

# Important Bird Area Conservation & Management Plan

Bafflin Sanctuary Complex, Pomfret, Connecticut

Prepared by The Connecticut Audubon Society

For Audubon Connecticut



## Connecticut Audubon Society

Connecticut Audubon Society (CAS) conserves Connecticut's environment through science-based education and advocacy focused on the state's bird populations and habitats. Founded in 1898, CAS operates nature facilities in Fairfield, Milford, Glastonbury, Old Lyme, Sherman, and Pomfret, an EcoTravel office in Essex and an Environmental Advocacy program in Hartford.

CAS's staff and volunteers educate over 200,000 children and adults annually. Working exclusively in the state of Connecticut for over 100 years, CAS is an independent organization, not affiliated with any national or governmental group.

In addition, CAS manages and protects 20 sanctuaries, covering more than 3,300 acres of wildlife habitat throughout Connecticut. CAS sanctuaries include significant upland forest habitat, Ramsar Convention Designated Wetlands of International Importance, some of the state's largest tracts of managed grassland habitat, as well as critical breeding, wintering and staging areas for shorebirds along the Long Island Sound that are deemed of national importance.

CAS implements and manages a wide range of conservation studies and initiatives throughout the state as part of its core mission. Through its Science & Conservation office, CAS also provides mission-driven conservation services for third parties in both the public and private sectors.

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# Executive Summary

The CAS Bafflin Sanctuary, hereafter the Bafflin Sanctuary, is located in Pomfret, Connecticut and is comprised of 702 acres of protected open space, which include a combination of managed wildlife habitat and actively farmed fields. The Bafflin Sanctuary is open to the public for passive recreation and the enjoyment of nature; access to the property is via walking trails only.

At the heart of the sanctuary complex lays the **Lois Orswell Grassland Bird Conservation Center**, operated by the CAS. This state-of-the-art education facility serves as a point of contact for visitors to the sanctuary and an access point to the extensive trail network. CAS offers educational programming and summer camp opportunities for school-aged children at the center, as well as citizen-science based conservation programs for the general public.

The Bafflin Sanctuary Complex is comprised of the lands owned by Ct Audubon Society and nearby Wyndham Land Trust in the eastern part of Pomfret, Connecticut. The Wyndham Land Trust holdings total about 660 acres in this area. Thus creating the 1,362 acre Bafflin Sanctuary Complex. This complex of natural and managed areas is officially recognized as an Important Bird Area by Audubon Connecticut, the state office of the National Audubon Society. Within this complex area not officially included in the IBA are an additional 623 acres of land protected by conservation easements and 223 acres of State Forest.

The Bafflin Sanctuary protects an extensive mosaic of early successional grassland and scrubland vegetation, interspersed with mature woodlots. Early successional habitat types have declined significantly in Connecticut, as have the species that rely on them. Active sanctuary management practices, utilized in an adaptive manner and directed by data collected on the ground, are employed to maintain and improve suitable habitat for a suite of early successional habitat species, including several that are protected under Connecticut's Endangered and Threatened Species Act (CT-ESA).

**The purpose of this Conservation & Management Plan is to:**

1. Provide an inventory of the natural resources of the complex
2. Identify priority species that can guide habitat management and conservation actions
3. Identify all stakeholders and their role in the complex
4. Identify management issues
5. Refine an action plan to provide optimal protection and management of the complex and its species

## The Important Bird Area (IBA) Program

The IBA program is an international program that identifies and attempts to protect areas that provide important habitat to one or more bird species. Although founded by BirdLife International in Great Britain in 1995, the program is managed in the U.S. by the National Audubon Society. Connecticut currently has 27 publicly announced IBAs, including the Bafflin Sanctuary Complex, and more are being considered. IBAs may include public and private lands, and may or may not include areas currently designated as protected land. Important Bird Areas tend to be sites that support long-term research and/or monitoring projects that contribute substantially to ornithology, bird conservation and/or education and are generally sites that support:

- Species of conservation concern (e.g. threatened and endangered species)
- Range-restricted species (species that are vulnerable because they are not widely distributed)
- Species that are vulnerable because their populations are concentrated in one general habitat type or biome
- Species, or groups of similar species (such as waterfowl or shorebirds), that are vulnerable because they occur at high densities due to their congregatory behavior





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# Chapter 1: The Bafflin Sanctuary

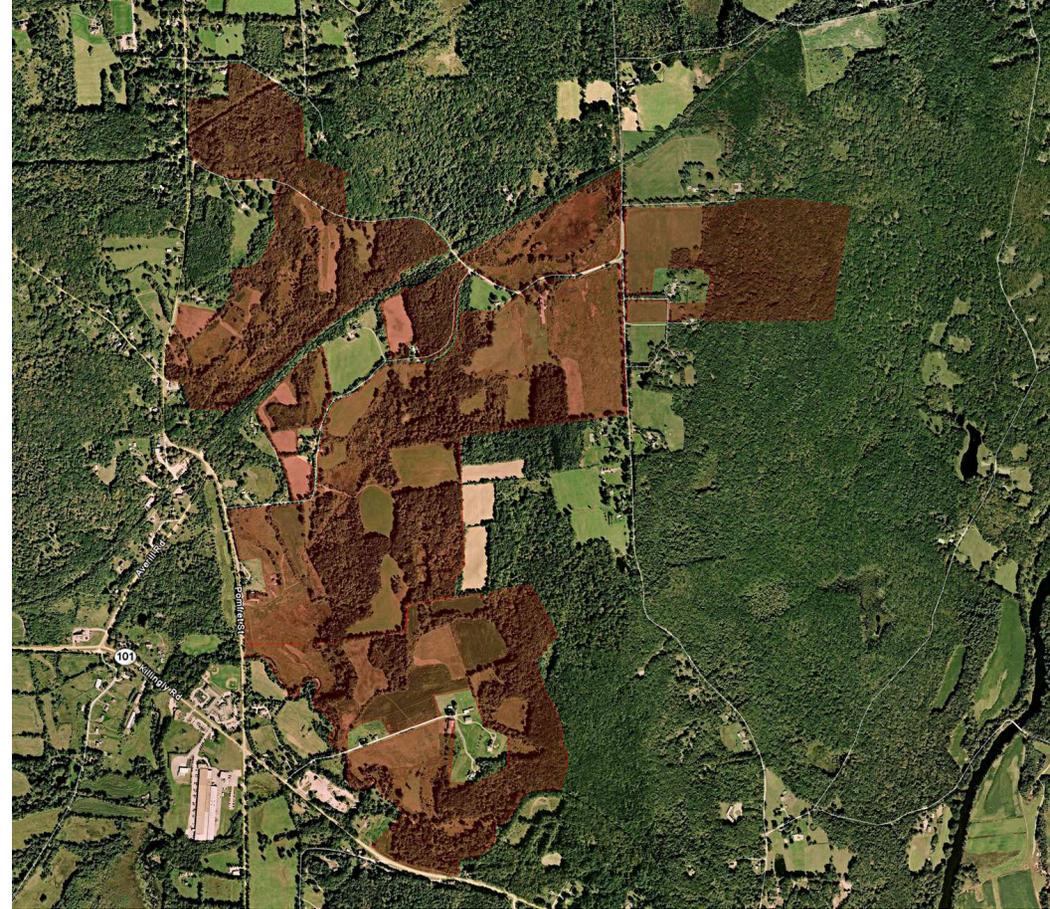
## 1.1 Description of the Bafflin Sanctuary

The CAS Bafflin Sanctuary presently encompasses 702 acres of preserved lands in Pomfret, Windham County, Connecticut. The sanctuary is generally located westerly of the Quinebaug River, northerly of Route 101, easterly of Route 169, and southerly of Route 44 in Pomfret on the Putnam and Danielson topographic quadrangle maps (USGS quadrants CT 28 and 43, respectively). The sanctuary is abutted by Pomfret Community School to the southwest, Pomfret School to the north, and various residential homes and Wyndham Land Trust parcels to the north and east (see Figure 1). The natural features of the sanctuary are diverse, ranging from flood plain to rolling hills and steep ravines. Approximately 31% of the complex (203 acres) is managed as early successional habitat, comprised of managed grasslands (mowed annually) and shrubland. Included in this number are 33 acres of late-season hayfields – agricultural grasslands that are mowed annually after July 15 to accommodate grassland bird breeding. However, several miles of dense riparian scrub habitat found alongside the wetlands and streams on the sanctuary are not included in the managed early successional habitat numbers.

A portion of the sanctuary (roughly 8% or 59 acres) remains in rotating agricultural production, primarily corn and alfalfa.

The remainder of the sanctuary is comprised of woodland (approximately 350 acres), water bodies, and their associated floodplains. The property contains several wetland complexes, vernal pools, numerous streams and larger brooks, all of which drain into Mashamoquet Brook which defines a large portion of the southern property boundary. The combined surface area of these wetlands and their floodplains (which contain additional early successional habitat of high quality) is approximately 28 acres.

The sanctuary is managed and maintained by CAS. CAS also runs outdoor education, outreach and research programs on the Bafflin Sanctuary from its state-of-the-art Lois Orswell Grassland Bird Conservation Center on Day Road.



**Figure 1.** The Connecticut Audubon Society Bafflin Sanctuary in Pomfret, CT. The sanctuary is bounded to the south by Route 101 and to the west by Route 169. Note the location of the Quinebaug River to the east. The northern section of the complex is bisected by the CT Air Line Trail.



## 1.2 Area History

The Bafflin Sanctuary is located in Pomfret, Connecticut, which was incorporated in 1713. The fact that the last wolf in Connecticut was killed here in 1742, by Israel Putnam, is testament to the ruggedness and wild character of this area during the first half of the 18<sup>th</sup> century. However, like much of southern New England, the Pomfret area was largely cleared of its woodlands for agricultural purposes in the late 1700s and early 1800s. Over the last century, the majority of the Bafflin Sanctuary was under agricultural production or lay fallow and converted back to woodland.

Due to its convenient location in northeastern Connecticut, roughly halfway between Boston and New York, Pomfret became a country retreat for wealthy city folk. Portions of the Bafflin Sanctuary, particularly on the northern half of the property, once belonged to large country estates. Construction of the Airline Railroad, a railroad connecting Boston and New York along the straight line (“as if a line had been drawn through the air”), took place from 1869-1874 and reached the Pomfret area in 1872. Train service on this section of the railroad ended by the early 1900s.

CAS’s 702-acre Bafflin Sanctuary in Pomfret was the result of land gifts, starting in 1992, by Lois Orswell (1904-1998). Orswell, who summered in Pomfret as a girl, purchased 45 acres in 1950, built a small house on the property, where she collected abstract expressionist art and modern sculpture (most of which is now in the collections of Harvard University’s Fogg Art Museum). Mrs. Orswell was instrumental in the purchase of Pomfret’s old golf course after it was abandoned. The Pomfret Golf Course had been in operation between 1914 and 1973 and was operated by the French family, who closed it when they retired in 1973. Many local kids learned to play golf on this course and fond memories abound in the community. Mrs. Orswell purchased and donated this property as the first major parcel for the Bafflin Sanctuary.; Management of the course was ceased and the area was allowed to revert to a natural state. Since the mid-1990s, this parcel has been mowed annually to keep the remaining meadows open.

Land acquisition apart from the Pomfret Golf Course for the Bafflin Sanctuary and its adjacent conservation lands began in the 1990s and continues through the present day. The complex is comprised of contiguous lands that were acquired and protected as open space over several years as agricultural operations, primarily dairy, went out of business and were put on the market for development. CAS works closely with the Wyndham Land Trust on sanctuary management, identification, and acquisition of additional open space in the town of Pomfret. As adjoining properties have become available and as funding has allowed, additional parcels have been acquired. Since this plan was first created numerous parcels have been protected. The Wyndham Land Trust acquired 200 acres in the northern part of the complex and acquired an 4 acre and 43 acre conservation easement adjacent to the core Bafflin Sanctuary. The Town of Pomfret bonded \$4 million in open space money. This protected an additional 306 acres in the IBA area. Two farms in the north part of the IBA area sold their development right to the State protecting 231 acres.

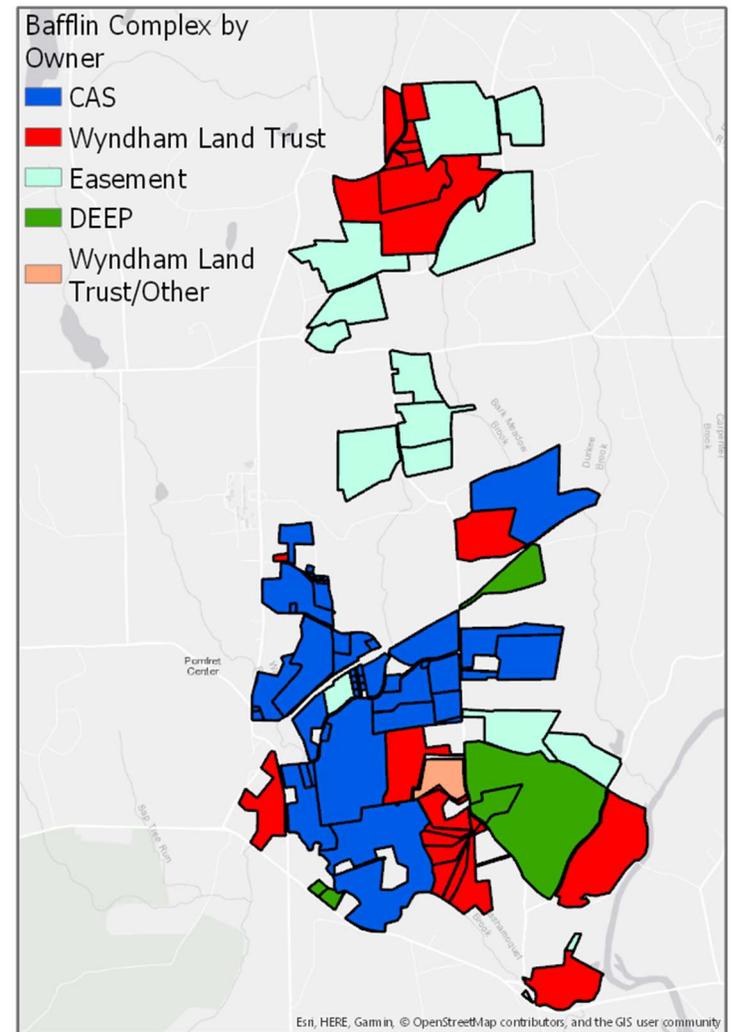
In 2001 CAS opened up its Pomfret center in a remodeled gas station and service center on Pomfret Street (Route 169). After ten years of operating the sanctuary and all associated programs from this facility, a new facility was constructed on the site of the historic landmark 1895 barn on Day Road, located in the heart of the 702-acre Bafflin Sanctuary. The new center was built on the same footprint and in the same style as the barn that preceded it. CAS’s Lois Orswell Grassland Bird Conservation Center opened in 2011 and serves as a community-based facility offering programming for all ages year-round. The CAS Grassland Bird Conservation Center also forms a hub from which many miles of trails depart to allow visitors a closer look at the various habitat types and variety of flora and fauna that is found within the sanctuary.

