999) |
| Asteraceae | <i>Erechtites hieracifolius</i> (L.) Raf. ex DC. var. <i>megalocarpus</i> (Fern.) Cronq. | new | new | | N | Kartesz (1999); Barkley (2006) |
| Asteraceae | <i>Erigeron canadensis</i> L. | Compositae | same; <i>Erigeron pusillus</i> Nutt. | Canada fleabane; horseweed | N | Seymour (1982); Kartesz (1999) |
| Celastraceae | <i>Euonymus alatus</i> (Thunb.) Sieb. | same | same | burning bush; winged euonymus; winged spindle-tree | I | Seymour (1982); Kartesz (2008) |
| Asteraceae | <i>Eupatorium perfoliatum</i> L. | Compositae | same | boneset thoroughwort | N | Seymour (1982); Kartesz (1999) |
| Euphorbiaceae | <i>Euphorbia maculata</i> L. | same | same; <i>Euphorbia supina</i> Raf. | spotted sandmat; eyebane; spotted spurge | N | Seymour (1982); Kartesz (2008) |
| Asteraceae | <i>Euthamia caroliniana</i> (L.) Greene ex Porter & Britt. | Compositae | <i>Solidago tenuifolia</i> Pursh | coastal plain grass-leaved goldenrod; slender-leaved goldenrod | N | Seymour (1982); Kartesz (1999) |
| Asteraceae | <i>Euthamia graminifolia</i> (L.) Nutt. | Compositae | <i>Solidago graminifolia</i> (L.) Salisb. var. <i>graminifolia</i> ; <i>Solidago graminifolia</i> (L.) Salisb. var. <i>mutalli</i> (Greene) Fern. | common grass-leaved goldenrod | N | Seymour (1982); Kartesz (1999) |
| Asteraceae | <i>Eutrochium maculatum</i> (L.) E.E. Lamont var. <i>maculatum</i> | Compositae | <i>Eupatorium maculatum</i> L. | spotted Joe-Pye weed | N | Seymour (1982); Kartesz (2007) |
| Polygonaceae | <i>Fallopia scandens</i> (L.) Holub | Polygonaceae | <i>Polygonum scandens</i> L. | bindweed; climbing false buckwheat | N | Seymour (1982); Kartesz (2008) |
| Amaranthaceae | <i>Froelichia gracilis</i> (Hook.) Moq. | Amaranthaceae | same | slender cotton-weed; slender snake-cotton | I | Dowdian (1979) |
| Asteraceae | <i>Gnaphalium uliginosum</i> L. | Compositae | same | brown cudweed; low cudweed | E | Seymour (1982); Kartesz (2007) |
| Malvaceae | <i>Hibiscus moscheutos</i> L. ssp. <i>moscheutos</i> | same | <i>Hibiscus palustris</i> L. | swamp rose-mallow | N | Seymour (1982); Kartesz (2008) |
| Asteraceae | <i>Hieracium</i> sp. | Compositae | same | | | |
| Cannabaceae | <i>Humulus japonicus</i> Sieb. & Zucc. | same | same | Japanese hop | I | Seymour (1982); Kartesz (1999) |
| Hypericaceae | <i>Hypericum gentianoides</i> (L.) B.S.P. | Guttiferae | same | orange-grass St. John's-wort | N | Seymour (1982); Kartesz (2008) |
| Hypericaceae | <i>Hypericum perforatum</i> L. ssp. <i>perforatum</i> | Guttiferae | <i>Hypericum perforatum</i> Lam. | common St. John's-wort | E | Seymour (1982); Kartesz (2008) |
| Asteraceae | <i>Hypochoeris radicata</i> L. | Compositae | same | hairy cat's-ear | E | Seymour (1982); Kartesz (2007) |
| Balsaminaceae | <i>Impatiens capensis</i> Meerb. | same | same | spotted touch-me-not; jewelweed. | N | Seymour (1982); Kartesz (1999) |
| Asteraceae | <i>Iva frutescens</i> L. | Compositae | <i>Iva frutescens</i> L. var. <i>oraria</i> (Bartlett) Fern. & Griseb. | maritime marsh-elder; marsh-elder | N | Seymour (1982); Kartesz (2007) |
| Juncaceae | <i>Juncus effusus</i> L. ssp. <i>solanus</i> (Fern. & Wieg.) Hämet-Ahti | same | <i>Juncus effusus</i> L. var. <i>solanus</i> Fern. & Wieg.; <i>Juncus effusus</i> L. var. <i>compactus</i> Lej. & Court | common soft rush | N | Seymour (1982) |
| Juncaceae | <i>Juncus gerardi</i> Loisel. | same | same | saltmarsh rush; black grass | N | Brooks and Clemants (2000) |
| Juncaceae | <i>Juncus tenuis</i> Willd. | same | <i>Juncus tenuis</i> Willd. var. <i>tenuis</i> ; <i>Juncus tenuis</i> Willd. var. <i>williamsii</i> Fern. | path rush | N | Brooks and Clemants (2000) |
| Cupressaceae | <i>Juniperus communis</i> L. var. <i>depressa</i> Pursh | Pinaceae | same | common juniper; pasture juniper | N | Adams (1993) |
| Cupressaceae | <i>Juniperus virginiana</i> L. var. <i>virginiana</i> Pursh | Pinaceae | <i>Juniperus virginiana</i> L. var. <i>crebra</i> Fern. & Griseb. | eastern red cedar; red cedar | N | Adams (1993) |
| Fabaceae | <i>Kummerowia striata</i> (Thunb.) Schindl. | new | new | Japanese-clover | E | Mehrhoff (1995; Rhodora 97: 26) |
| Poaceae | <i>Leptochloa fusca</i> (L.) Kunth ssp. <i>fascicularis</i> (Lam.) N. Snow | Gramineae | <i>Diplachne maritima</i> Bickn. | bearded sprangleto; salt meadow grass | N | En Angelo and Boufford (1998); Kartesz (1999) |
| Fabaceae | <i>Lespedeza capitata</i> Michx. | Leguminosae | <i>Lespedeza capitata</i> Michx. var. <i>capitata</i> ; <i>Lespedeza capitata</i> Michx. var. <i>stenophylla</i> Bissell & Fern.; <i>Lespedeza capitata</i> Michx. var. <i>velutina</i> (Bickn.) Fern.; <i>Lespedeza capitata</i> Michx. var. <i>vulgaris</i> Torr. & Gray | rough-headed bush-clover | N | Seymour (1982); Kartesz (2008) Haines doesn't specifically say that var. <i>vulgaris</i> is included here, but ITIS includes it. |
| Fabaceae | <i>Lespedeza</i> sp. | Leguminosae | same | | | |
| Fabaceae | <i>Lespedeza virginica</i> (L.) Britt. | Leguminosae | same | slender bush-clover | N | Seymour (1982); Kartesz (2008) |
| Plumbaginaceae | <i>Limonium carolinianum</i> (Walt) Britt. | same | <i>Limonium nashii</i> Small | Carolina sea-lavender; sea-lavender | N | Seymour (1982); Kartesz (2008) |
| Plantaginaceae | <i>Linaria vulgaris</i> P. Mill. | Scrophulariaceae | <i>Linaria vulgaris</i> Hill. | butter-and-eggs | E | Seymour (1982); Kartesz (2008) |
| Caprifoliaceae | <i>Lonicera japonica</i> Thunb. | same | same | Japanese honeysuckle | I | Seymour (1982); Kartesz (1999) |
| Caprifoliaceae | <i>Lonicera morrowii</i> Gray | same | same | Morrow's honeysuckle | I | Seymour (1982); Kartesz (1999) |
| Fabaceae | <i>Lotus corniculatus</i> L. | Leguminosae | same | garden bird's-foot-trefoil | E | Seymour (1982); Kartesz (2008) |
| Lythraceae | <i>Lythrum salicaria</i> L. | same | <i>Lythrum salicaria</i> L. var. <i>salicaria</i> ; <i>Lythrum salicaria</i> L. var. <i>tomentosum</i> (P. Mill.) DC. | purple loosestrife | I | Seymour (1982); Kartesz (1999) |
| Fabaceae | <i>Melilotus albus</i> Medik. | Leguminosae | <i>Melilotus alba</i> Desr. | white sweet-clover | E | Seymour (1982) |
| Asteraceae | <i>Mikania scandens</i> (L.) Willd. | Compositae | same | climbing hempvine | N | Seymour (1982); Kartesz (2007) |
| Myricaceae | <i>Morella caroliniana</i> (Mill.) Small | same | <i>Myrica pensylvanica</i> Loisel. | bayberry | N | Seymour (1982); Kartesz (2008) |
| Moraceae | <i>Morus alba</i> L. | same | same | white mulberry | E | Seymour (1982); Kartesz (2008) |
| Poaceae | <i>Muhlenbergia schreberi</i> J.F. Gmel. | Gramineae | same | nimblewill muhly | N | Angelo and Boufford (1998); Kartesz (1999) |
| Boraginaceae | <i>Myosotis</i> sp. | | | | | |
| Plantaginaceae | <i>Nuttallanthus canadensis</i> (L.) D.A. Sutton | Scrophulariaceae | <i>Linaria canadensis</i> (L.) Dumont | oldfield-toadflax; blue toadflax | N | Seymour (1982); Kartesz (2008) |
| Cornaceae | <i>Nyssa sylvatica</i> Marsh. | Nyssaceae | same | black tupelo; pepperidge tree; black-gum | N | Seymour (1982); Kartesz (2008) |
| Onagraceae | <i>Onohera biennis</i> L. | same | same | common evening-primrose | E | Seymour (1982); Kartesz (2008) |
| Cactaceae | <i>Opuntia humifusa</i> (Raf.) Raf. | same | <i>Opuntia compressa</i> (Salisb.) Macbr. | eastern prickly-pear | N | SC Seymour (1982); Kartesz (1999) |
| Oxalidaceae | <i>Oxalis stricta</i> L. | same | same; <i>Oxalis europaea</i> Jord. | common yellow wood sorrel; showy yellow wood-sorrel | N | Seymour (1982); Kartesz (2008) |
| Poaceae | <i>Panicum virgatum</i> L. | Gramineae | <i>Panicum virgatum</i> L. var. <i>virgatum</i> ; <i>Panicum virgatum</i> L. var. <i>cubense</i> Griseb.; <i>Panicum virgatum</i> L. var. <i>spissum</i> Linder | switch panicgrass; switchgrass | N | Angelo and Boufford (1998); Kartesz (1999) |