### 1.3 Abutting Land Uses

The town of Pomfret is largely comprised of rural residential development. The Bafflin Sanctuary is bounded on the south by Mashamoquet Brook, private residences, and a Connecticut Department of Transportation Highway Garage. To the west, the sanctuary is bounded by private residences and the town’s sole public school facility, Pomfret Community School, serving grades pre-K through 8. To the north, the sanctuary is bounded by private residences and the campus of the Pomfret School, a private high school. To the east, the sanctuary is bordered by the Quinebaug River, private residences, and agricultural operations.

The Wyndham Land Trust owns approximately 661 acres of protected open space contiguous, or in close proximity, with the Bafflin Sanctuary. CAS and the Wyndham Land Trust cooperate closely on conservation and management issues on this combined ‘Bafflin Sanctuary Complex’, and both organizations actively identify and pursue the acquisition of critical buffer and wildlife habitat parcels that can improve the functionality of the complex.

The State of Connecticut, through its Department of Energy and Environmental Protection (CT DEEP), owns and manages 1,500 acres southwesterly of the complex. One thousand acres is held as Mashamoquet State Park and another 500 acres is held as the Wolf Den Block of Natchaug State Forest, also known as Baker Hollow. In addition, the state owns the Airline Trail Linear Park, the former Airline Railroad bed, which bisects the Bafflin Sanctuary Complex running east to west. A Natural Gas transmission line bisects the northernmost section of the sanctuary through the neighboring Wyndham Land Trust Duck Marsh parcel. See Figure 2 for location of key parcels.



**Figure 2.** Committed Open Space parcels located in proximity to the Connecticut Audubon Society Bafflin Sanctuary in Pomfret, CT. Note how several Wyndham Land Trust parcels (indicated in red) are contiguous with the Bafflin Sanctuary (indicated in dark blue), forming the joint Bafflin Sanctuary Complex.

## 1.4 Property Stakeholders

The Bafflin Sanctuary Complex is owned by two conservation organizations, the CAS (approximately 702 acres) and the Wyndham Land Trust (approximately 661 acres). Both organizations cooperate on sanctuary management and are actively involved in identification of additional buffer and/or conservation lands to further the functionality of the sanctuary complex.

The Bafflin Complex has a broad base of support. The following is an overview of organizations, agencies and institutions that have been involved with different facets of its acquisition, operation and/or management:

### Nation-wide stakeholder organizations

- Natural Resources Conservation Service (NRCS)
- U.S. Department of Agriculture (USDA)
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- MAPS Bird Banding Program and Volunteers
- BirdLife International/National Audubon Society Important Bird Area Program

### State-wide stakeholders

- Connecticut Department of Energy and Environmental Protection
- CAS
- Connecticut Butterfly Association
- Connecticut Ornithological Association
- Grassland Bird Habitat Initiative

### Regional stakeholders

- The Wyndham Land Trust
- Quinebaug Shetucket National Heritage Corridor
- Easter CT Conservation District
- Thames River Valley Basin Partnership
- Towns of Pomfret, Woodstock, Eastford, Hampton, Canterbury, Killingly, Putnam and Brooklyn
- Conservation Commissions from the towns of Pomfret, Woodstock, Hampton, Canterbury, and Eastford
- CAS's Community science Monitoring Volunteers
- Natchaug Ornithological Association
- United National Foods, Helping Hands Volunteers
- Appalachian Mountain Club

### Local stakeholders

- Abutting Land Owners
- General Public – walkers and birdwatchers
- Boy Scouts – Troop 25 (Putnam), Troop 26 (Pomfret) & Troop 27 (Putnam)
- Girl Scouts – Troop 5117 (Pomfret) Troop 5836 (Woodstock)

### Educational institutions

Students and faculty from the following educational institutions have been involved in programming, research and/or community service projects in the Bafflin Sanctuary Complex:

- Pomfret Community School – grades pre-K through 8
- Rectory School – grades pre-K through 9
- Pomfret School – grades 9 through 12
- Killingly Public Schools – grades 1 through 12
- Woodstock Academy – grades 9 through 12
- Woodstock Public Schools – grades K through 8
- Putnam Public Schools – grades 1 through 4
- Norwich Public Schools – grades 2 through 4
- Canterbury Public Schools – grades 2 through 4
- Yale School of Forestry and Environmental Studies
- University of Connecticut
- Eastern Connecticut State University
- Quinebaug Valley Community College



## 1.5 Designation as an Important Bird Area

The Bafflin Sanctuary Complex was publicly recognized as an IBA based on its unique and diverse habitats which support numerous bird species, several of which are either considered endangered, threatened, or of special concern according to the Connecticut Endangered Species Act (CT-ESA) or are recognized by the CT Comprehensive Wildlife Conservation Strategy (CWCS) as a Greatest Conservation Need (GCN) species. Various habitat types contained within the sanctuary complex serve as breeding, migratory stopover and/or wintering grounds for a number of conservation concern species. The IBA designation will raise awareness about the importance of this site for birds and will help focus conservation efforts.

The following information, provided by Audubon Connecticut, the state office of the National Audubon Society, forms the basis for the Bafflin Sanctuary Complex designation as an Important Bird Area (<http://ct.audubon.org>):

### **Bafflin Sanctuary Complex, Pomfret, Windham County**

**Status:** Recognized IBA

**Ownership:** The CAS, Wyndham Land Trust

**Nominator:** Andy Rzeznikiewicz, CAS Center at Pomfret and Wyndham Land Trust

**Size:** approximately 1,363 acres in protection

**Location:** 71° 57' W, 41° 52' N

**Habitats:**

Primary—Mix of habitats

Secondary—Conifer forest, deciduous forest, shrub, field, grassland, non-tidal freshwater marsh, swamp, river/stream, pond/lake

**Land Use:**

Primary—Nature and wildlife conservation, other recreation or tourism, agriculture/livestock, undeveloped

Secondary—Hunting/fishing, forestry, water supply, utility/right-of-way, suburban/residential

**Threats:**

Serious—Invasive or non-native plants, development of unprotected lands

Minor—Introduced animals, cowbird parasitism, predators, starlings in kestrel nest boxes, disturbance to birds or habitat

Potential—Habitat conversion (succession), development

**Site Description:** Of the 1,363 acres in protection, 702 acres are owned by The CAS, and 661 acres belong to the Wyndham Land Trust. Some of the remarkable natural features of this property include a large beaver pond, extensive fields, a hemlock ravine, 3 large brooks, flood plains, vernal pools, alder thickets, and wet meadows. Some trails have interpretive signage. The CAS's resident staff naturalists serve as caretakers of the property and offer guided bird walks and other environmental programs. A MAPS (Monitoring Avian Productivity and Survivorship) bird banding station is in an early- to mid-successional area of the sanctuary.

**IBA Criteria:** Connecticut Endangered and Threatened species; High Conservation Priority Species; Rare, Unique or Representative Habitat; 500+ Waterfowl (winter) 1000+ Waterfowl (staging); Long-term Research and/or Monitoring.

**Birds:** Bafflin Sanctuary Complex provides a variety of habitats that support numerous species of birds. American Black Ducks (high conservation priority) and state endangered Pied-billed Grebes have been known to nest in the wetlands here. These areas are also a migratory stopover for the state endangered American Bittern in the fall. Numerous Northern Harriers (state endangered) are found in the grasslands yearly during the winter and also during both spring and fall migration. One state endangered (Sedge Wren), one state threatened (Eastern Meadowlark), and three state species of special concern (American Kestrel, Savannah Sparrow and Bobolink) breed in the grassland habitat and also use the area as a stopover. The early successional habitat at Bafflin, consisting of old field, shrub/scrub, and young woodlands, provides breeding grounds for several WatchList species and/or species of high conservation priority including American Woodcock, Blue-winged Warbler, Prairie Warbler, Field Sparrow, Eastern Towhee, Black-billed Cuckoo, Yellow-billed Cuckoo, Eastern Kingbird, Baltimore Oriole and Orchard Oriole. Brown Thrasher (CT-special concern) and Purple Martin (CT- special concern) also breed here. The winter roost for Long-eared Owls (CT-endangered). The woodland habitat, like the early successional habitat, also hosts a variety of high conservation priority species. Eastern Wood Pewee, Louisiana Waterthrush, Wood Thrush, Worm-eating Warbler, Canada Warbler, Least Flycatcher, Great Crested Flycatcher, Purple Finch, Scarlet Tanager and Red-breasted Grosbeak all breed in the woodlands at Bafflin Sanctuary Complex. See Table 1-1 for a list of the IBA nomination criteria.

**Non-avian Resources:** Until recently, this property was a working dairy farm and about 100 acres is an old golf course. CAS leads tours here year-round.

**Existing Conservation Measures:** Invasive species are being removed or controlled to some extent on The CAS's and Wyndham Land Trust properties. Both organizations are monitoring the surrounding lands to take advantage of any acquisition opportunities.

**Table 1-1. State-listed species values for Bafflin Sanctuary Complex included as IBA nomination criteria**

Species	Breeding	Winter	Migration	Dates
Blue-winged Teal (CT – Threatened – nesting population only)	1 pair	-	-	2003
American Bittern (CT – Endangered)	-	-	1/ fall	2001, 03, 04
Pied-billed Grebe (CT – Endangered)	1-2 pairs	-	Fall	1998, 99 annual in fall
Long-eared Owl (CT – Endangered)	-	Ave. 4; Max. 15-20	-	2000-08
Saw-whet Owl (CT – Special Concern)	-	-	Fall	Annual
Northern Harrier (CT – Endangered)	-	Some	Numerous	Annual
American Kestrel (CT – Threatened)	2-4 pairs	1-2 birds	Spring, fall	Annual
Purple Martin (CT – Threatened)	At least 3 pairs	-	-	1997-2002, 2017-2018
Brown Thrasher (CT – Special concern)	At least 6 pairs	-	-	Annual
Savannah Sparrow (CT – Special concern)	At least 2 pair	-	Fall/Spring	Annual
Bobolink (CT – Special concern)	Numerous	-	Hundreds in late summer and fall	Annual
Eastern Meadowlark (CT – Special concern)	1 pair	-	Fall/winter	Annual
Great Egret (CT – Special Concern)	-	-	Summer/Post-breeding	Annual
Sharp-shinned Hawk (CT – Endangered)	-	Numerous	Numerous	Annual
Broad-winged Hawk (CT – Special Concern)	1 pair possible	-	Some	Annual
Bald Eagle (CT – Threatened)	-	Several	Several	Annual
Short-eared Owl (CT – Threatened)	-	1-2 birds	-	Annual
Sedge Wren (CT – Endangered)	2-3 pairs	-	-	2018
Alder Flycatcher (CT – Special Concern)	2 pairs	-	-	2018
Vesper Sparrow (CT – Endangered)	-	-	Spring/fall	Annual

# Chapter 2: Natural Resources

## 2.1 Ecological Region

The Bafflin Sanctuary Complex is located in the Northeastern Coastal Zone Ecoregion (EPA Level III; Ecoregion 59), subdivision Southern New England Coastal Plains and Hills (EPA Level IV; Ecoregion 59c). The Northeastern Coastal Zone covers most of southern New England and the coastal areas of New Hampshire and southern Maine, and is defined as follows (Griffith 2010):

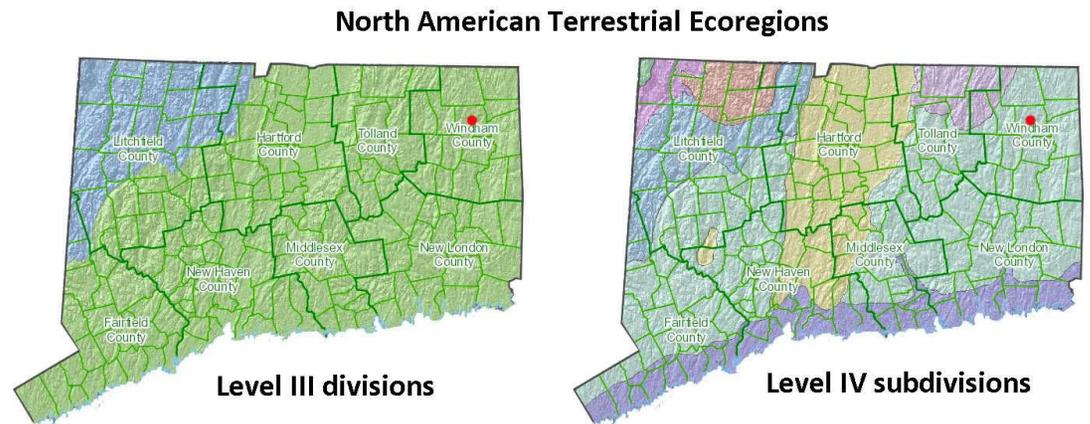
**Climate:** This ecoregion has a severe mid-latitude humid continental climate, marked by warm summers and severe winters. The mean annual temperature ranges from approximately 8°C to 10°C (46 to 50 °F). The frost-free period ranges from 150 to 230 days. The mean annual precipitation is 1,181 mm, ranging from 890 to 1,250 mm, and is generally evenly distributed throughout the year.