| | | | | | | | | |
|-----------------|---|----------------|---|--|---|---|--|---|
| Poaceae | <i>Paspalum laeve</i> Michx. | Gramineae | <i>Paspalum laeve</i> Michx. var. <i>laeve</i> ; <i>Paspalum laeve</i> Michx. var. <i>ciculare</i> (Nash) Fern.; <i>Paspalum laeve</i> Michx. var. <i>pilosum</i> Scribn. | field beadgrass | N | T | Angelo and Boufford (1998); Kartesz (1999) | |
| Poaceae | <i>Paspalum setaceum</i> Michx. var. <i>muhlenbergii</i> (Nash) D. Banks | Gramineae | <i>same</i> | slender beadgrass; bead grass | N | | Angelo and Boufford (1998) | no distinctions made at varietal level in NDDB |
| Polygonaceae | <i>Persicaria hydropiperoides</i> (Michx.) Small | Polygonaceae | <i>Polygonum hydropiperoides</i> Michx.; <i>Polygonum opelousanum</i> Riddle var. <i>opelousanum</i> ; <i>Polygonum opelousanum</i> Riddle var. <i>adenocalyx</i> Stanford | false water-pepper smartweed; mild water-pepper | N | | Seymour (1982); Kartesz (2008) | |
| Polygonaceae | <i>Persicaria maculosa</i> S.F. Gray | Polygonaceae | <i>Polygonum mite</i> Schrank; <i>Polygonum persicaria</i> L. var. <i>persicaria</i> ; <i>Polygonum persicaria</i> L. var. <i>ruderale</i> (Salisb.) Meisn. | lady's-thumb smartweed | E | | Seymour (1982); Kartesz (2008) | |
| Polygonaceae | <i>Persicaria sagittata</i> (L.) H. Gross | Polygonaceae | <i>Polygonum sagittatum</i> L. | arrow-leaved tearthumb | N | | Seymour (1982); Kartesz (2008) | |
| Poaceae | <i>Phalaris arundinacea</i> L. | Gramineae | <i>same</i> | reed canary grass | I | | Angelo and Boufford (1998); Kartesz (1999) | considered native by Haines |
| Poaceae | <i>Phragmites australis</i> (Cav.) Trin. ex Steud. var. <i>australis</i> | Gramineae | <i>Phragmites australis</i> (Cav.) Trin. ex Steud. | common reed | I | | Angelo and Boufford (1998); Kartesz (1999) | |
| Phytolaccaceae | <i>Phytolacca americana</i> L. var. <i>americana</i> | <i>same</i> | <i>Phytolacca americana</i> L. | American pokeweed; poke | N | | Seymour (1982); Kartesz (2008) | |
| Plantaginaceae | <i>Plantago aristata</i> Michx. | <i>same</i> | <i>same</i> | bracted plantain; buckhorn | E | | Seymour (1982); Kartesz (2008) | |
| Plantaginaceae | <i>Plantago lanceolata</i> L. | <i>same</i> | <i>Plantago lanceolata</i> L. var. <i>lanceolata</i> ; <i>Plantago lanceolata</i> L. var. <i>sphaerostachya</i> Mert. & Koch; <i>Plantago altissima</i> L. | English plantain; ribgrass | E | | Seymour (1982); Kartesz (2008) | |
| Plantaginaceae | <i>Plantago major</i> L. | <i>same</i> | <i>Plantago major</i> L. ssp. <i>major</i> | common plantain | E | | Seymour (1982); Kartesz (2008) | |
| Asteraceae | <i>Pluchea odorata</i> (L.) Cass. var. <i>succulenta</i> (Fern.) Cronq. | Compositae | <i>Pluchea purpurascens</i> (Sw.) DC. var. <i>succulenta</i> Fern. | sweet-scented camphorweed; salt-marsh fleabane; purple camphorweed | N | | Seymour (1982); Kartesz (2007) | |
| Salicaceae | <i>Populus deltoides</i> Bart. ex Marsh. var. <i>deltoides</i> | Salicaceae | <i>Populus deltoides</i> Marsh. | necklace poplar; cottonwood | N | | Seymour (1982); Kartesz (2009) | |
| Salicaceae | <i>Populus grandidentata</i> Michx. | Salicaceae | <i>same</i> | big-toothed poplar; bigtooth aspen | N | | Seymour (1982); Kartesz (2009) | |
| Portulacaceae | <i>Portulaca oleracea</i> L. | <i>same</i> | <i>same</i> | Common purslane | E | | Kartesz (2008) | |
| Rosaceae | <i>Potentilla simplex</i> Michx. | <i>same</i> | <i>Potentilla simplex</i> Michx. var. <i>simplex</i> ; <i>Potentilla simplex</i> Michx. var. <i>calvescens</i> F. | old-field cinquefoil | N | | Seymour (1982); Kartesz (2009) | |
| Lamiaceae | <i>Prunella vulgaris</i> | Labiatae | <i>same</i> | <i>same</i> | | | | |
| Rosaceae | <i>Prunus serotina</i> Ehrh. var. <i>serotina</i> | <i>same</i> | <i>Prunus serotina</i> Ehrh. | black cherry | N | | Seymour (1982); Kartesz (2009) | |
| Fagaceae | <i>Quercus palustris</i> Moench. | <i>same</i> | <i>same</i> | pin oak | N | | Seymour (1982); Kartesz (2008) | |
| Fagaceae | <i>Quercus rubra</i> L. | <i>same</i> | <i>Quercus rubra</i> L. var. <i>rubra</i> ; <i>Quercus rubra</i> L. var. <i>borealis</i> (Michx. f.) Farw. | northern red oak | N | | Seymour (1982); Kartesz (2008) | |
| Anacardiaceae | <i>Rhus copallina</i> L. var. <i>latifolia</i> Engl. | Anacardiaceae | <i>Rhus copallina</i> L. var. <i>latifolia</i> Engler | winged sumac; shining sumac | N | | Seymour (1982); Kartesz (1999) | |
| Anacardiaceae | <i>Rhus glabra</i> L. | Anacardiaceae | <i>same</i> | smooth sumac | N | | Seymour (1982); Kartesz (1999) | |
| Anacardiaceae | <i>Rhus hirta</i> (L.) Sudworth | Anacardiaceae | <i>Rhus typhina</i> L. | staghorn sumac | N | | Seymour (1982); Kartesz (1999) | |
| Rosaceae | <i>Rosa carolina</i> L. ssp. <i>carolina</i> | <i>same</i> | <i>Rosa carolina</i> L. var. <i>carolina</i> ; <i>Rosa carolina</i> L. var. <i>villosa</i> ; <i>Rosa carolina</i> L. var. <i>grandiflora</i> (Baker) Rehd. | Carolina rose; pasture rose | N | | Seymour (1982); Kartesz (2009) | |
| Rosaceae | <i>Rosa multiflora</i> Thunb. ex Murr. | <i>same</i> | <i>Rosa multiflora</i> Thunb. | rambler rose; multiflora rose | I | | Kartesz (2009); Les Mehrhoff (IPANE data) | |
| Rosaceae | <i>Rubus allegheniensis</i> Porter | <i>same</i> | <i>same</i> | common blackberry; Allegheny blackberry | N | | Hodgdon and Steele (1966) | |
| Rosaceae | <i>Rubus flagellaris</i> Willd. | <i>same</i> | <i>same</i> | northern dewberry | N | | Hodgdon and Steele (1966) | |
| Polygonaceae | <i>Rumex acetosella</i> L. ssp. <i>pyrenaeicus</i> (Pourret ex Lapeyr.) Akeroyd | Polygonaceae | <i>Rumex acetosella</i> L. | sheep sorrel; sheep dock | I | | Seymour (1982); Kartesz (2008) | |
| Polygonaceae | <i>Rumex crispus</i> L. ssp. <i>crispus</i> | Polygonaceae | <i>Rumex crispus</i> L. | curly dock; curled or yellow dock | E | | Seymour (1982); Kartesz (2008) | |
| Polygonaceae | <i>Rumex obtusifolius</i> L. ssp. <i>obtusifolius</i> | Polygonaceae | <i>Rumex obtusifolius</i> L. | bitter dock; board-leaved dock | E | | Seymour (1982); Kartesz (2008) | |
| Amaranthaceae | <i>Salicornia</i> | Chenopodiaceae | <i>same</i> | <i>same</i> | | | | |
| Salicaceae | <i>Salix</i> sp. | <i>same</i> | <i>same</i> | <i>same</i> | | | | |
| Adoxaceae | <i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli | Caprifoliaceae | <i>Sambucus canadensis</i> L. | black elderberry | N | | Kartesz (1999); Seymour (1982) | |
| Poaceae | <i>Schizachyrium scoparium</i> (Michx.) Nash var. <i>scoparium</i> | Gramineae | <i>Andropogon scoparius</i> Michx. var. <i>scoparius</i> ; <i>Andropogon scoparius</i> Michx. var. <i>frequens</i> F.T. Hubbard; <i>Andropogon scoparius</i> Michx. var. <i>septentrionalis</i> Fern. & Griseb. | little bluestem | N | | Angelo and Boufford (1998); Kartesz (1999) | |
| Cyperaceae | <i>Scirpus cyperinus</i> (L.) Kunth | <i>same</i> | <i>same</i> | common woosledge | N | | Whittemore and Schuyler (2002) | |
| Asteraceae | <i>Senecio vulgaris</i> L. | Compositae | <i>same</i> | common ragwort; common groundsel | E | | Seymour (1982); Kartesz (2007) | |
| Poaceae | <i>Setaria pumila</i> (Poir.) Roemer & J.A. Schultes ssp. <i>pumila</i> | Gramineae | <i>Setaria glauca</i> (L.) Beauv. | yellow foxtail | E | | Angelo and Boufford (1998) | |
| Caryophyllaceae | <i>Silene latifolia</i> Poir. ssp. <i>alba</i> (P. Mill.) Greuter & Burdet | <i>same</i> | <i>Silene alba</i> (P. Mill.) E.H.L. Krause | white campion | E | | Seymour (1982); Kartesz (2008) | |
| Caryophyllaceae | <i>Silene vulgaris</i> (Moench) Gareke ssp. <i>vulgaris</i> | <i>same</i> | <i>Silene vulgaris</i> (Moench) Gareke | bladder campion | E | | Seymour (1982); Kartesz (2008) | |
| Asteraceae | <i>Solidago rugosa</i> P. Mill. ssp. <i>rugosa</i> | Compositae | <i>Solidago rugosa</i> Ait. var. <i>rugosa</i> ; <i>Solidago rugosa</i> Ait. var. <i>villosa</i> (Pursh) Fern. | common wrinkle-leaved goldenrod; rough-stemmed goldenrod | N | | Seymour (1982); Kartesz (2007) | |
| Asteraceae | <i>Solidago sempervirens</i> L. var. <i>sempervirens</i> | Compositae | <i>same</i> | seaside goldenrod | N | | Seymour (1982); Kartesz (2007) | |
| Poaceae | <i>Sorghastrum nutans</i> (L.) Nash | Gramineae | <i>same</i> | Indian grass | N | | Angelo and Boufford (1998); Kartesz (1999) | |
| Poaceae | <i>Spartina alterniflora</i> Loisel. | Gramineae | <i>Spartina alterniflora</i> Loisel. var. <i>alterniflora</i> ; <i>Spartina alterniflora</i> Loisel. var. <i>pilosa</i> (Merr.) Fern. | smooth cordgrass; saltmarsh cordgrass | N | | Angelo and Boufford (1998); Kartesz (1999) | S. a. var. <i>pilosa</i> not in AH; FNA places here |
| Poaceae | <i>Spartina patens</i> (Ait.) Muhl. | Gramineae | <i>Spartina patens</i> (Ait.) Muhl. var. <i>patens</i> ; <i>Spartina patens</i> (Ait.) Muhl. var. <i>monogyna</i> (M.A. Curtis) Fern. | saltmeadow cordgrass; white rush | N | | Angelo and Boufford (1998); Kartesz (1999) | |
| Poaceae | <i>Spartina pectinata</i> Link | Gramineae | <i>Spartina pectinata</i> Link var. <i>pectinata</i> ; <i>Spartina pectinata</i> Link var. <i>suttiei</i> (Farg.) Fern. | prairie cordgrass; freshwater cordgrass, slough grass | N | | Angelo and Boufford (1998); Kartesz (1999) | |
| Caryophyllaceae | <i>Spergularia marina</i> (L.) Griseb. | <i>same</i> | <i>Spergularia marina</i> (L.) Griseb. var. <i>marina</i> ; <i>Spergularia marina</i> (L.) Griseb. var. <i>leiosperma</i> (Kindb.) Guerke | saltmarsh sand-spurry | N | | Seymour (1982); Kartesz (2008) | |
| Rosaceae | <i>Spiraea tomentosa</i> L. | <i>same</i> | <i>same</i> | steplebush; rosy meadowsweet; hardhack | N | | Seymour (1982); Kartesz (2009) | |
| Fabaceae | <i>Strophostyles hevola</i> (L.) Ell. | Leguminosae | <i>same</i> | annual woolly bean | N | | Seymour (1982); Kartesz (2008) | |
| Amaranthaceae | <i>Suaeda maritima</i> (L.) Dumort. ssp. <i>maritima</i> | Chenopodiaceae | <i>Suaeda maritima</i> (L.) Dumort. | herbaceous sea-bite; low sea-bite | E | | Seymour (1982); Kartesz (1999) | Dowhan lists as native. Haines says other ssp is native but not present in CT |