**Vegetation:** Appalachian oak forest and northeastern oak-pine forest are the natural vegetation types. These include white oak, red oak, hickories, white pine, and some maple, beech, birch, and hemlock in cooler or more mesic areas.

**Hydrology:** Abundant perennial streams, lakes, ponds, and wetlands. Stream networks have a variety of patterns due to geologic variety and complex geomorphic history, including dendritic, deranged, and trellis. Streams mostly moderate to low gradient. Some of the surface waters are sensitive to acidification.

**Terrain:** Landforms include irregular plains, plains with low to high hills, and open hills. Elevations range from sea level to over 300 m (984 ft.). Soils are mostly Inceptisols with some Entisols and Histosols and have a mesic soil temperature regime, and an aquic or udic soil moisture regime. The Northeastern Coastal Zone contains fine to medium-textured, relatively nutrient poor soils with relatively little surface irregularity. Bedrock geology is complex and varied, with mostly igneous and metamorphic rocks, but some areas of sedimentary also occur.

**Land Use/Human Activities:** This region contains dense concentrations of human population. Although attempts were made to farm much of the Northeastern Coastal Zone after the region was settled by Europeans, land use now mainly consists of forests, woodlands, and urban/suburban development, with only some minor areas of pasture and cropland.



**Figure 3.** North American Terrestrial Ecoregions covering Connecticut at Level III (left) and Level IV (right). The location of the Bafflin Sanctuary Complex is indicated by the red dot. The sanctuary is located in the Northeastern Coastal Zone Ecoregion (EPA Level III; Ecoregion 59), subdivision Southern New England Coastal Plains and Hills (EPA Level IV; Ecoregion 59c).  
*Source:* U. S. Environmental Protection Agency (<http://www.epa.gov/wed/pages/ecoregions.htm>).

## 2.2 Bafflin Physical Characteristics

### 2.2.1 Geology

The bedrock of the Pomfret area is typical of the Eastern Connecticut Uplands. The rock is believed to be lower to possibly middle Paleozoic sedimentary, volcanic, and intrusive igneous rock that were regionally metamorphosed and subsequently deformed cataclastically. The sanctuary is located in the upper plate of the Lake Char Fault. The bedrock of the Quinebaug Formation is a heterogeneous mixture of metavolcanic rocks including the Hebron Formation, a thinly layered, fine-grained calcic schist, and the Scotland Schist, a polytict schist (USDA-NRCS, 2008).

### 2.2.2 Surficial Geology

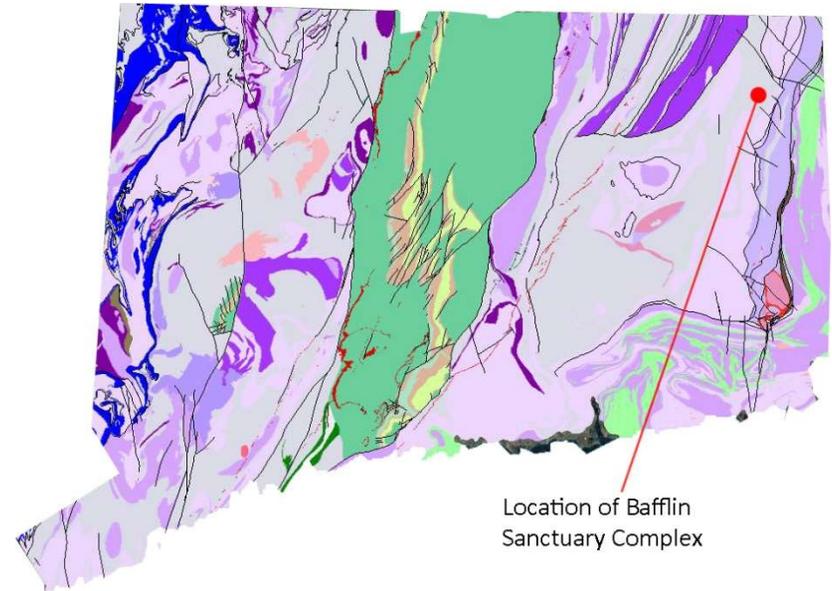
The surficial geology of the Bafflin Complex is characterized as glacial till with bedrock outcrops. Lowlands associated with streambeds and floodplains, specifically in the southern portion of the Complex through which Mashamoquet Brook, Day Brook, and Wappoquia Brook flow (as well as the Quinebaug River along the eastern border of the Complex), are characterized as stratified drift sand and gravel deposited by glacial waters as well as alluvial deposits from modern streams (Randall & Pessl, 1968).

### 2.2.3 Topography and Soils

The topography of the Complex is rolling to level with gradients generally less than 15 percent. Elevations range from 279 ft. at Mashamoquet Brook and the Quinebaug River to 476 on Pomfret Hill. According to the Soil Conservation Service Mapping for Windham County (USDA Soil Conservation Service 1981), there are 22 different soil types found on the sanctuary. A map displaying the location of these soil types and their descriptions can be found in Appendix 1.

### 2.2.4 Climate

Locally recorded climate data for Pomfret via The Weather Channel climatological database indicates that the annual mean temperature for the area surrounding the Bafflin Sanctuary Complex is 48.1 °F (8.9 °C) with an average of 27.3 °F (-2.6 °C) in winter and 68.7 °F (20.4 °C) in summer. On average, the warmest month is July and the coolest month is January, with the highest average precipitation occurring in the month of November. The all-time record high was 100 °F in 1982 while the all-time record low was -23 °F in 1984. The average last frost in the area generally occurs during the second week of May, and the first frost starts around the first week of October. This results in a frost-free season of around 140 days. The seasonal snowfall averages 49.5 inches, and the mean annual precipitation for Pomfret is approximately 51.2 inches.



**Figure 4.** Geological map of Connecticut indicating orientation and location of geological formations. The Bafflin Sanctuary Complex is situated on the Quinebaug Formation, indicated in light gray on the map. Source: USDA-NRCS (2008)



## 2.3 Habitats and Biotic Communities

The variety of habitat types found in the Bafflin Sanctuary Complex each has its habitat-specific flora. In addition, long-time agricultural practices in the area have purposely or inadvertently led to the introduction of a many different cultivars and non-native plants. The resulting mix of plant species found in the sanctuary is rich and diverse and primarily consists of highly adaptable species.

No formal vegetation survey has been carried out, but an opportunistic assessment of the preserve's floral diversity forms a basis for future plant surveys. An overview of the species recorded from the Bafflin Sanctuary Complex is included as Appendix 2. To date, no state-listed plant species are known to occur on the sanctuary.

### 2.3.1 Forest

Forest lands that occur within the IBA are comprised of mainly oak/pine forest. There are white pine and hemlock groves present as well. In some areas, white ash, shagbark hickory, tulip and black birch trees dominate. Subcanopy, shrub, and herb layers vary, but in many areas a moderately well- to well-developed heath layer is present dominated by lowbush blueberry.

The red maple – white ash / spicebush / skunk cabbage association is the dominant forest cover of lower toposequence palustrine forested wetlands (See Section 2.3.5).

Other canopy or subcanopy associates in the areas include tulip tree, black cherry, and black birch in the uplands and witch hazel, pin oak, and American elm in wetland areas.

### 2.3.2 Shrubland

Shrubland areas occur along the perimeter of the IBA either as a continuous ecotone between the grassland and adjacent woodland or as discrete pockets. Shrubland composition changes with location around the IBA as a function of soil drainage, slope, aspect, soil texture and other factors, but all are important cover habitat for a variety of bird species. Well-developed stands of both native and non-native shrubs provide cover and foraging habitat for both resident and migrant flycatchers, warblers, sparrows, and finches. Species noted along these margins included Rose-breasted Grosbeak, Song Sparrow, Eastern Towhee, Common Yellowthroat, Gray Catbird, and Indigo Bunting.

### 2.3.3 Grassland / Field Areas

The grassland areas are dominated by cool-season forage hay and clover. Dominant species are orchard grass, timothy, and red clover. Reed canary-grass, bentgrass, Kentucky bluegrass, and fescue are also commonly encountered. Common forb associates within the gramminoid-dominated community include cow vetch, bedstraw, birdsfoot trefoil, tall goldenrod, grass-leaved goldenrod and daisy fleabane. Other forbs noted include giant burdock, common milkweed, common plantain, English plantain, wild chamomile, heal-all, and chickweed.

The grassland areas provide nesting habitat, foraging habitat, or both for various species including Northern Harrier, American Kestrel, Killdeer, Mourning Doves, American Crow, American Robin, Eastern Kingbird, Eastern Bluebird, Sedge Wren, Common Grackle, Redwing Blackbird, Eastern Meadowlark, Bobolink, sparrows (e.g., Chipping Sparrow, Savannah Sparrow, etc.) during nesting, migration, or winter seasons or a combination thereof. Some of this habitat in the IBA is subject to periodic haying which actually helps to maintain the grassland units as grasslands, but may have long-term impact to grassland nesting birds in some applications. The grassland portions of Management Units H1-H4 (see Figure 7) are used as forage hay. Haying is typically conducted after July 15<sup>th</sup> in order to avoid impact to grassland nesting birds. The value of the grassland as nesting habitat can be enhanced through the adjustment of mowing schedules and implementation of conservation mowing techniques (Refer to Section 8.0).

### 2.3.4 Cropland

The IBA has a section that is planted with corn. The corn is planted, grown, and harvested as a food source (silage) for dairy cows off site. The areas planted in corn historically were corn and are too small of an area to attract nesting grassland birds if converted. A 30 plus acre section of cropland is going to be converted to grasslands in the fall of 2019. We waited to do this until the farmer who had always used this area went out of business recently. Some units are planted in alfalfa and most units are rotated between these two important agricultural crops.

### 2.3.5 Wetlands

Large inland wetland systems occur within the IBA Complex. Using the Cowardin (et al. 1987) system, the majority of these wetlands are classified as either Palustrine Scrub/Shrub (PSS) or Palustrine Forested (PFO) broad-leaved deciduous seasonally saturated wetlands. The largest PSS wetland systems occur along the Day Brook and Wappoquia Brook drainages. Most of the PFO wetlands occur as isolated depressions within a larger forested block. The PSS systems are composed of one or more of the following wetland shrubs: winterberry, sweet pepperbush, silky dogwood, alder, highbush blueberry, and northern arrowwood. Most PFOs consist of the red maple – white ash / spicebush / skunk cabbage association. This association typically occurs in saturated situations on slightly sloping hillsides, along small drainages, or in landform concavities that receive overland flooding likely in addition to groundwater discharge. These swamps are moderately acidic. Soils are shallow to moderately deep mucks over mineral soils. Red Maple dominates the canopy but green ash or white ash may also occur in the canopy. The shrub layer is fairly open to quite dense, depending on the amount of canopy closure. In addition to Spicebush, other shrub species commonly include northern arrowwood, sweet pepperbush, silky dogwood, highbush blueberry, or winterberry. Poison ivy is a common liana. The herbaceous layer is variable in cover as well. In addition to skunk cabbage, cinnamon fern is often quite common in much of this habitat type as may be sensitive fern, royal fern, marsh fern, and New York fern with scattered other herbaceous species mixed in. Microtopography is generally apparent, resulting from blown-downs of shallow rooted Red Maples. Tree seedlings and Sphagnum mosses are common on hummocks but do not in general form extensive carpets. Invasive shrubs and herbs, including Japanese Barberry, Multiflora Rose, and Morrow's honeysuckle are often problematic species in these systems. Limited areas of Palustrine Emergent wetlands occur on site as well, typically as inclusions within large PSS or PFO systems. These emergent wetlands are typically vegetated with common cattail or stands of common reed. The distribution of wetlands across the IBA and vicinity is depicted in Figure 5.



Figure 5. NWI Wetlands and their distribution across the site and surrounding area

## 2.4 Avian Species Information

### 2.4.1 Avian Community Overview

To date, 212 species of birds have been identified in the Bafflin Sanctuary Complex, including 31 state-listed species (Blue-winged Teal, Pied-billed Grebe, American Bittern, Great Egret, Snowy Egret, Little Blue Heron, Glossy Ibis, Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Broad-winged Hawk, American Kestrel, Peregrine Falcon, Common Gallinule, Barn Owl, Long-eared Owl, Short-eared Owl, Northern Saw-whet Owl, Common Nighthawk, Red-headed Woodpecker, Alder Flycatcher, Horned Lark, Purple Martin, Brown Thrasher, Golden-winged Warbler, Northern Parula, Vesper Sparrow, Savannah Sparrow, Bobolink, and Eastern Meadowlark, Sedge Wren) and one recently de-listed species (Common Raven). More than half of the sanctuary's birds (110 species) are included in Connecticut's Comprehensive Wildlife Conservation Strategy (CWCS) as species of Greatest Conservation Need. In addition, 11 species of CAS's Conservation Priority Top 20 have been found in the sanctuary: American Black Duck, American Woodcock, Blue-winged Warbler, Bobolink, Brown Thrasher, Cerulean Warbler, Common Nighthawk, Eastern Meadowlark, Golden-winged Warbler, Prairie Warbler, and Wood Thrush.