| | | | | | | | |
|------------------|---|----------------|---|---|---|--|--|
| Cornaceae | <i>Swida anomum</i> (P. Mill.) Small var. <i>anomum</i> | same | <i>Cornus anomum</i> P. Mill. | silky dogwood | N | Seymour (1982); Kartesz (2008) | |
| Asteraceae | <i>Symphotrichum lateriflorum</i> (L.) A. & D. Löve | Compositae | <i>Aster lateriflorus</i> (L.) Britt. var. <i>lateriflorus</i> ; <i>Aster lateriflorus</i> (L.) Britt. var. <i>angustifolius</i> Wieg.; <i>Aster lateriflorus</i> (L.) Britt. var. <i>pendulus</i> (Ait.) Burgess | calico American-aster | N | Seymour (1982); Kartesz (2007) | Dowhan has var. <i>pedulus</i> but Haines has no syn. ITIS has the current name of that var as <i>S. lateriflorum</i> var. <i>horizontale</i> which USDA plants shows is in CT - need to look at specimens; Haines thinks it will end up here. |
| Asteraceae | <i>Symphotrichum subulatum</i> (Michx.) Nesom var. <i>subulatum</i> | Compositae | <i>Aster subulatus</i> Michx. var. <i>subulatus</i> ; <i>Aster subulatus</i> Michx. var. <i>euroauster</i> Fern. & Grise. | annual saltmarsh American-aster | N | Seymour (1982); Kartesz (2007) | |
| Asteraceae | <i>Taraxacum officinale</i> G.H. Weber ex Wiggers | Compositae | <i>Taraxacum officinale</i> Weber, <i>sensu lato</i> | common dandelion | E | Seymour (1982); Kartesz (2007) | |
| Lamiaceae | <i>Teucrium canadense</i> | Labiatae | | American germander; wood sage | N | Seymour (1982); Kartesz (1999) | |
| Lamiaceae | <i>Teucrium canadense</i> L. var. <i>occidentale</i> (Gray) McClintock & Epling | Labiatae | <i>Teucrium occidentale</i> Gray var. <i>boreale</i> (Bickn.) Fern. | American germander; northern germander, hairy germander | N | Seymour (1982); Kartesz (1999) | |
| Thelypteridaceae | <i>Thelypteris palustris</i> Schott var. <i>pubescens</i> (G. Lawson) Fern. | Polypodiaceae | <i>Thelypteris palustris</i> Schott | marsh fern | N | Smith (1993) | |
| Anacardiaceae | <i>Toxicodendron radicans</i> (L.) Kuntze ssp. <i>radicans</i> | Anacardiaceae | <i>Toxicodendron radicans</i> (L.) Ktze. ssp. <i>radicans</i> | poison-ivy | N | Gillis (1971) | |
| Poaceae | <i>Tridens flavus</i> (L.) A.S. Hitchc. var. <i>flavus</i> | Gramineae | <i>Tridens flavus</i> (L.) Hitchc. | purpletop grass; tall red top | N | Angelo and Boufford (1998); Kartesz (1999) | |
| Fabaceae | <i>Trifolium pratense</i> L. | Leguminosae | <i>Trifolium pratense</i> L. var. <i>pratense</i> ; <i>Trifolium pratense</i> L. var. <i>sativum</i> Sturm | red clover | E | Seymour (1982); Kartesz (2008) | |
| Fabaceae | <i>Trifolium repens</i> L. | Leguminosae | same | white clover | E | Seymour (1982); Kartesz (2008) | |
| Poaceae | <i>Tripsacum dactyloides</i> (L.) L. | Gramineae | same | eastern gamagrass; gamagrass | N | Angelo and Boufford (1998); Kartesz (1999) | |
| Typhaceae | <i>Typha angustifolia</i> L. | same | same | narrow-leaved cat-tail | E | Angelo and Boufford (2000); Kartesz (1999) | |
| Typhaceae | <i>Typha latifolia</i> L. | same | same | broad-leaved cat-tail; common cat-tail | N | Angelo and Boufford (2000); Kartesz (1999) | |
| Ulmaceae | <i>Ulmus americana</i> L. | same | same | American elm | N | Seymour (1982); Kartesz (2009) | |
| Scrophulariaceae | <i>Verbascum thapsus</i> L. | same | same | common mullein | E | Seymour (1982); Kartesz (2009) | |
| Verbenaceae | <i>Verbena hastata</i> L. var. <i>hastata</i> | same | <i>Verbena hastata</i> L. | blue vervain | N | Seymour (1982); Kartesz (2009) | |
| Verbenaceae | <i>Verbena urticifolia</i> | | | white vervain | | | |
| Adoxaceae | <i>Viburnum dentatum</i> L. var. <i>lucidum</i> Ait. | Caprifoliaceae | <i>Viburnum recognitum</i> Fern. | smooth arrowwood | N | Kartesz (1999); Seymour (1982) | |
| Fabaceae | <i>Vicia cracca</i> L. ssp. <i>cracca</i> | Leguminosae | <i>Vicia cracca</i> L. | bird vetch | E | Seymour (1982); Kartesz (2008) | |
| Violaceae | <i>Viola brittoniana</i> Pollard | same | same | coast violet | N | Seymour (1982); Kartesz (2009) | En |
| Vitaceae | <i>Vitis</i> sp. | | | grape | | | |