Breeding bird surveys have been carried out opportunistically during the past. In 2018 for updating to the Breeding Bird Atlas evidence of breeding activity was recorded at three levels (Possible, Probable & Confirmed) using the criteria and codes indicated in the sidebar on this page. During this survey, 55 bird species could be confirmed as breeding in the sanctuary, 21 additional species classified as probable breeders and another 23 species possibly breed in the sanctuary. For a complete overview of the birds documented in the Bafflin Sanctuary Complex and their conservation and breeding status, see Appendix 4.

In general, the avian fauna represented in the Bafflin Sanctuary represents a suite of species characteristically found in grassland and early successional habitat, with woodland and wetland units further enhancing the primary two Connecticut conservation-priority habitat types. The sanctuary's early successional habitat management areas include species that rely on a mosaic of different-aged forest stands, young forest or open scrub habitat. Examples of such species, commonly found in the Bafflin Sanctuary, include American Woodcock, Blue-winged Warbler, Chestnut-sided Warbler, Prairie Warbler, and Eastern Towhee. All of these species are considered species of Greatest Conservation Need in Connecticut (CWCS, 2006), and most would not occur in the sanctuary if managed early successional habitat areas did not exist there.

Several bird species found in the Bafflin Sanctuary have a restricted breeding range in Connecticut and are generally only found nesting in particular sections of the state. Those species include White-eyed Vireo, Black-billed Cuckoo, and Yellow-billed Cuckoo. The presence of these avian species breeding in the sanctuary attests to the functionality of the mature woodland areas in the sanctuary and their interaction with managed wetlands and scrublands.

The variety of wetland habitats and associated wetland vegetation in the Bafflin Sanctuary Complex provide additional habitat for a number of bird species with specific resource requirements. Dead trees and snags in the beaver marshes and bogs provide breeding habitat for Great Blue Herons as well as for cavity-breeding waterfowl, such as Wood Duck. The widespread and relatively undisturbed nature of the sanctuary's wetlands and the expanding stands of Cattails provide potentially suitable breeding habitat for additional species such as rails and state-listed species that include Pied-billed Grebe, and American Bittern. This habitat also provides a stopover or wintering site for numerous waterfowl species, in particular American Black Duck and Hooded Merganser.

## 2.4.2 Seasonal Changes to the Avian Community

The composition of the bird community changes with the seasons at the preserve. January is typically among the coldest months of the year in Connecticut. By late winter species richness is lowest. Roving flocks of mixed species land birds begin to appear in the region and may be found on site. These flocks sometimes include “winter finches” such as Pine Siskins, Evening Grosbeaks, and Common Redpolls, which might be sighted along the forested edge of the IBA or as flyovers. Only hardy land birds such as Horned Lark, Tree Sparrows, or Snow Buntings may be found within the open grassy wind swept fields during winter.

During the month of March, winter grades to spring. The first migrant land birds return to the site to feed on the soil invertebrates beginning to stir in the ground. Examples include the American Woodcock and Killdeer. Tree Swallows and Eastern Phoebes begin to arrive soon after and appear at the site by late March, as their insect prey begins to emerge. Eastern Meadowlarks may return to the area as early as late March and into early April.

Spring migration is ramping up by April marked by an almost daily increase in species richness and abundance. Numbers of migrant sparrows swell, increasing the chances for sightings of uncommon visitors such as White-crowned, Fox, and Vesper Sparrow. Savannah Sparrows begin to return to the region as well and may begin to establish territories within the IBA. By late in the month, large numbers of Yellow-rumped and Palm Warblers and the first representatives of later migrants such as Black-and-white Warblers, and Blue-gray Gnatcatcher utilize the adjacent forested habitats or forest-field ecotone as a rest stop on their northbound migration. By late April, Bobolinks begin to return to Connecticut and are typically back within the IBA by May. Late April is also the best time to encounter migrating Rusty Blackbirds and calling Virginia Rails.

In May, spring migration is at its peak as warblers, vireos, and other neotropical migrants pass through the preserve and surrounding lands. The preserve offers suitable migratory stopover habitat for a multitude of more northerly bound migrants. These migrants may spend time at the IBA and adjacent areas of the preserve actively feeding and at times may be quite visible while preoccupied with feeding, thus attracting a multitude of birders.

By mid-June, the waves of migrants begin to ebb. However, late migrants such as Blackpoll and Mourning Warblers, and some flycatchers are still moving northward and may still be encountered in the forested areas adjacent to the IBA. Within the shrubby margins surrounding the IBA, local nesters such as American Robin, Gray Catbird, and Northern Cardinal are feeding their first broods at this time. The time periods when CT-ESA Listed grassland birds are known to breed are presented in Table 2-1.

In July, young of the year’s grassland bird population are starting to fledge. By mid to late July many are fledged. At this time, one can see juvenile Bobolinks assembling into roving flocks with adults within the IBA.

By August, mixed species flocks can be encountered throughout the sanctuary. Large flocks of Bobolinks (over 200 birds) are found in the large grasslands that haven’t been cut. In early September, when increasing numbers of songbirds, shorebirds, and raptors move south with the onset of autumn. August is a good time to see Common Nighthawks at the site as they pass high over the grasslands foraging for insect prey in late afternoon and into dusk.

As September progresses, increasing numbers of songbirds and raptors follow each cold front. October is a transitional month with late autumn migrants still moving through the area while early winter residents such as Tree Sparrows, White-throated Sparrows, and some winter finches begin to appear. By late October many of the neotropical migrants have passed through Connecticut. Large numbers of Kinglets, Yellow-rumped Warblers, and various sparrow species are commonly found now.

**Table 2-1. Time period when CT DEP Listed grassland birds are known to breed.**

Common Name/ Scientific Name	CT Status <sup>1</sup>	Nesting / egg Dates <sup>2</sup>
Upland Sandpiper <i>Bartramia longicauda</i>	E	April 23- June 15
Peregrine Falcon <i>Falco peregrinus</i>	E	March 26 to May 31
American Kestrel <i>Falco sparverius</i>	SC	April 27 to May 26
Eastern Meadowlark <i>Sturnella magna</i>	SC	April 21 to June 28
Grasshopper Sparrow <i>Ammodramus savannarum</i>	E	May 30 – Aug 6
Savannah Sparrow <i>Passerculus sandwichensis</i>	SC	May 21- June 29
Bobolink <i>Dolichonyx oryzivorus</i>	SC	May 18 – June 20
Vesper Sparrow <i>Pooecetes gramineus</i>	E	April 15 – Aug 11
Sedge Wren <i>Cistothorus platensis</i>	E	June 15 – Aug 20 (Based on 2018)

<sup>1</sup> CTDEP, 2004

<sup>2</sup> DeGraaf and Yamaski, 2001

### Breeding Bird Survey Activity Criteria & Codes

#### Possible breeding

- X Species observed in possible nesting habitat, but no other indication of breeding noted.  
Singing male(s) present (or breeding calls heard) in breeding season

#### Probable Breeding

- S singing male(s) present (or breeding calls heard) on more than one date at least a week apart in the same place
- P Pair observed in suitable habitat in breeding season
- T Bird, or pair, apparently holding territory
- C Courtship display, copulation, agitated behavior or anxiety calls from adults observed, suggesting nearby presence of nest or young.
- N Visiting probable nest site
- B Nest building or excavation of nest cavity

#### Confirmed Breeding

- DD Distraction display or injury-feigning behavior observed
- UN Used nest found
- FE Female with egg in oviduct caught in mist net
- FL Recently fledged young present
- ON Adult(s) entering or leaving nest in circumstances indicating occupied nest
- FS Adult carrying fecal sac
- FY Adult(s) with food for young
- NE Identifiable nest and eggs, adult sitting on nest, identifiable egg shells found below nest, identifiable dead nestling found
- NY Nest with young

*Adapted from: McGowan & Corwin (2008)*

By November, many of the winter residents have arrived at the preserve, while the last of the late migrants head toward their wintering grounds. In November you often get a preview of what sort of winter this will be for birds. Large numbers of finches sometimes invade our area during the winter. Some winters are notable for the irruption of winter finches (grosbeaks, crossbills, siskins, etc.).

December is Christmas Bird Count (CBC) month. The CBC was started in 1900 as an alternative to traditional Christmas bird hunts. Thousands of people across North America brave the December winds to count birds and with hopes of finding a rarity. The site is included in the Storrs area CBC.

### *2.4.3 Endangered, Threatened, and Special Concern Species*

The 31 state-listed bird species that have been observed in the Bafflin Sanctuary Complex represent a combination of passage migrants, breeding birds, and wintering individuals. They include 14 endangered species, 7 threatened species, and 10 special concern species. Most significant are the annual nesting species that include American Kestrel (Special Concern), Purple Martin (Special Concern), Brown Thrasher (Special Concern), Savannah Sparrow (Special Concern), Bobolink (Special Concern), Sedge Wren (Endangered), Short-eared Owls (wintering Threatened), and Eastern Meadowlark (Threatened). These numbers can vary from several pairs of American Kestrels to dozens of Bobolink to a couple of Eastern Meadowlark. Active management practices make this breeding possible, from the erection and maintenance of nesting boxes for Kestrels to the mowing regime applied to the fields inhabited or utilized by these species.

An additional suite of potential nesting species based on the existing habitat includes but is not limited to Blue-winged Teal (Threatened), Pied-billed Grebe (Endangered), American Bittern (Endangered), Sharp-shinned Hawk (Endangered), Broad-winged Hawk (Special Concern), Barn Owl (Endangered), and Alder Flycatcher (Special Concern). At the very least these birds can and have been found in migration. Sharp-shinned Hawk (Endangered) and Broad-winged Hawk (Special Concern) migrate through Connecticut by the thousands and tens of thousands, respectively, but nests of these woodland raptors are notoriously difficult to locate and these species could easily be overlooked as breeders. They were detected in the 2018 Breed Bird Survey, but not confirmed. . The Broad-winged Hawk is in particular a secretive woodland raptor, and its recent listing in the CT-ESA is an indication of low breeding numbers that are seemingly decreasing.

Bald Eagle (Threatened), Peregrine Falcon (Threatened), and Northern Harrier (Endangered) are all species recorded as passage migrants, and a limited number winter in nearby areas or on the sanctuary. It is certainly not out of the question that Northern Harrier could breed on the property. Great Egret (Threatened), Snowy Egret (Threatened), Little Blue Heron (Special Concern), and Glossy Ibis (Special Concern) utilize the Bafflin Sanctuary Complex's freshwater ponds and wetlands as stopover feeding sites. Long-eared Owl (Endangered), Short-eared Owl (Threatened), Northern Saw-whet Owl (Special Concern), and Horned Lark (Endangered) can be found in winter in the Bafflin Sanctuary Complex, some seeking temporary residency and others passing through. During heavier irruption years dozens or hundreds of Northern Saw-whet Owls likely utilize the sanctuary in migration. Other migrant species include Common Gallinule (Endangered), Common Nighthawk (Endangered), Northern Parula (Special Concern), and Vesper Sparrow (Endangered). Red-headed Woodpecker (Endangered) and Golden-winged Warbler (Endangered) would find some suitable breeding habitat, but the former is only very rarely seen in Connecticut in the present day and the latter is confined to a very small area in the northwest corner of the state. Both Lawrence's and Brewster's Warbler have been banded during the breeding season.

## 2.4.4 Additional Species of Conservation Concern

110 of CWCS Greatest Conservation Need (GCN) species have been recorded in the Bafflin Sanctuary Complex, of which 47 are considered 'Very Important' with another 11 considered 'Most Important'. These include the state-listed (CT-ESA) species already mentioned, as well as several others that appear to have healthy populations in the sanctuary. The most noteworthy of those include Hooded Merganser, Green Heron, American Woodcock, Yellow-billed Cuckoo, Black-billed Cuckoo, Chimney Swift, Least Flycatcher, Great Crested Flycatcher, Wood Thrush, Chestnut-sided Warbler, Prairie Warbler, Black-and-White Warbler, Canada Warbler, Eastern Towhee, Field Sparrow, Rose-breasted Grosbeak, and Indigo Bunting. This assemblage of species is indicative of the existence of a functional mosaic of extensive mature woodland interspersed with early successional habitat and young forest, since it includes forest interior species as well as scrubland species. Maintaining robust populations of these GCN species is a priority when designing a habitat management strategy for the future. In addition, the following 'Very Important' GCN species occur in the sanctuary in small numbers and all are considered of conservation priority: American Black Duck, Sora, Blue-headed Vireo, Marsh Wren, Golden-crowned Kinglet, Hermit Thrush, Black-throated Blue Warbler, and Worm-eating Warbler. Stabilizing and, where possible, increasing the population size of each is an additional goal for future management of the Bafflin Sanctuary Complex.

The current assemblage of habitat types in the Bafflin Sanctuary provides suitable resources and habitat to sustain populations of several bird species that are declining statewide. These include early successional and grassland habitat species which require large blocks of regularly managed and properly maintained young habitat, forest interior birds that generally suffer from edge-effect, invasive species, nest parasitism and habitat fragmentation, and wetland species that are affected by loss and degradation of their habitat. Future management practices in the Bafflin Sanctuary will attempt to balance the need for sufficient high-quality habitat of these various types to support local bird populations, while continued monitoring of resource use by certain key indicator species will provide information on habitat use that can help us to fine-tune management practices.

## 2.5 Non-avian Species Information

### 2.5.1 Invertebrates

An ongoing survey of the area's Lepidoptera (butterflies and moths) by CAS board member and local resident Ben Williams has resulted in an extensive species list for the sanctuary complex. To date, 32 different butterfly species and 149 moth species have been identified on site. Two state-listed butterfly species: Eyed Brown (*Lethe eurydice*) and Harris' Checkerspot (*Melitaea harrisii*), both species of Special Concern, have been documented in the Bafflin Sanctuary. A complete list of all species recorded is included as Appendix 3.

No specific inventory of other invertebrate groups has been undertaken and only opportunistic observations are available at this moment. A preliminary survey of the preserve's Odonata (damselflies and dragonflies) was initiated in 2011 since the

### Bird Species Banded at Bafflin Sanctuary Complex MAPS Station (2001-2018)

American Crow (AMCR)  
American Goldfinch (AMGO)  
American Redstart (AMRE)  
American Robin (AMRO)  
American Woodcock (AMWO)  
Black & White Warbler (BAWW)  
Black-billed Cuckoo (BBCU)  
Blue-gray Gnatcatcher (BGGN)  
Black-capped Chickadee (BCCH)  
Blue Jay (BLJA)  
Blue-winged Warbler (BWWA)  
Brown Thrasher (BRTH)  
Carolina Wren (CARW)  
Cedar Waxwing (CEDW)  
Common Yellowthroat (COYE)  
Chestnut-sided Warbler (CSWA)  
Downy Woodpecker (DOWO)  
Eastern Bluebird (EABL)  
Eastern Phoebe (EAPH)  
Eastern Towhee (EATO)  
Eastern Wood Pewee (EAWP)  
Field Sparrow (FISP)  
Gray Catbird (GRCA)  
Hairy Woodpecker (HAWO)  
House Wren (HOWR)  
Indigo Bunting (INBU)  
Lawrence's Warbler (LAWA)  
Louisiana Waterthrush (LOWA)  
Mourning Dove (MODO)  
Northern Cardinal (NOCA)  
Northern Waterthrush (NOWA)  
Ovenbird (OVEN)  
Pine Warbler (PIWA)  
Pileated Woodpecker (PIWO)  
Prairie Warbler (PRAW)  
Rose-breasted Grosbeak (RBGR)  
Red-bellied Woodpecker (RBWO)  
Red-eyed Vireo (REVI)  
Ruby-throated Hummingbird (RTHU)  
Scarlet Tanager (SCTA)  
Song Sparrow (SOSP)  
Tufted Titmouse (TUTI)  
Veery (VEER)  
White-breasted Nuthatch (WBNU)  
White-eyed Vireo (WEVI)  
Worm-eating Warbler (WEWA)  
Wood Thrush (WOTH)  
Yellow-shafted Flicker (YSFL)  
Yellow-throated Vireo (YTVI)  
Yellow Warbler (YEWA)

area's wetlands and streams appear to support a diverse odonate fauna. These surveys will continue to further assess the species diversity of this group in the Bafflin Sanctuary and the potential presence of habitat specialists and/or state-listed species.

Several species of damselfly and dragonfly have narrow biological requirements and are sensitive to habitat alteration. As a result, the state's Endangered and Threatened Species Act includes several odonates. These animals can serve as useful indicators of habitat quality and functionality. Continued monitoring of the preserve's odonate fauna to include species flying at different times during the season and targeting specialty habitats will undoubtedly add a number of species to the current list.

**Table 2-2. Damselflies and Dragonflies of the Bafflin Sanctuary Complex**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Family</i>	<i>CT-ESA status</i>	<i>CWCS status</i>
<b>Damselflies (suborder Zygoptera)</b>				
Ebony Jewelwing	<i>Calopteryx maculata</i>	Calopterygidae	-	-
Aurora Damsel	<i>Chromagrion conditum</i>	Coenagrionidae	-	-
Eastern Forktail	<i>Ischnura verticalis</i>	Coenagrionidae	-	-
Fragile Forktail	<i>Ischnura posita</i>	Coenagrionidae	-	-
Marsh Bluet	<i>Enallagma ebrium</i>	Coenagrionidae	-	-
Powdered Dancer	<i>Argia moesta</i>	Coenagrionidae	-	-
Slender Spreadwing	<i>Lestes rectangularis</i>	Lestidae	-	-
<b>Dragonflies (suborder Anisoptera)</b>				
Spatterdock Darner	<i>Rhionaeschna mutata</i>	Aeshnidae	-	-
Common Green Darner	<i>Anax junius</i>	Aeshnidae	-	-
Common Baskettail	<i>Epithea cynosura</i>	Corduliidae	-	-
Spangled Skimmer	<i>Libellula cyanea</i>	Libellulidae	-	-
Slaty Skimmer	<i>Libellula incesta</i>	Libellulidae	-	-
Twelve-spotted Skimmer	<i>Libellula pulchella</i>	Libellulidae	-	-
Blue Dasher	<i>Pachydiplax longipennis</i>	Libellulidae	-	-
Common Pondhawk	<i>Erythemis simplicollis</i>	Libellulidae	-	-
Eastern Amberwing	<i>Perithemis tenera</i>	Libellulidae	-	-
Banded Pennant	<i>Celithemis fasciata</i>	Libellulidae	-	-
Common Whitetail	<i>Plathemis lydia</i>	Libellulidae	-	-
Autumn Meadowhawk	<i>Sympetrum vicinum</i>	Libellulidae	-	-
Dot-tailed Whiteface	<i>Leucorrhina intacta</i>	Libellulidae	-	-
Black Saddlebags	<i>Tamea lacerata</i>	Libellulidae	-	-

Additional inventories of the preserve's invertebrate fauna would be desirable. Two groups that would warrant closer attention due to the potential for rare or sensitive species are freshwater mussels (Gastropoda) and the Dragonflies and Damselflies (Odonata). Both groups are generally represented throughout the broader Connecticut environment but several stenotypic taxa exist within these groups that thrive only under very narrow habitat conditions. Such sensitive species can be good indicators of habitat quality and can be used to guide and gauge habitat management practices. A preliminary list of Odonata from the IBA is provided in Table 2-2.

## 2.5.2 Fish

No formal fish survey has been carried out at the Bafflin Sanctuary Complex. However, the following fish species have been reported to occur in a variety of wetland types in the area: Largemouth Bass, Rainbow Trout, Brook Trout (both stocked and native forms), Brown Trout, Tiger Trout, Brown Bullhead, Yellow Bullhead, Pumpkinseed, Sunfish, Chain Pickerel, American Eel, Sucker spp., Dace spp., Shiner spp. (Andy Rzeznikiewicz, pers. comm.).

CTDEEP Fisheries Division data was available for Wappoquia Brook (Site No. 6039). This location is described as “upstream of viaduct at state trail on old railroad bed”. That location lies on or adjacent to the eastern limits of the IBA. The data from this location is presented in Table 2-3.

**Table 2-3. Fish Species Collected from Site No. 6039: Wappoquia Brook, Pomfret, CT**

Scientific Name	Common Name	Number (SE)	Feeding Guild	Preferred Habitat Attributes
<i>Anguilla rostrata</i>	American Eel	95.0 (0.0)	Invertivore, Piscivore	rivers, streams, ponds, and the shallow, more productive areas of lakes; spawns in Sargasso Sea
<i>Salvelinus fontinalis</i> WILD	Brook Trout	71.3 (0.0)	Insectivore	Yearly dissolved oxygen concentrations that do not drop below 5 mg/l
<i>Salvelinus fontinalis</i> STOCKED	Brook Trout	403.8 (0.0)	Insectivore	Yearly dissolved oxygen concentrations that do not drop below 5 mg/l
<i>Rhinichthys atratulus</i>	Black-nosed Dace	9,477 (76.9)	Insectivore	Pools and slower runs of cool, gravelly or rocky headwaters, creeks, small rivers with high – mod. gradient
<i>Esox niger</i>	Chain Pickerel	23.8 (0.0)	Omnivore	
<i>Luxilus cornutus</i>	Common Shiner	1876 (116.4)	Herbivore, Invertivore	Clear, cool weedless water in creeks and small - medium rivers with moderate - swift current, and gravel to rubble bottom.
<i>Semotilus corporalis</i>	Fallfish	427.6 (0.0)	Invertivore; Piscivore	Clear, flowing, gravel- to rubble-bottomed small to medium rivers
<i>Notemigonus crysoleucas</i>	Golden Shiner	47.5 (0.0)	Herbivore, Invertivore	clean, quiet, vegetated water within and adjacent to extensive shallows of ponds, lakes, and slow moving sections of small to large streams
<i>Rhinichthys cataractae</i>	Long-nose Dace	1544 (474.3)	Insectivore	Clear, swift-moving water over gravel or boulders
<i>Lepomis gibbosus</i>	Pumpkinseed	118.8 (0.0)	Invertebrates and fishes	clear water of ponds, lakes, sloughs, with aquatic vegetation and some organic debris
<i>Etheostoma olmstedi</i>	Tessellated Darter	95.0 (0.0)	Invertivore	Sand- and mud-bottomed pools, slow runs, and backwaters of headwater streams and small - large rivers
<i>Catostomus commersoni</i>	White Sucker	3966 (78.6)	Invertivore, Piscivore	Shallow riffles for spawning

The Wappoquia Brook sampling results show that all of the species collected are native Connecticut species. The sampling data show that this drainage supports both warm-water and cold-water fisheries. The primary important cold-water gamefish species sought by recreational anglers in the drainage is the Brook Trout. The drainage supports a native wild population that is augmented with hatchery raised stock fish. Indicators of biological integrity and ecosystem health include the presence of varying habitats along the drainage supporting a diversity of fish species, the presence of predatory fish (e.g., Chain Pickerel), an extant wild brook trout population (indicator of clear, cold, well-oxygenated water with stable dissolved oxygen levels), the absence of non-native introduced species, and the presence of the catadromous American Eel, which signifies a biological connection with Long Island Sound waters.

### 2.5.3 Amphibians

The Bafflin Sanctuary supports a diverse amphibian fauna and twelve species have been recorded to date. Several of these are included as species of Greatest Conservation Need in Connecticut's Comprehensive Wildlife Conservation Strategy (CWCS). Table 2-4 provides an overview of the amphibian species encountered in the IBA and their respective conservation status.

**Table 2-4. Amphibians of the Bafflin Sanctuary**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Family</i>	<i>CT-ESA status</i>	<i>CWCS status</i>
<b>Salamanders (order Caudata)</b>				
Spotted Salamander	<i>Ambystoma maculatum</i>	Ambystomatidae	-	Important
Redback Salamander	<i>Plethodon cinereus</i>	Plethodontidae	-	-
Northern Two-lined Salamander	<i>Eurycea bislineata</i>	Plethodontidae	-	-
Northern Dusky Salamander	<i>Desmognathus fuscus</i>	Plethodontidae	-	Important
Red-spotted Newt	<i>Notophthalmus viridescens</i>	Salamandridae	-	Important
<b>Frogs and Toads (order Anura)</b>				
American Toad	<i>Bufo americanus</i>	Bufoidea	-	-
Spring Peeper	<i>Pseudacris crucifer</i>	Hylidae	-	-
Gray Tree Frog	<i>Hyla versicolor</i>	Hylidae	-	Important
Bullfrog	<i>Rana catesbeiana</i>	Ranidae	-	-
Green Frog	<i>Rana clamitans</i>	Ranidae	-	-
Pickerel Frog	<i>Rana palustris</i>	Ranidae	-	-
Wood Frog	<i>Rana sylvatica</i>	Ranidae	-	Important

Spotted Salamander (*Ambystoma maculatum*) and Wood Frog (*Rana sylvatica*) are considered obligate vernal pool breeding species and inhabit the woodland areas surrounding the sanctuary's known vernal wetlands. Northern Two-lined Salamanders (*Eurycea bislineata*) and Northern Dusky Salamanders (*Desmognathus fuscus*) inhabit streams and seeps, while Red-spotted Newts (*Notophthalmus viridescens*) are found in permanent ponds. The terrestrial phase of the Red-spotted Newt, commonly called 'Red Eft', can be seen in the understory of wooded habitats, where it inhabits the leaf litter layer and hides under logs and other cover objects.

Although the amphibian diversity in the Bafflin Sanctuary is significant, additional species can still be expected. Four-toed Salamanders (*Hemidactylium scutatum*) are small, secretive woodland salamanders that breed in swamps, bogs and vernal pools with a substantial *Sphagnum* ground cover. It is also possible that Marbled Salamanders (*Ambystoma opacum*) occur in the area. This is an obligate vernal pool breeding species that is generally found at relatively low elevation areas. Areas of potentially suitable habitat for both Four-toed Salamander and Marbled Salamander are limited within the sanctuary complex and if present, these species probably occur in low density. A species that likely occurs in the area, but one that easily escapes detection is Fowler's Toad (*Bufo fowleri*). This is a species generally associated with well-drained, sandy soils often in flood plains. It is widespread in Connecticut, but is generally found in relatively low density and is easily mistaken for the ubiquitous American Toad (*Bufo americanus*).

## 2.5.4 Reptiles

A relatively small number of reptile species has been documented at the Bafflin Sanctuary. The reptile fauna of the Bafflin Sanctuary currently comprises four species of turtles and three species of snakes; two of these species are considered of Greatest Conservation Need and are included in the state’s Endangered and Threatened Species Act (CT-ESA) (see Table 2-5). Wood Turtles (*Glyptemys insculpta*) are found infrequently in the floodplains of the Mashamoquet Brook. Wood Turtles require clean stream habitat with densely vegetated shores, steeply undercut banks for hibernation and sun-exposed sand bars or other sandy deposits to bury their eggs in. Seemingly good quality habitat for this species exists along several sections of the Mashamoquet Brook, as well as along other watercourses on the sanctuary (e.g. Day Brook and Wappoquia Brook). A single Eastern Box Turtle (*Terrapene carolina carolina*) was recorded from the intersection of Route 101 and Lake Road on the Killingly/Pomfret line by the Quinebaug River in July 2010 (Andy Rzeznikiewicz, pers. comm.). Good habitat for this secretive species exists in the area and this species is likely more common than currently understood.