Appendix D: Resumes

CURRICULUM VITAE

Anthony J. Zemba CHMM Certified Ecologist / Certified Soil Scientist

Summary of Experience

Mr. Zemba has over 30 years of professional experience in the Environmental Sciences. Areas of expertise include environmental impact statements/assessments; environmental permitting; fish and wildlife inventories and monitoring; fish and wildlife habitat assessments/characterizations, management, planning, and restoration; wetland functions and values assessments; conservation planning. Currently, as Environmental Specialist for Fitzgerald and Halliday, Mr. Zemba is working on a variety of projects involving NEPA compliance, rare species assessment, environmental permitting, conservation planning, and habitat enhancement/restoration.

During his professional career, Mr. Zemba has gained notable experience in forest health issues (as a former employee with USDA Forest Service), natural resource management planning (as senior ecologist with a full service engineering firm), and NEPA policy (as adjunct professor at the University of New Haven Graduate Program in Environmental Science). Details of education, continuing education specialized coursework, registrations / certifications and representative projects follow.

Education

B.S., 1987, Biology/Ecology, - Eastern CT State University, Willimantic, CT

M.S., 1996, Ecology/Environmental Science - University of New Haven, New Haven, CT

Regional Soil Science Certificate Program, 2006 - University of Massachusetts, Amherst, MA

Additional Specialized Training / Coursework

- Refuge Comprehensive Conservation Planning – National Conservation Training Center
- Wildlife Management – American Public University
- Conservation Biology – American Public University
- Restoration Ecology – American Public University
- Field Ornithology – Wesleyan University
- Herpetology – Wesleyan University
- Short Course in River Processes – Yale University
- Ecological Risk Assessment: Practices and Protocols - Rutgers University
- Flowering Plants of Spring – Wesleyan University, Lauren Brown
- Native New England Flowering Plants – New England Wildflower Society, Leslie Duthie
- *Carex* Workshop – Aton Forest/Bill Moorhead (2009)
- Grasses of CT - New England Wildflower Society, Lauren Brown (2013)
- Inscrutable Gramminoids Workshop – Aton Forest/Bill Moorhead (2016)
- *Salix* of CT Workshop – Aton Forest, Bill Moorhead (2016)
- Coastal Gramminoids of CT Workshop – Aton Forest/Bill Moorhead (2017)
- Asters Demystified Workshop – Aton Forest/Bill Moorhead (2019)

Professional Registrations/Certifications

- Certified Ecologist (Ecological Society of America)
- Certified Soil Scientist (New England Land Grant Universities)

- Certified Hazardous Materials Manager (Institute of Hazardous Materials Management)
- Qualified Compliance Inspector of Storm Water (Connecticut)
- Qualified Preparer of Storm Water Pollution Prevention Plans (Connecticut)
- OSHA 40-Hr. Hazardous Waste Operations and Emergency Response Certification
- PADI Open Water Diver No. 87126484
- CT Safe Boating Certification

Professional Employment

Fitzgerald and Halliday, Inc. – Hartford, CT (August 2014 – Present). Environmental Specialist: Wetland delineation, functional assessments, impact mitigation planning, wetland mitigation monitoring; rare flora and fauna species surveys, assessments, and impact mitigation; ecological risk assessment.

HRP Associates – Stratford, CT (April 2014 – August 2014). Sr. Wetland Scientist: Wetland delineation, wetland impact mitigation planning, rare species mitigation, ecological risk assessment.

Connecticut Audubon Society – Fairfield, CT (August 2012 – April 2014). Director of Conservation Services: Habitat restoration, conservation planning, flora & fauna inventories.

GZA GeoEnvironmental, Inc. – Springfield, MA (March 2009 – July 2012). Certified Ecologist / Soil Scientist: Conservation planning, rare flora and fauna species surveys, rare species habitat assessments and impact mitigation, wetland delineation, functions and values assessments, ecological risk assessment.

Maguire Group Inc. – New Britain, CT (October 1997–February 2009). Senior Ecologist: Environmental Impact Statements (EIS)/ Environmental Assessments (EA), Dredged Material Management Plans, fish and wildlife habitat assessments, flora and fauna surveys, wetland functions and values assessments, Conservation & Management Plans.

Vanasse Hangen Brustlin, Inc. – Providence, RI (1993 – 1997). Environmental Scientist: EIS/EAs, Phase I and Phase II Environmental Site Assessments (ESAs), wetland delineations, flora and fauna species surveys, wetland mitigation monitoring.

EnviroScience Consultants – Newington, CT (1991 – 1993). Environmental Scientist: Phase I and Phase II ESAs; Site Remediation

Fuss Environmental, Inc. – Manchester (1989 – 1991). Inorganic Chemist: water, wastewater, soil, and sludge analysis for nutrients, heavy metals (via Graphite Furnace Atomic Absorption and Inductively Coupled Plasma), BOD, COD, and coliform bacteria.

USDA Forest Service – Hamden, CT (May 1987 – 1989). Biological Aide: Analysis of plant tissues for starch and amino acid content, maintenance of sterile culture of root rot fungus (*Armillaria* spp.), field studies for forest tree pathogen distribution and mapping.

Representative Wildlife/Natural Resource Survey/Inventory Projects

Rare Plant Vegetation Survey – CT Audubon Society Coastal Center at Milford Point: Conducting a botanical inventory to identify and map species of conservation concern on the 5-acre Coastal Center at Milford Point, property owned by the State of CT Department of Energy and Environmental Protection and leased by the Connecticut Audubon Society.

Biological Surveys for Sikorsky Airport Runway Safety Improvements: Conducted Seasonal (Spring, Summer, and Winter) transect surveys, point counts, and wetland call-back surveys for avifauna. Conducted lepidoptera sampling using UV-light traps. Conducted vegetation monitoring of wetland mitigation sites for performance standards. Conducted rare flora surveys.

New Haven-Hartford-Springfield Construction – North Haven to Hartford, CT: Listed plant species mitigation and monitoring services; turbidity monitoring; invasive plant species identification and control feasibility assessment.

Listed Species Screening Assessment - Windsor-Bloomfield, CT: Conducted habitat surveys and evaluations for species listed in the CT Endangered Species Act. Surveys were conducted along multiple miles of linear existing sewer pipe in order to identify high habitat conservation priority areas. Collected information was reported to design team in order to avoid or reduce impact of proposed sewer access and maintenance activities.

Impact Assessment – Bride Brook and Wellfield No. 3, East Lyme, CT: Conducted baseline flora and faunal surveys of the Pattagansett River and associated wetland systems to assess impact of increased groundwater withdrawal during summer peak demand.

Biological Surveys for EIS, Routes 82/85/11 – Salem to Waterford, CT: Managed, coordinated, and conducted biological surveys along an 11-mile proposed highway corridor. Composed target survey species lists, identified and negotiated appropriate survey protocols for target taxa and state and federal regulators (USEPA, USFWS, USACOE, FHWA, CTDEP). Organized and managed multidisciplinary team of scientist/naturalists representing academia (University of New Hampshire, University of Connecticut, and Southern CT State University), government agencies, and private consultants to conduct multi-taxa seasonal surveys. Surveys included the following:

- Stream bioassessment surveys for aquatic invertebrates using EPA Rapid Assessment Protocol, search sampling, and traps
- Seasonal (Spring, Summer, and Winter) avian transect surveys, point counts, wetland call-back surveys
- Herpetofauna surveys
- Seasonal (e.g., “vernal”) pool inventory and evaluation
- Winter and Spring animal track surveys
- Odonata survey, and
- New England Cottontail (*Sylvilagus transitionalis*) survey using *Mt*-DNA testing.

Biological Surveys for EA, Route 66 – Meriden to Middletown, CT: Managed, coordinated, and conducted biological surveys along a 3-mile proposed corridor widening project. Composed target survey species lists, identified and negotiated appropriate survey protocols for target taxa and state and federal regulators (USEPA, USFWS, USACOE, FHWA, CTDEP). Conducted multi-taxa seasonal surveys including following:

- Hans Brook stream bioassessment surveys for aquatic invertebrates using EPA Rapid Assessment Protocol, search sampling, and traps;
- Breeding bird surveys;
- Herpetofauna surveys; and
- Rare flora survey.

Natural Resource Inventories – Naval Air Station Brunswick (NASB), Brunswick, Maine: In support of Environmental Assessments (3 projects) for a New Hangar Construction; Air Traffic Control Tower Replacement and Runway Safety Zone Expansion; New Bachelor Enlisted Quarters, conducted the following surveys:

- Avifauna point count surveys and rare grassland bird survey of approximately 13.8 acres of existing grassland habitat for the Grasshopper Sparrow, Upland Sandpiper, Horned Lark, and Vesper Sparrow.
- Vernal pool inventory and assessments to identify specialist herpetofauna
- Plant Community Characterizations
- Wetland Delineations

Flora and Fauna Community Characterization – Cathole Mountain, Meriden, CT: Conducted flora and fauna surveys along a traprock ridge in order to provide an ecological characterization of the site. Provided expert witness testimony on the natural resources of the ridge on behalf of the client who had requested CTDEP intervention to stop the illegal quarrying activity and resultant destruction of wetland resources on the mountain.

Natural Resource Inventory, New London Waterfront Revitalization Plan – New London, CT: Conducted a biological investigation and natural resource inventory of terrestrial, intertidal, and subtidal zone flora and fauna at the City Pier area. This inventory provided baseline information used during the permitting process to assess potential environmental impact to these habitats associated with the rehabilitation of the City's blighted waterfront area and creation of a premier multi-use public facility.

Vegetation and Wildlife Survey – Windsor, CT: Conducted a vegetation and wildlife survey at a major utility substation site. The purpose of the survey was to identify the important plant and animal resources and their habitat attributes at the site so that informed decisions could be made regarding potential future infrastructure improvements and expansion.

Economic Development Feasibility Study, Universal Drive and Valley Service Road Sites, Town of North Haven, CT: Conducted biological surveys for rare species and their habitats, and addressed potential implications of their presence within the corridors.

Avian Survey and Small Mammal Trapping at Fry Farm National Historic Site – East Greenwich, RI: Provided seasonal point count avian surveys and small mammal trapping of five wetland habitats within a 40-acre farm to determine the impact of groundwater withdrawal associated with hazardous waste remediation efforts being proposed at an up-gradient site.

Conservation and Natural Resource Planning

Rapid Ecological Assessments of 10 Preserves - Fairfield County, CT: Conducted rapid (one – two day) ecological assessments of 10 preserves owned and managed by the Aspetuck Land Trust in Easton, Weston, Westport, and Fairfield, CT. Identified goals and objectives for land management for passive recreation, biodiversity conservation, access and security, and natural resource management. Conducted community crosswalks on site to characterize the floristic composition of each preserve.

Important Bird Area (IBA) Conservation Planning – Audubon (National Audubon Society). For Audubon's state office in Southbury, CT, Prepared IBA plans for the following CT IBAs:

- Cove Island Park - Stamford, CT
- 170 acre Good Hill Farm, Woodbury/Roxbury, CT
- Stewart B. McKinney National Wildlife Refuge (Salt Meadow Unit Westbrook, CT
- Stewart B. McKinney National Wildlife Refuge (Great Meadow Unit) and the Bridgeport Municipal (Sikorsky) Airport. Stratford, CT
- Connecticut Audubon Society's Bafflin Preserve in Pomfret, CT
- East Rock Park, New Haven, CT (ongoing)

Identification of Globally Important Bird Areas in 3 Eastern States – Audubon’s National Science Office: For Audubon’s National Science Office in Ivyland, PA, identified **Globally Important Bird Areas** the states of Rhode Island, Alabama, and West Virginia. Prepared reports that included site descriptions of the resources and documented species criteria, ownership, habitat, threats, and land use. Results of planning process identified approximately 19 coastal IBAs of global significance in Rhode Island, 19 IBAs in Alabama, and approximately 26 sites in West Virginia.

Integrated Natural Resources Management Plan – Marine Corps Reserve Center (MCRC), Syracuse, NY: Prepared an Integrated Natural Resource Management Plan (INRMP) for a 163 acre Marine Reserve tank warfare training facility. Conducted avian point count surveys during the winter and summer to determine residents; inventoried seasonal pools in the spring for herpetofauna and macroinvertebrate species, inventoried plant communities, and conducted planning level wetland delineation.

Tree Health Assessment – Wilmington (Whiteface Mountain) NY: Collected data on the morphological characteristics of red spruce growing at varying elevations and exposure scenarios in relation to acidic precipitation, collected samples of boughs and roots for subsequent laboratory analysis of starch and amino acid concentrations as indicators of stress.

Habitat Restoration Services

Rare Species Habitat Restoration – Agawam, MA: Prepared a habitat restoration plan for MA state-listed rare herpetofauna and other species of conservation concern. Parcel was subject to a conservation restriction in favor of Eversource (formerly WMECO) but was subsequently impacted by quarrying operation from an adjacent land owner. Prepared a written habitat restoration and planting plan for the site that would benefit conservation targets. Plan was reviewed and approved by Massachusetts Natural Heritage and Endangered Species Program (MNHESP).

Ash Creek Riparian Habitat Rehabilitation – Fairfield, CT: Orchestrated habitat restoration efforts of a riverine tidal system including invasive plant species control, re-establishing native coastal wetland and riparian vegetation associations, special habitat attributes, educational signage, and coastal access improvement elements.

Grassland Bird Survey and Habitat Restoration Services – Rentschler Field, East Hartford, CT: Provided monitoring services of a grassland bird community at a private airfield in central Connecticut. Partial funding of the development project was provided by the state necessitating rare grassland bird habitat mitigation. Conducted annual surveys of rare grassland birds to document the post construction status of the bird community on the remaining 99 hectares (244 acres). Supervised habitat restoration and enhancement for 2006 breeding season.

Wetland and Warm-season Grassland Restoration – Former Auto Salvage Yard, Coventry, RI: Supervised removal of solid waste debris from wetlands and adjacent sand plain and warm season grassland upland located within a former auto salvage yard. Work was conducted in conjunction with a site restoration program implemented following site remediation of hazardous waste. Responsible for providing contractor oversight during solid waste removal and during the installation of erosion and sedimentation control measures prior to remediation.

Representative Volunteer Services

USGS/CTDEEP Winter Eagle Survey (2010-2021): As part of a nationwide survey, conducted 4-hr survey from a fixed point along a reach of the Connecticut River (Cobalt Landing) to document presence and activity of wintering eagles.

CT Breeding Bird Atlas (2018 – present): Block Lead for 67E – Middletown, and 96A Branford.

CTDEP New Haven County Breeding Bird Atlas (2011, 2012): Conducted point counts for breeding birds (auditory and visual detections) at six locations established along a route that traversed Town of Wallingford Open Space lands including Tyler Mills Forest, Williams Farm, and Vietnam Veterans Memorial Park.

CTDEP Wetland Avian Callback Survey (1996): Conducted an avian callback survey of state-listed rare avifauna within the Cromwell Meadows and Durham Meadows Wildlife Management Areas on a volunteer basis for the Connecticut Department of Environmental Protection, Wildlife Division. Documented presence of Virginia Rail (*Rallus limicola*) at Durham Meadows WMA and both Virginia Rail and Least Bittern (*Ixobrychus exilis*) at Cromwell Meadows WMA.

UCONN CES/APHIS Vegetation Monitoring at Hartford Audubon Society Sanctuary – South Windsor, CT (2000-2003): Provided vegetation monitoring services during a five-year study to determine the effectiveness of a purple loosestrife (*Lythrum salicaria*). Services were provided for the Hartford Audubon Society and University of Connecticut Cooperative Extension System APHIS Pest Survey Program.

CTDEP Migratory Bird Stopover Survey (2001-2002): Conducted point counts at ten locations along a survey transect established in Natchaug State Forest, Eastford, CT.