**Table 2-5: Reptiles of the Bafflin Sanctuary Complex**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Family</i>	<i>CT-ESA status</i>	<i>CWCS status</i>
<b>Turtles (order Testudines)</b>				
Common Snapping Turtle	<i>Chelydra serpentina</i>	Chelydridae	-	-
Painted Turtle	<i>Chrysemys picta</i>	Emydidae	-	-
Eastern Box Turtle	<i>Terrapene carolina</i>	Emydidae	Special Concern	Very Important
Wood Turtle	<i>Glyptemys insculpta</i>	Emydidae	Special Concern	Very Important
Spotted Turtle				
<b>Lizards and snakes (order Squamata)</b>				
Brown Snake	<i>Storeria dekayi</i>	Colubridae	-	-
Northern Water Snake	<i>Nerodia sipedon</i>	Colubridae	-	-
Eastern Garter Snake	<i>Thamnophis sirtalis</i>	Colubridae	-	-
Black Rat Snake				
Ring-necked Snake	<i>Diadophis punctatus</i>			
Milk Snake	<i>Lampropeltis triangulum</i>			

## 2.5.5 Mammals

The large expanse of undeveloped and protected lands within the IBA support a diversity of mammal species, including notable predators. The presence of the predators within the IBA is an indicator of ecosystem integrity. No state Endangered, Threatened or Special Concern mammals have been observed in the Bafflin Sanctuary Complex, but some listed bat species (order Chiroptera) may likely occur. A list of mammalian species known to occur within the IBA is provided in Table 2-6. Mammal data from the Bafflin Sanctuary Complex is predominantly based on sight records, track surveys and limited camera trapping. The resulting mammal list is likely under-represents several groups. For example, no bat species have been positively identified in the sanctuary yet even though suitable habitat for several species exists, possibly including some state-listed species. Systematic surveys for small insectivores and rodents likely will reveal the presence of many additional species in the preserve. Species of interest that potentially occur there include: Northern Watershrew, Woodland Vole, Red-backed Vole and Meadow Jumping Mouse.

**Table 2-6. Mammals of the Bafflin Sanctuary Complex**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Family</i>	<i>CT-ESA status</i>	<i>CWCS status</i>
<b>Shrews and moles (order Soricomorpha)</b>				
Short-tailed Shrew	<i>Blarina brevicauda</i>	Soricidae	-	-
Eastern Mole	<i>Scalopus aquaticus</i>	Talpidae	-	-
<b>Rabbits (order Lagomorpha)</b>				
Eastern Cottontail	<i>Sylvilagus floridanus</i>	Leporidae	-	-
<b>Rodents (order Rodentia)</b>				
North American Beaver	<i>Castor canadensis</i>	Castoridae	-	-
White-footed Mouse	<i>Peromyscus leucopus</i>	Cricetidae	-	-
Meadow Vole	<i>Clethrionomys gapperi</i>	Muridae	-	-
Muskrat	<i>Ondatra zibethicus</i>	Muridae	-	-
Rat sp.	<i>Rattus sp.</i>	Muridae	-	-
Southern Flying Squirrel	<i>Glaucomys volans</i>	Sciuridae	-	-
Woodchuck	<i>Marmota monax</i>	Sciuridae	-	-
Gray Squirrel	<i>Sciurus carolinensis</i>	Sciuridae	-	-
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Sciuridae	-	-
Eastern Chipmunk	<i>Tamias striatus</i>	Sciuridae	-	-
<b>Bats (order Chiroptera)</b>				
Big Brown Bat	<i>Eptesicus fuscus</i>	Vespertilionidae	-	-
Small Brown Bat				
<b>Opposums (order Didelphimorphia)</b>				
Virginia Opossum	<i>Didelphis virginiana</i>	Didelphidae	-	-
<b>Carnivores (order Carnivora)</b>				
Coyote	<i>Canis latrans</i>	Canidae	-	-
Gray Fox	<i>Urocyon cinereoargenteus</i>	Canidae	-	-
Red Fox	<i>Vulpes</i>	Canidae	-	-
Bobcat	<i>Lynx rufus</i>	Felidae	-	Very Important
Striped Skunk	<i>Mephitis</i>	Mephitidae	-	-
Raccoon	<i>Procyon lotor</i>	Procyonidae	-	-
Fisher	<i>Martes pennanti</i>	Mustelidae	-	-
Short-tailed Weasel	<i>Mustela ermine</i>	Mustelidae	-	Important
Long-tailed Weasel	<i>Mustela frenata</i>	Mustelidae	-	Important
Mink	<i>Mustela vison</i>	Mustelidae	-	Important

River Otter	<i>Lontra canadensis</i>	Mustelidae	-	-
American Black Bear	<i>Ursus americanus</i>	Ursidae	-	Important
<b>Even-toed Ungulates (order Artiodactyla)</b>				
White-tailed Deer	<i>Odocoileus virginianus</i>	Cervidae	-	-

### 2.5.6 Other Organisms

The diversity observed in groups described previously is primarily driven by the availability of various high quality habitat types within the Bafflin Sanctuary Complex. Although other organisms present in the area have received little or no attention, likely additional rare and unusual species remain to be found. Surveys for species groups such as mushrooms can be rewarding since many species have been observed during site visits, but no organized inventory has been attempted. In short, the Bafflin Sanctuary Complex offers tremendous potential for future biological inventories.

Future sanctuary management will be guided by available data from some of the better-known groups, using species that are good indicators of specific key habitats to provide feedback on the functionality of these habitat types. Additional surveys and ongoing biological monitoring studies will gradually increase the overall knowledge of the preserve's biota and help in determining whether management and conservation strategies need adjusting.

# Chapter 3: Current Conservation Activities

## 3.1 Management Units

Approximately 32 distinct management units (MUs) spanning four major habitat types – early successional habitat including grasslands (G) and hayfields (H), agricultural (A) lands (e.g., row crops), woodlands or forestlands (W), and wetlands (WL) can be found within the IBA. With the help of the NRCS Wildlife Habitat Improvement Program (WHIP) grant monies since 1999, approximately 22 acres involving MUs A12-13, H3-4 and portions of G1 and G3 have been managed for early succession staged habitat. About half of this is mowed once a year avoiding shrubs and young trees, and a quarter is spot-mowed for invasive plant control. The remainder is left as is despite significant cover from the invasive multiflora rose. Multiflora rose has been retained for now as it supports nesting Yellow Warblers, Song Sparrows, Common Yellowthroats, Northern Cardinals, and Gray Catbirds. The rose will remain until funds can be committed to replace it with native plant analogs. Prairie Warblers, American Woodcock, Willow Flycatchers, Field Sparrows and Eastern Towhees nest in other thickets throughout the IBA. The remainder of the property is forestland some of which is well-drained upland and some of which is flooded lowlands. Scarlet Tanagers, Blue-gray Gnatcatchers, Ovenbirds, Red-eyed Vireos, Rose-breasted Grosbeaks, and Black-and-white Warblers are some of the nesting birds found in these forests and woodlands. A map displaying all management activities is shown below. Further details of habitat, current management, and the species benefitted are provided in the tables and sections of following sections.

### 3.1.1 Grassland and Hayfields

The early successional habitat areas within the Bafflin Sanctuary Complex are classified as ‘Grassland’ or ‘Hayfield’ depending on whether these areas qualify as conservation land or farmland, respectively. Both types of MU are managed to maintain their early successional habitat character through regular mowing. However, ‘hayfield’ MUs are more likely to consist entirely of herbaceous early successional habitat since the vegetation is regularly cut to feed livestock, whereas ‘grassland’ MUs may consist of a mixture of herbaceous (grasses and forbs) and woody (scrub) early successional vegetation. However, both types of MU are mowed only after the avian breeding season is completed (generally in late summer through early winter).

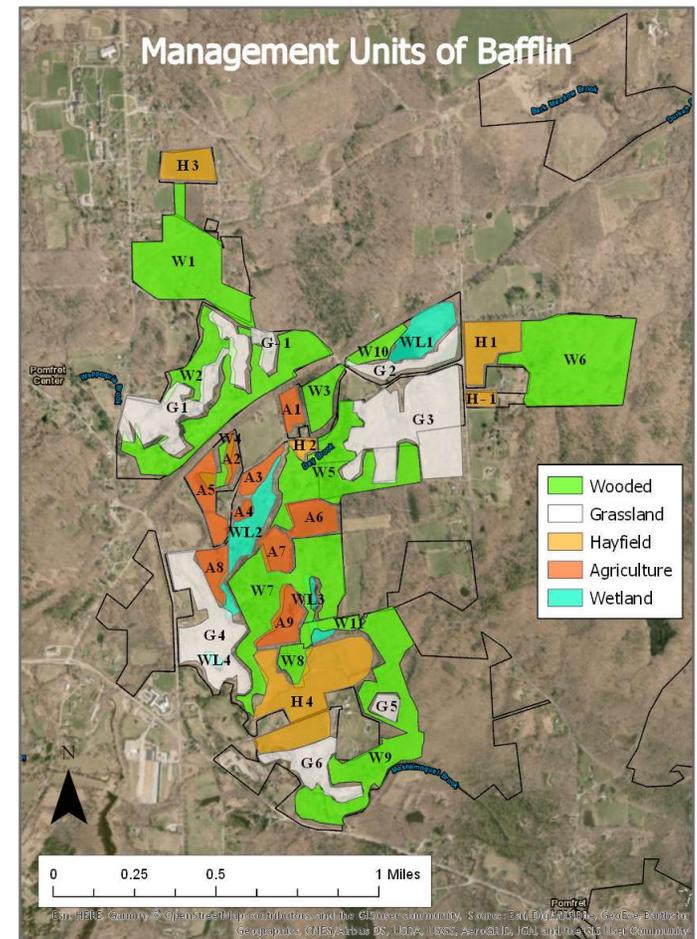


Figure 6. All Management Units of Bafflin Sanctuary

Six different ‘Grassland’ MUs and four ‘Hayfield’ MUs are currently recognized in the sanctuary. Note that the MUs H3 and H4 are in rotating grass/corn production and even though these areas currently qualify as ‘Hayfields’, depending on the crops grown there in future years they may need to be re-classified as ‘Agricultural’. Additional information on the grassland and hayfield management units is presented in Table 3-1.

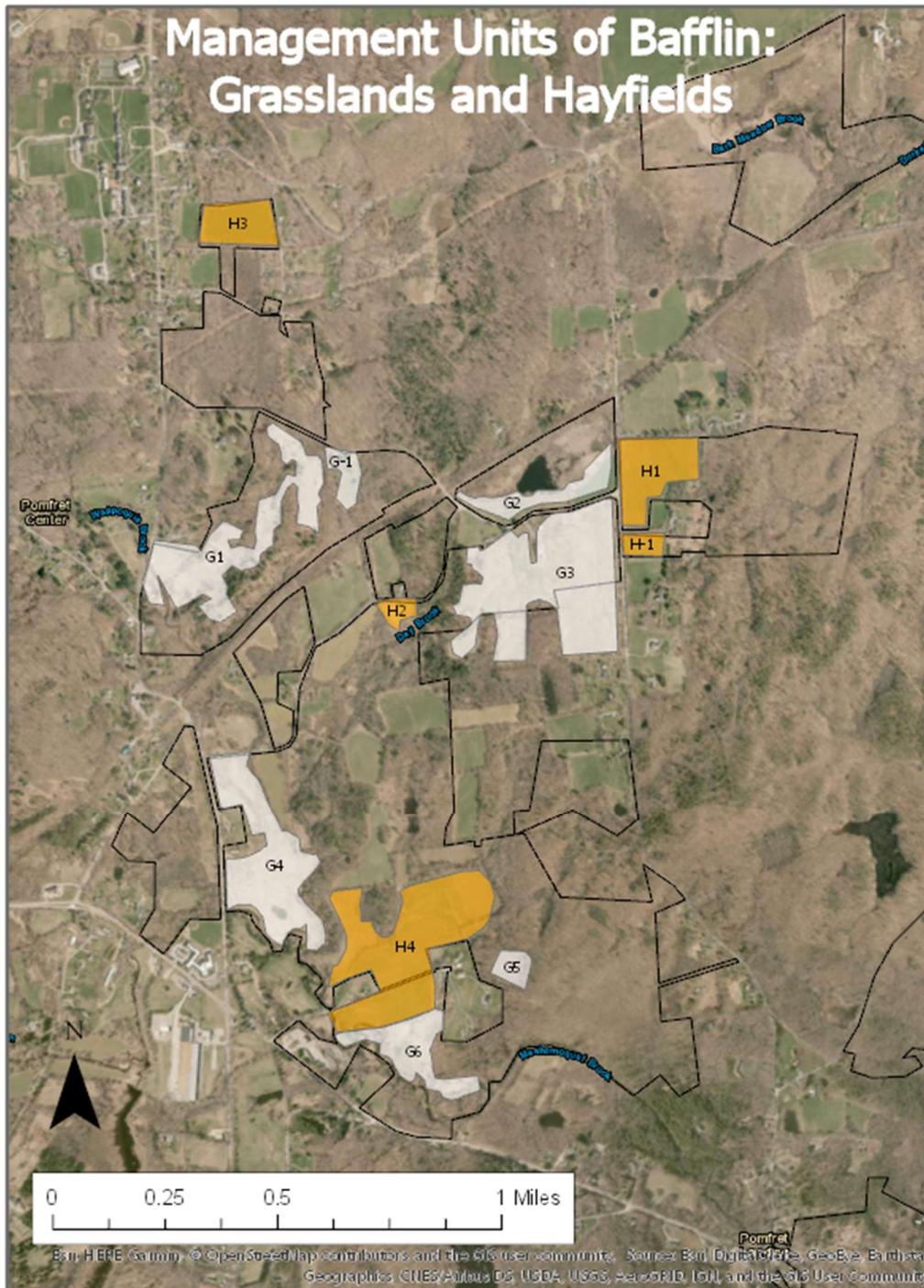
### 3.1.2 Agricultural land

Thirteen management units in the Bafflin Preserve are currently farmed to produce crops, primarily corn and alfalfa. Several of these MUs are in a corn/alfalfa rotation and support alfalfa for five years, followed by three years of corn. Although these plots are not specifically managed as wildlife habitat, the crops provide food and attract invertebrate prey for local wildlife. In addition, agreements have been reached with local farmers to leave residual rows of corn behind after the harvest to provide additional resources for local fauna. Details regarding these agricultural use parcels within the Bafflin Sanctuary are provided in Table 3-2.