CTDEP Shrubland Bird Survey (2006): Conducted point counts at five locations along a survey transect established in Durham Meadows Wildlife Management Area, Durham, CT.

CTDEP Night bird Callback Survey (2008): Conducted call back survey of three owl species along a 10-station survey route spanning two Connecticut municipalities. Documented presence of CT State Special Concern Whip-poor-will (*Caprimulgus vociferous*) at two survey locations.

Quinnipiac University Annual BioBlitz (2009, 2010) – Sleeping Giant State Park in Hamden, CT: Served as group leader for avian identification, and provided support for botanical identification.

CTDEEP Plant Conservation Volunteer (PCV)

CT IPANE Volunteer

Invited Presentations

“CT Wetland In Lieu Fee (ILF) Program 2016 Summary and a look ahead for 2017”. Presentation to the Connecticut Association of Wetland Scientists Annual Meeting March 2017.

“Achieving the Goal of an Interconnected Landscape: Improving Biodiversity at Multiple Scales”. Presentation to the Fairfield County Regional Partnership. March 2016.

“Connecticut Estuaries: In Need of Remediation, Restoration, and Policy Change”. Co-presentation (with Dr. Jennifer Matei from Sacred Heart University) to the International Society of Wetland Scientist Annual Meeting in Providence, RI. June 2015.

“*Environmental Impact in the United States Virgin Islands – Case Study: Wastewater Treatment at Red Point – Charlotte Amalie, Saint Thomas USVI*”. 2007-2016. Presentation to Yale University Graduate School of Forestry and Environmental Science – FES 90116b Caribbean Coastal Development: Cesium and CZM

“*Conservation and Management Planning at the Trout Brook Valley Conservation Area*”. 2013 – Keynote Speaker Presentation to the Aspetuck Land Trust Annual Meeting.

“*The Adaptive Significance of Mixed Species Flocks*” 2007. Presentation to the Hartford Audubon Society. West Hartford, CT.

“*A Grassland Bird Conservation Primer*” 2006. Presented to the Town of Wallingford Conservation Commission. Wallingford, CT.

“*Cove Island Park, A Connecticut Important Bird Area*”. 2006. Presented on behalf of National Audubon Society to Conference Participants at “All Audubon Day”. Southbury, CT.

“*NEPA Compliance and the CHMM*”. 2006. Presentation to CT Certified Hazardous Materials Manager Training Class Conducted by Field Safety Corporation.

“*The Ecology of Connecticut’s Trap Rock Ridges*” 2005. Presentation to the Hartford Audubon Society. West Hartford, CT.

“*Addressing Biodiversity in the Environmental Impact Assessment*”. 2002-2005. Presentation to University of New Haven Graduate School of Environmental Science - EN 607 Environmental Reports and Impact Assessment.

Rare Species Expertise (State or Federally listed species for which their observed or expected presence was successfully identified or addressed for project completion):

Invertebrates

- | | |
|---|---|
| Frosted Elfin (<i>Callophrys irus</i>) | Staghorn Coral (<i>Acropora palmata</i>) |
| Big Sand Tiger Beetle (<i>Cicindela formosa generosa</i>) | Elkhorn Coral (<i>Acropora cervicornis</i>) |
| Tiger Spiketail (<i>Cordulegaster erronea</i>) | |

Herpetofauna

- | | |
|---|--|
| Wood Turtle (<i>Glyptemys insculpta</i>) | Spotted Turtle (<i>Clemmys guttata</i>) |
| Eastern Box Turtle (<i>Terrapene carolina</i>) | Bog Turtle (<i>Glyptemys muhlenbergii</i>) |
| Eastern Ribbon Snake (<i>Thamnophis sauritus</i>) | Loggerhead Turtle (<i>Caretta caretta</i>) |
| Diamondback Terrapin (<i>Malaclemys terrapin</i>) | Black Rat Snake (<i>Pantherophis alleghaniensis</i>) |
| Atlantic Green Turtle (<i>Chelonia mydas</i>) | Marbled Salamander (<i>Ambystoma opacum</i>) |

Avifauna

- | | |
|---|--|
| Common Tern (<i>Sterna hirundo</i>) | Least Tern (<i>Sternula antillarum</i>) |
| Roseate Tern (<i>Sterna dougalii</i>) | American Bittern (<i>Butorides lentiginosus</i>) |
| Pied-billed Grebe (<i>Podilymbus podiceps</i>) | Great Egret (<i>Ardea alba</i>) |
| Least Bittern (<i>Ixobrychus exilis</i>) | Bald Eagle (<i>Haliaeetus leucocephalus</i>) |
| Yellow-crowned Night-heron (<i>Nyctanassa violacea</i>) | Black-crowned Night-heron (<i>Nycticorax nycticorax</i>) |

Little Blue Heron (*Egretta caerulea*)
 Snowy Egret (*Egretta thula*)
 American Kestrel (*Falco sparverius*)
 American Oystercatcher (*Haematopus palliatus*)
 Upland Sandpiper (*Bartramia longicauda*)
 Long-eared Owl (*Asio otus*)
 Savannah Sparrow (*Passerculus sandwichensis*)
 Seaside Sparrow (*Ammodramus maritimus*)
 Saltmarsh Sparrow (*Ammodramus caudacutus*)

Glossy Ibis (*Plegadis falcinellus*)
 Broad-winged Hawk (*Buteo platypterus*)
 Piping Plover (*Charadrius melodus*)
 Barn Owl (*Tyto alba*)
 Whip-poor-will (*Caprimulgus vociferous*)
 Brown Thrasher (*Toxostoma rufum*)
 Eastern Meadowlark (*Sturnella magna*)
 Grasshopper Sparrow (*Ammodramus savannarum*)
 Bobolink (*Dolichonyx oryzivorus*)

Flora

Fragrant Sumac (*Rhus aromatica*)
 Bitter Panicgrass (*Panicum amarum*)
 Purple Milkweed (*Asclepias purpurescens*)
 Thread-leaf Sundew (*Drosera filiformis*)
 Lizardstail (*Saururus cernuus*)
 Balsam Fir (*Abies balsamea*)
 Sweet Gum (*Liquidambar styraciflua*)
 Low Frostweed (*Helianthemum propinquum*)
 Woolly Beach-heather (*Hudsonia tomentosa*)
 Seaside Spurge (*Euphorbia polygonifolia*)
 Cattail Sedge (*Carex typhina*)
 Coast Violet (*Viola brittoniana*)

Squarrose Sedge (*Carex squarrosa*)
 Wiegand's Wild rye (*Elymus wiegandii*)
 Prickly Pear (*Opuntia humifusa*)
 Creeping bush-clover (*Lespedeza repens*)
 Sickle-leaved Golden Aster (*Chrysopsis falcata*)
 Field Milkwort (*Polygala cruciata*)
 Purple Wood Sorrel (*Oxalis violacea*)
 Field Beadgrass (*Paspalum laeve*)
 Northern Dropseed (*Sporobolus neglectus*)
 Beach Needlegrass (*Aristida tuberculosa*)
 Needlegrass (*Aristida longespica*)
 Saltpond grass (*Leptochloa fusca*)

CURRICULUM VITAE

Daniel A. Hageman, NHCWS New Hampshire Certified Wetland Scientist / Certified Soil Scientist

Summary of Experience

Mr. Hageman is a Senior Environmental Scientist with over 21 years of professional experience in environmental planning and permitting, wetland investigations, wildlife habitat assessment, conservation planning, vernal pool assessments, plant and animal monitoring and surveys, and biological assessments for threatened and endangered species. Currently, as Senior Environmental Scientist for Fitzgerald and Halliday, Mr. Hageman is working on a variety of projects involving environmental permitting, NEPA compliance, rare species assessment, conservation planning, and habitat enhancement/restoration.

Mr. Hageman conducts wetland/habitat assessments, natural resource inventories, vernal pool assessments, essential fish habitat studies, plant and animal monitoring and surveys, and forest fragmentation analyses. His work also includes biological assessments and field surveys for threatened and endangered wildlife and vegetation species. He also prepares conservation management plans, forest management plans and urban forest management plans for public parks and forests, and other open space and conservation lands. Field surveys have included a large variety of wildlife, including avian, reptile, amphibian, invertebrate, and mammal species.

Education

B.S., 1993, Natural Resource Management and Engineering, - University of Connecticut
Masters Coursework 1994-2006, Masters Soil Science Classes - University of Massachusetts

Professional Registrations/Certifications

- New Hampshire Certified Wetland Scientist (State of New Hampshire)
- Certified Soil Scientist (University of Connecticut)
- OSHA 40-Hr. Hazardous Waste Operations and Emergency Response Certification

Professional Employment

Fitzgerald and Halliday, Inc. – Hartford, CT (March 2010 – Present). Senior Environmental Scientist: Environmental permitting for infrastructure projects, mitigation planning and design, NEPA and CEPA documentation, fish and wildlife habitat assessments, flora and fauna surveys, wetland delineation and functions and values assessments, mitigation monitoring, conservation & management plans.

BL Companies, Inc. – Meriden, CT (July 2008 – March 2010). Senior Scientist: Environmental permitting for infrastructure projects, NEPA and CEPA documentation, fish and wildlife habitat assessments, flora and fauna surveys, wetland delineation and functions and values assessments.

Maguire Group Inc. – New Britain, CT (June 1993 – July 2008). Senior Environmental Planner: Environmental permitting for infrastructure projects, NEPA and CEPA documentation, fish and wildlife habitat assessments, flora and fauna surveys, wetland delineation and functions and values assessments, conservation & management plans.

New Hampshire Audubon Society (May 1993 – June 1993). Seasonal Avian Biologist in support of White Mountain National Forest Monitoring Plan. Conducted Wetland call-back, permanent plot, and high elevation breeding bird avian surveys.

Representative Wildlife/Natural Resource Survey/Inventory Projects

Rare Plant Vegetation Survey – New Hampshire Department of Transportation at Seabrook/Hampton, NH: Conducted botanical surveys for listed plant species within dune habitat adjacent to Hampton Harbor. Target species included:

- Dwarf glasswort (*Salicornia bigelovii*) (NH endangered)
- Seaside threawn (*Aristida tuberculosa*) (NH endangered)
- Hairy hudsonia (*Hudsonia tomentosa*) (NH threatened)
- Gray's umbrella sedge (*Cyperus grayi*) (NH endangered)
- Long-spined sandbur (*Cenchrus longispinus*) (NH endangered)
- Sand dropseed (*Sporobolus cryptandrus*) (NH endangered)
- Seaside sandmat (*Euphorbia polygonifolia*) (NH endangered)
- Field wormwood (*Artemisia campestris* ssp. caudata) (NH endangered)
- Seaside-sandwort (*Honckenya peploides* ssp. robusta) (NH endangered)

Rare Plant Vegetation Survey – CT Audubon Society Coastal Center at Milford Point: Assisted with botanical inventory to identify and map species of conservation concern on the 5-acre Coastal Center at Milford Point, property owned by the State of CT Department of Energy and Environmental Protection and leased by the Connecticut Audubon Society.

Sikorsky Memorial Airport Runway Safety Improvements Biological Surveys: Assisted with seasonal (Spring, Summer, and Winter) transect surveys, point counts, and wetland call-back surveys for avifauna. Conducted listed plant surveys and monitoring of listed plant mitigation areas for performance standards.

Rare Plant Habitat Survey – New Hampshire Department of Transportation at Lebanon, NH: Conducted habitat survey for listed plant species within roadway project area. Target species included: crested sedge (*Carex cristatella*) and Appalachian barren-strawberry (*Geum fragarioides*).

New Haven-Hartford-Springfield High Speed Rail Program – North Haven to Hartford, CT: Listed plant surveys and listed species mitigation and monitoring services; invasive plant species identification and control feasibility assessment.

Listed Species Screening Assessment - Windsor-Bloomfield, CT: Conducted habitat surveys and evaluations for species listed in the CT Endangered Species Act. Surveys were conducted along multiple miles of linear existing sewer pipe in order to identify high habitat conservation priority areas. Collected information was reported to design team in order to avoid or reduce impact of proposed sewer access and maintenance activities.

Impact Assessment – Bride Brook and Wellfield No. 3, East Lyme, CT: Conducted baseline flora and faunal surveys of the Pattagansett River and associated wetland systems to assess impact of increased groundwater withdrawal during summer peak demand.

Biological Surveys for EIS, Routes 82/85/11 – Salem, Montville, East Lyme, and Waterford, CT: Conducted biological surveys along an 11-mile proposed highway corridor. Composed target survey species lists, identified and developed survey protocols for target taxa. Surveys included the following:

- Vegetation and habitat community survey
- Listed vegetation species surveys
- Stream bioassessment surveys for aquatic invertebrates using EPA Rapid Assessment Protocol, search sampling, and traps
- Seasonal (Spring, Summer, and Winter) avian transect surveys, point counts, wetland call-back surveys
- Herpetofauna surveys
- Seasonal (e.g., “vernal”) pool inventory and evaluation
- Winter and Spring animal track surveys
- Odonata survey, and
- New England Cottontail (*Sylvilagus transitionalis*) survey using Mt-DNA testing.

Biological Surveys for EA, Route 66 – Meriden to Middletown, CT: Managed, coordinated, and conducted biological surveys along a 3-mile proposed corridor widening project. Composed target survey species lists, identified and negotiated appropriate survey protocols for target taxa and state and federal regulators (USEPA, USFWS, USACOE, FHWA, CTDEP). Conducted multi-taxa seasonal surveys including breeding bird surveys, herpetofauna surveys, and rare flora survey. Undertook mitigation for listed plant species impact.

Natural Resource Inventories – Naval Air Station Brunswick (NASB), Brunswick, Maine: In support of Environmental Assessments (3 projects) for a New Hangar Construction; Air Traffic Control Tower Replacement and Runway Safety Zone Expansion; New Bachelor Enlisted Quarters, conducted the following surveys:

- Avifauna point count surveys and rare grassland bird survey of approximately 13.8 acres of existing grassland habitat for the Grasshopper Sparrow, Upland Sandpiper, Horned Lark, and Vesper Sparrow.
- Vernal pool inventory and assessments to identify specialist herpetofauna
- Plant Community Characterizations
- Wetland Delineations
- Listed Plant surveys (*Carex vestita*)

Flora and Fauna Community Characterization – Cathole Mountain, Meriden, CT: Assisted with flora and fauna surveys along a traprock ridge in order to provide an ecological characterization of the site.

Natural Resource Inventory, New London Waterfront Revitalization Plan – New London, CT: Assisted with biological investigation and natural resource inventory of terrestrial, intertidal, and subtidal zone flora and fauna at the City Pier area. This inventory provided baseline information used during the permitting process to assess potential environmental impact to these habitats associated with the rehabilitation of the City’s blighted waterfront area and creation of a premier multi-use public facility.

Representative Volunteer Services

CTDEEP Plant Conservation Volunteer (PCV)

CT IPANE Volunteer