<b>Management Unit and size</b>	<b>Description of Habitat and Current Management</b>	<b>Species Benefitted</b>
<b>G1: Old Pomfret Golf Course and Bafflin Homestead — about 55-60 acres</b>	This area is managed for early to mid-successional habitat. It was a golf course until 1974. It is a mosaic of grasslands, shrub-lands, young forest, conifer stands, and dry and wet areas that attract a large diversity of birds. The grasslands are mowed yearly in late September to October. Areas with the highest diversity of wildflowers are mowed the latest in the season. No trails transect this section of the sanctuary due to a deed restriction. This is beneficial to the various wildlife that isn’t disturbed by visitors. The main goal is to maintain the shrub-land structure and increase it over time. Yearly during the winter select trees are cut down and sections are set back to maintain this habitat. Invasive plants are selectively controlled through summer spraying and cutting in the winter and/or fall. Two American Kestrel nest boxes, a Wood duck box, and numerous bluebird nest boxes are in this section. A Screech Owl used one of the boxes in 2018. This is the location of the MAPS bird banding study since 2001.	Early successional and shrubland species such as Blue-winged Warbler, Eastern Towhee, Indigo Bunting, American Woodcock, White-eyed Vireo, Prairie Warbler, Black-billed Cuckoo, Yellow-billed Cuckoo, Brown Thrasher, Field Sparrow, Common Yellowthroat, Gray Catbird, Chestnut-sided Warbler
<b>G2: Grasslands – about 8 acres</b>	About 75% of this section is hayed after July 15 <sup>th</sup> . A wildlife food plot is made each year consisting of sunflowers, millet, sorghum, and various weeds that come in with the cow manure. A trail traverses much of this section. A hedgerow separates the two hayfields. The hedgerow is mostly black walnut with some white pine and red cedar. Many bluebird nest boxes are present. A Purple Martin house is also located here.	Sedge wren confirmed nesting in the eastern most field. Orchard Orioles, Yellow-throated Vireos, Cedar Waxwings, Common Yellowthroats, Baltimore Orioles, Willow Flycatchers, Yellow Warblers are some of the birds that nest around this section. American Kestrels are often sitting on the wires along the road any time of year.
<b>G3: Grasslands around new center — 67 acres</b>	This is the best grassland on the Bafflin Sanctuary. About 1/3 of this grassland is cut in August or September. The large area to the east is mowed in November through January depending on weather conditions. A two acre wet grassland meadow located to the west of the nature center is mowed in mid-winter when conditions allow the tractor to drive on the frozen ground. The wet grassland is comprised of many wildflowers, sedges, reeds and some cattails. Some invasive plant control is conducted to keep the purple	Bobolinks, American Kestrel, Eastern Meadowlark, and Northern Harriers nest and/or use this area regularly. Sedge Wren nesting in 2018. Hundreds of post-breeding Bobolinks in this section from August – September. Northern Harriers regularly use these fields in spring and fall. Eastern Meadowlarks historically nested here but have been absent for the past two seasons (2017 and 2018). Migratory meadowlarks are still observed. Short-eared Owls are observed in this section most years.

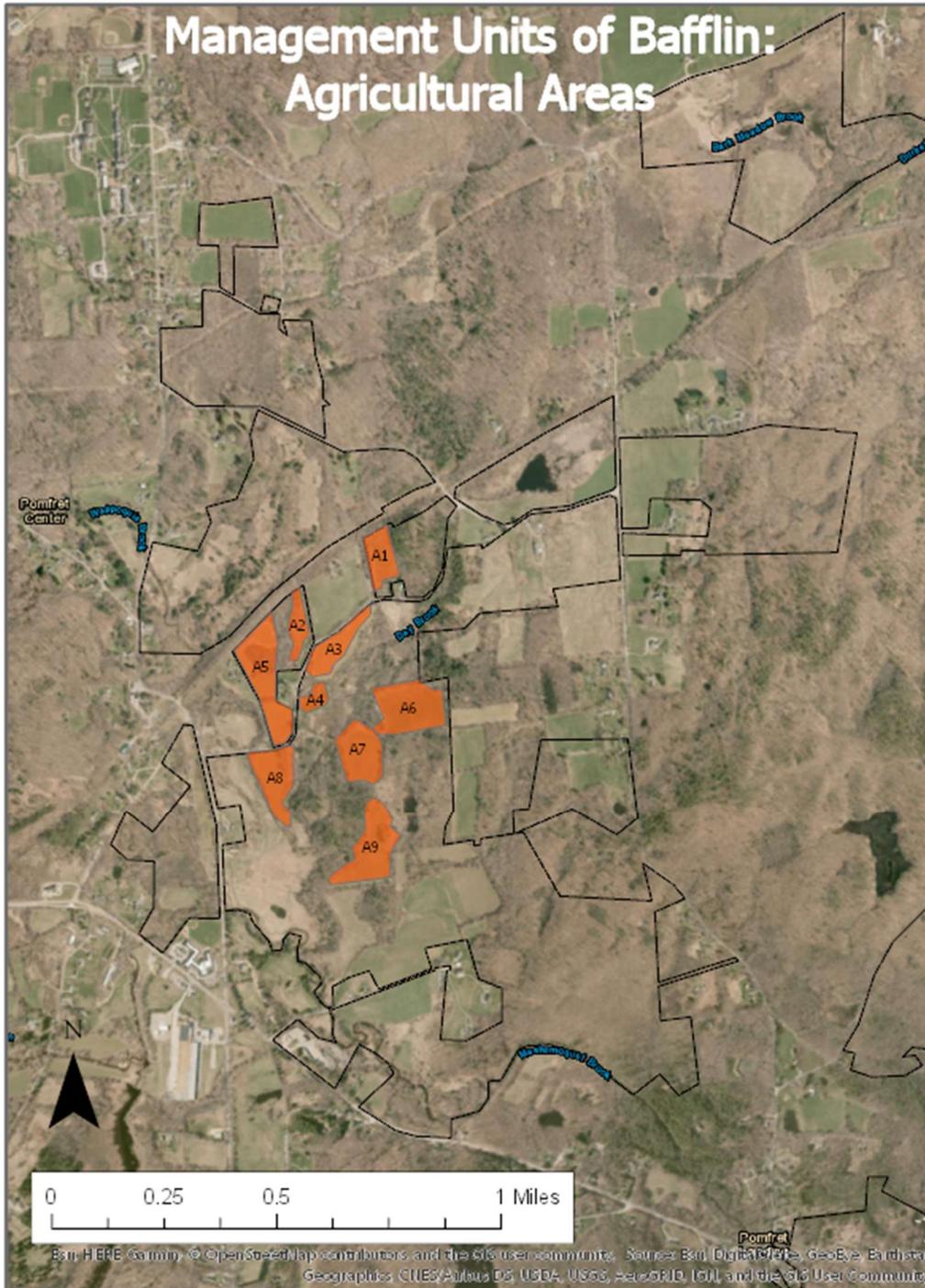
	<p>loosestrife, spotted knapweed, tansy, and mugwort from increasing in the fields. A hiking trail traverses the grassland. Several hedgerows are maintained consisting of white pine, Norway spruce, cranberry viburnum, black cherry, and shadbush. Some thick invasive multiflora rose bush thickets are in areas that are left for many birds and rabbits. An American Kestrel nest box, many bluebird boxes and a screech owl box are located in this section. All bird boxes are cleaned and repaired in March. The maintenance barn is left open from late April through the late summer to allow nesting barn swallows.</p>	<p>A Sedge Wren was territorial in the 2 acre wet grassland meadow in August of 2018. We suspect it was a late or second nesting although not confirmed.</p> <p>The hedgerows attract nesting Blue-winged Warblers, Orchard Orioles, Common Yellowthroats, Indigo Buntings, White-eyed Vireos, Yellow Warblers, Brown Thrashers, Black-billed Cuckoos, Willow Flycatchers, and Eastern Towhees to name a few.</p>
<b>G4: Grasslands — about 25 acres</b>	<p>A large grassland that has a percentage of goldenrods, Joe-pye weed and other perennial wildflowers. Some stubborn invasive plants that are in the field include burdock, a mint, Canada thistle, but not throughout the entire field. Control measures are conducted with spraying, but the seed bank must be tremendous, new plants germinate. The grassland is mowed once a year usually in January. The Pomfret Fire Department has conducted controlled burns in this field several times over the years. The last time was in 2014. One is planned for the spring of 2019. A large section of the field is a wet meadow full of native wildflowers and tusk sedges. This section can only be burnt and the invasive plants are spot sprayed. A trail passes through this section of the sanctuary. The Wappoquia Brook and Mashamoquet Brook form much of the boundary of the field. Along the stream banks is a thick hedgerow consisting of mostly multiflora rose bushes and scattered trees. The invasive bushes help control soil erosion and provide a valuable habitat for birds. An American Kestrel Box, a Purple Martin structure, and many bluebird boxes are in this grassland. A shallow wetland pond is located out in the grassland as well. We may have an osprey platform installed in the future in this field.</p>	<p>In August and September, flocks of Bobolinks are found here yearly. American Kestrels nest yearly in this nest box. Purple Martins have nested many times over the years, most recently in 2017 and 2018. Belted Kingfisher have historically nested along the bank of the Wappoquia Brook. Raptors such as Red-tailed Hawk, Rough-legged Hawks, and Northern Harriers often hunt this field. Bald Eagles and Osprey are often observed hunting along the brook. Great-blue Heron and Great Egret are observed feeding in the shallow wetland pond.</p> <p>Orchard Orioles, Willow Flycatchers, Black-billed Cuckoos, Brown Thrashers, Gray Catbirds, Yellow Warblers, Warbling Vireos, White-eyed Vireos, and American Redstarts are some of the nesting birds in the hedgerows.</p>
<b>G5: Early successional field — about 2.5 acres</b>	<p>This section is managed for early successional habitat. Goldenrods, Silky Dogwood, Black Cherry, Bayberry, Crabapple, Blackberry, and Raspberry are some of the native species that grow in this section. Many invasive plants such as multiflora rose, autumn olive, and bittersweet compete for space in the field. Some invasive control is usually done with the tractor by mowing or using the bucket to uprooting larger plants. A hiking trail goes along the edge of the field.</p>	<p>Birds nesting in this unit include but are not limited to Blue-winged Warblers, Indigo Buntings, Common Yellowthroat, and Chestnut-sided Warbler.</p>
<b>G6: Grasslands — about 20 acres</b>	<p>This section is managed for early to mid-successional habitat. About 1/3 of this area is mowed in the winter time. Black Cherry, Oak, Red Cedar, Red-stemmed Dogwood are some of the native woody vegetation. Invasive autumn olive, bittersweet, and multiflora rose are a problem in this area. In 2018 a small patch of swallow-wort was discovered and sprayed. This area is in the process of invasive plant control particularly the autumn olive and bittersweet. In one area Spotted Knapweed is pretty bad, control has been very</p>	<p>Prairie Warbler, Blue-winged Warbler, Field Sparrows, Willow Flycatchers, Rose-breasted Grosbeaks, and Gray Catbirds are some of the birds that nest in this section.</p>

	<p>difficult. Periodic cutting of the larger trees is conducted. There is also about an acre of marshy wetlands that are too rough to mow that contains many wildflowers. A trail traverses this section. A small colony of milkweed grows in the field. An American Kestrel nest box and many Bluebird nest boxes are located this section.</p>	
<p><b>H1: Managed Hayfield — 20 acres</b></p>	<p>These fields have been in production for decades, however, since c.1996, mowing has been restricted to after the nesting season (July 15th or later).</p> <p>Tree and shrub removal along Wrights Crossing Road and the stonewall line was conducted in the recent past to enhance grassland habitat for Meadowlark and Bobolink.</p> <p>An American Kestrel Box and many bluebird boxes are in this field.</p>	<p>Nesting Bobolinks have been observed in these fields. Eastern Meadowlarks have been observed during the breeding season but nesting has not yet been definitively confirmed. After the first cutting the milkweed is quick to re-grow. It seems a higher percentage of monarch larva use this field and aren't parasitized.</p> <p>American Kestrels nest in some years, starlings are a problem.</p>
<p><b>H2: Grassland — 2.3 acres</b></p>	<p>This field is brush-hogged annually in the winter. A high percentage of invasive woody sprouts like bittersweet and autumn olive dominate sections of this field. It's planned to start controlling this infestation in 2019 with spraying. Several Bluebird nest boxes are present.</p>	<p>Due to its small size, this unit is managed more for insects, esp. Lepidoptera and Odonata. Eastern Bluebird and Tree Swallows frequent this unit.</p>
<p><b>H3: Hayfield — 10 acres</b></p>	<p>This field is mowed after July 15<sup>th</sup>. An American Kestrel nest box will be installed in the future in this field.</p>	<p>Many Red-winged Blackbirds nest in this field. We keep hoping Bobolinks will nest someday.</p>
<p><b>H4: Managed Hayfield/Food plots — about 50 acres</b></p>	<p>About 10 acres of this section has been in hay for over 20 years. Most of the remaining areas has been corn. In September of 2019 all the corn area will be planted into a grassland. After two seasons of heavy cutting to get a good established hay field, the entire area will be cut after July 15<sup>th</sup>. Two long narrow wildlife food plots will be created in May of 2019. Many Bluebird nest boxes are in this section. Another American Kestrel nest box may be installed in the future after the hayfield is established.</p>	<p>Bobolink, Savannah Sparrow, and Killdeer are some of the nesters. With the size of the grassland that will be created Eastern Meadowlarks may colonize this field along with other grassland species. Common Snipe are common in March and April in this field.</p>



**Figure 7.** Location of Grassland (G) and Hayfield (H) units in the IBA

<b>Table 3-2. Agricultural Land Units in the IBA</b>		
<b>Management Unit</b>	<b>Description of Habitat and Current Management</b>	<b>Species Benefitted</b>
<b>A1: Agricultural Land – about 5 acres</b>	This unit is currently and usually planted in Hay grasses, but sometimes rotated to corn. The field is too small attract nesting grassland birds. A thick shrubby edge, consisting of mainly multiflora rose and small trees surround the field. The invasive plants are mostly left intact except the any autumn olive that appears.	When planted in corn Wild Turkeys, various sparrows and blackbirds utilize the field. The main benefit is the thicket around the edge attracting species such as Gray Catbird, Brown Thrasher, Song Sparrows, Yellow Warbler, White-eyed Vireo, and Blue-winged Warbler.
<b>A2: Agricultural Land – about 3.3 acres</b>	This is a hayfield surrounded by a thick shrubby edge and scattered large apple trees along the edge. Several bluebird nesting boxes.	The main benefit is the thick edge attracting nesting Common Yellowthroat, Gray Catbird, Blue-winged Warbler, Song Sparrow, and Yellow Warbler.
<b>A3: Agricultural Land – about 5.9 acres</b>	This field is rotated between corn and hay. The edge is a shrubby thicket with mostly multiflora rose bushes. Several Bluebird nesting boxes.	Canada Geese, Blackbird, and sparrow species use the field when planted in corn. The thick edge attracts nesting Yellow Warblers, Song Sparrows, Gray Catbirds, and White-eyed Vireos to name a few.
<b>A4: Agricultural Land – about 2.9 acres</b>	This field is a hayfield. Surrounded by thick shrubs mainly multiflora rose. Several Bluebird nesting boxes.	The edge has nesting Gray Catbirds, Song Sparrows, Willow Flycatchers, Blue-winged Warblers, and Yellow Warblers.
<b>A5: Agricultural Land – about 10.0 acres</b>	These fields are planted in corn. In the back field a large block of corn is left uncut each year for wildlife. Thick shrub edge consisting of mainly invasive bushes.	Wild Turkey, Blue Jays, Crows, sparrows, and Northern Cardinals frequent the residual corn stalks and scavenge waste corn left behind.
<b>A6: Agricultural Land – about 10.6 acres</b>	This field is called “Alfalfa Hill” and is planted in alfalfa. Several bluebird nest boxes.	Not the best spot for birds, Good spot to see migrating hawks since it’s a hill.
<b>A7: Agricultural Land – about 6.8 acres</b>	This field is planted in hay. May be rotated into corn at some time. Several Bluebird nest boxes.	Good location to see raptors and migrating Common Nighthawks.
<b>A8: Agricultural Land – about 5.9 acres</b>	The larger field is planted in corn. We require them to harrow this field since its flat, rather than plant no-till. A thick shrub edge consisting of mainly multiflora rose bushes surround the field. The smaller field consists of grasses and wildflowers. This field is mowed once a year in the winter. Part of the field is very wet. Several bluebird nest boxes.	The cornfield is harrowed because it provides a nesting location for Killdeer. Canada Geese, various sparrow and blackbird species use this field. The edge has nesting Song Sparrows, Gray Catbirds, Yellow Warblers, Willow Flycatcher to name a few. A Sandhill Crane was observed in October one year. .
<b>A9: Agricultural Land – about 8.6 acres</b>	This field is planted in hay. It may be rotated into corn at some time. Several bluebird nesting boxes. An island of Pitch Pine. Thick shrub edge consisting of old apple trees and multiflora rose. A spectacular large White Oak is on the edge. It’s hollow on the inside and has held up to 13 kids. Adults can easily stand inside. Called the “Secret Oak”.	Pine Warblers, Eastern Towhee, Song Sparrows, Gray Catbirds, and Rose-breasted Grosbeaks are some of the bird that nest around the edge of the field.

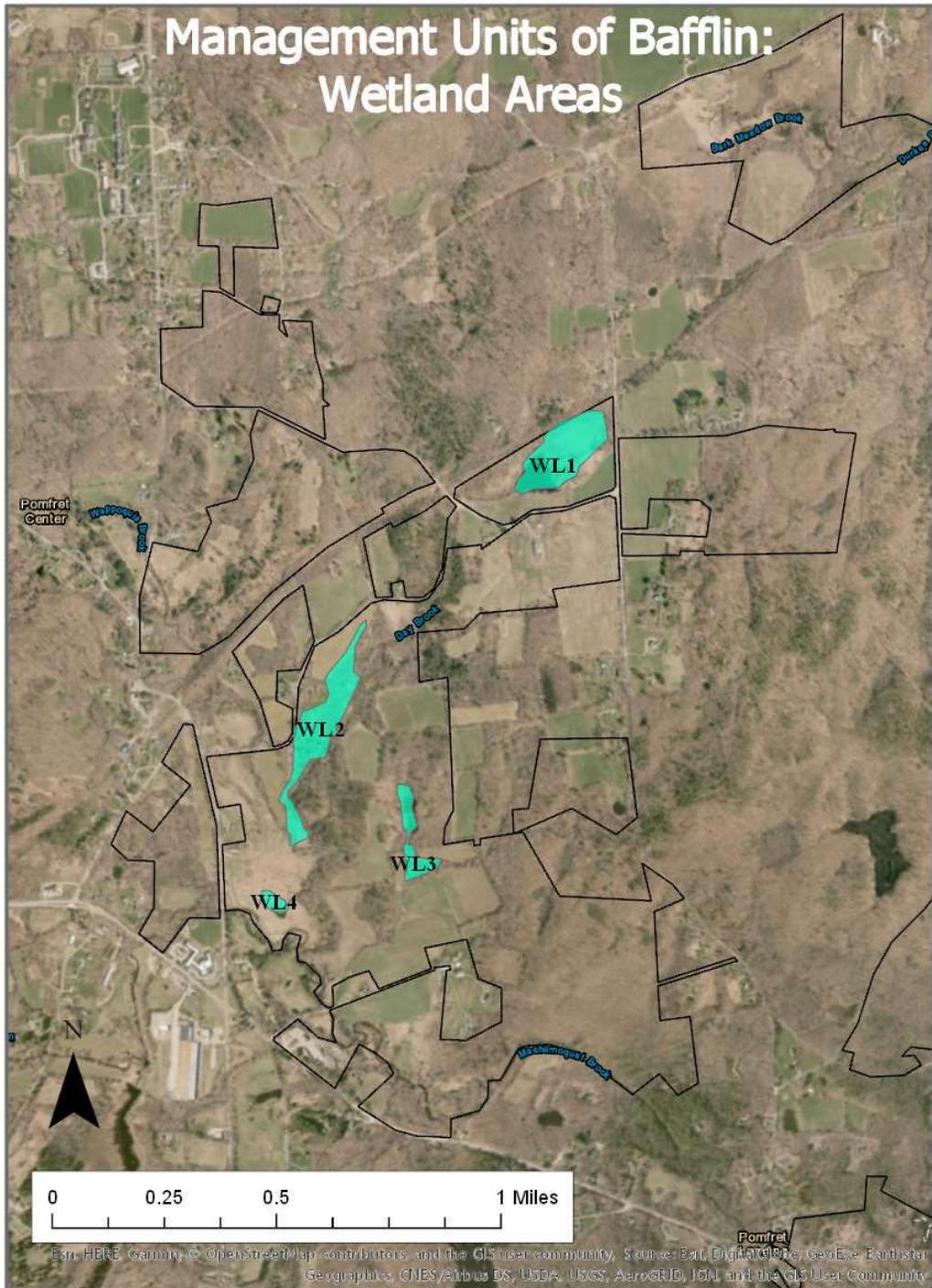


**Figure 8.**  
Location of  
Agricultural (A)  
units in the IBA

### 3.1.3 Wetlands

Several types of wetland exist on the Bafflin Sanctuary ranging from streams (riverine) both intermittent and perennial; shrubby swamps (palustrine scrub/shrub); forested swamps (palustrine forested), and densely vegetated marshes (palustrine emergent) to beaver ponds (palustrine open water) and “vernal” (e.g., seasonal, ephemeral, or temporary) pools. The complex contains significant floodplain habitat along the Mashamoquet Brook and Wappoquia Brook, which flow through the sanctuary. In addition, Day Brook originates within the Bafflin Sanctuary and bisects the area from northeast to southwest. Four relevant wetland MUs containing substantial open water are highlighted in Table 3-3.

<b>Table 3-3. Major Wetland Units within the IBA</b>		
<b>Management Unit</b>	<b>Description of Habitat and Current Management</b>	<b>Species Benefitted</b>
<b>WL1: Peat Wetland Area</b> — about 13 acres	An open body of water and a large cattail swamp dominate the area. This is the headwaters of Day Brook. According to local farmers, some of this area was mined for peat until the late 1950s. Beavers colonize the wetland every few years. The dam has blown out several times over the years due to heavy rain events. As recently as the fall of 2018 the dam went out. It will take several years for the food supply to re-generate to attract more beavers. Some Phragmites is present. I have sprayed it to control it over the years. But I can only do it when the water level is done. The late summer of 2019 is planned to spray the phragmites, since the beaver dam is out. A boardwalk passes through the far eastern edge of the swamp. The eastern part has willow, red maple and black walnut trees. A thick shrub layer is also present around the swamp. Wood duck nest boxes and a Screech Owl nest box are in the swamp.	When the unit holds an open water component, it provides habitat for ducks and geese such as Wood Duck, Hooded Merganser, Belted Kingfisher, Canada Goose Green Herons, and Mallards. Many spring and fall migrants such as Pied-billed Grebes and Buffleheads are found annually.  A large dense cattail area provides nesting cover for large numbers of Virginia Rails. Large numbers of Blackbird species roost in the cattails as well from March – October.  Willow Flycatchers, Eastern Kingbirds, Common Yellowthroats, Orchard Orioles, and Yellow Warblers frequent the pond margins. Brown Thrasher and White-eyed Vireo have occurred in pockets of dense shrubs. Rusty Blackbirds are found in spring and fall in the shrub cover. Screech Owls have been detected in trees surrounding the wetland. Sedge Wrens have been observed in the area as well. A pair of Alder Flycatchers were detected as possible nesters in 2018.
<b>WL2: Day Brook Wetland Areas</b> — about 40 acres	This area consists of a large cattail area, large phragmites area, red maple swamp with a mix of native and invasive shrubs, flooded areas with standing dead trees, and a marsh consisting of sedges and wildflowers. There is usually at least one beaver colony in this wetland. Several Wood Duck nest boxes are present. A long board walk is along the edge of the marsh. A small wildflower meadow is located at the edge of the marsh. Many unique native wildflowers are present. This mowed once a year in the winter. A couple of Bluebird boxes are present.	Some of the species that most likely nest in this area include: Virginia Rails, Orchard Orioles, Yellow and Black-billed Cuckoos, Eastern Kingbirds, Common Yellowthroats, Willow Flycatchers, Yellow Warblers, Warbling Vireo, Wood Duck, Mallard, Hooded Merganser, Eastern Screech Owl, and Green Heron. Black-crowned Night Heron, Great Blue Heron, American Bittern, Rusty Blackbird and many raptors are observed in this area yearly. A large number of blackbirds and swallows roost in the cattails from late summer to October.
<b>WL3: “Lake” Benjamin</b> — about 4.1 acres	Two small manmade ponds separated by an earthen dam and connected by a pipe. The shoreline is thick with mostly native trees and shrubs. A Wood Duck and bluebird nest box are present. A colony of Bottle Gentian and some Poison Sumac are present.	Great Blue Heron, Green Heron, Wood Duck, Belted Kingfisher, Eastern Screech Owls are often found in this section.
<b>WL4: Shallow Grassland Pond</b> — about 2 acres	Through WHIP monies and coordination with the NRCS and the CT DEEP, a shallow pond with a water control system was constructed in the summer of 2007. The purpose of the pond was to attract migrating shorebirds. The plan is to lower water levels to expose banks during fall migration. Unfortunately the water control structure wasn’t set correctly, so it doesn’t lower the water as low as we would like. Some native shrubs like alder and willow have grown along the edge.	To date, Killdeer, Yellow Warbler, and Canada Geese have nested adjacent to the pond. Spotted Sandpiper, Pectoral Sandpiper and Semipalmated Sandpiper, Belted Kingfisher, Greater Yellowlegs and Great Blue Heron have been observed on the pond.



**Figure 9.**  
Location of Major  
Wetland (WL) units  
in the IBA

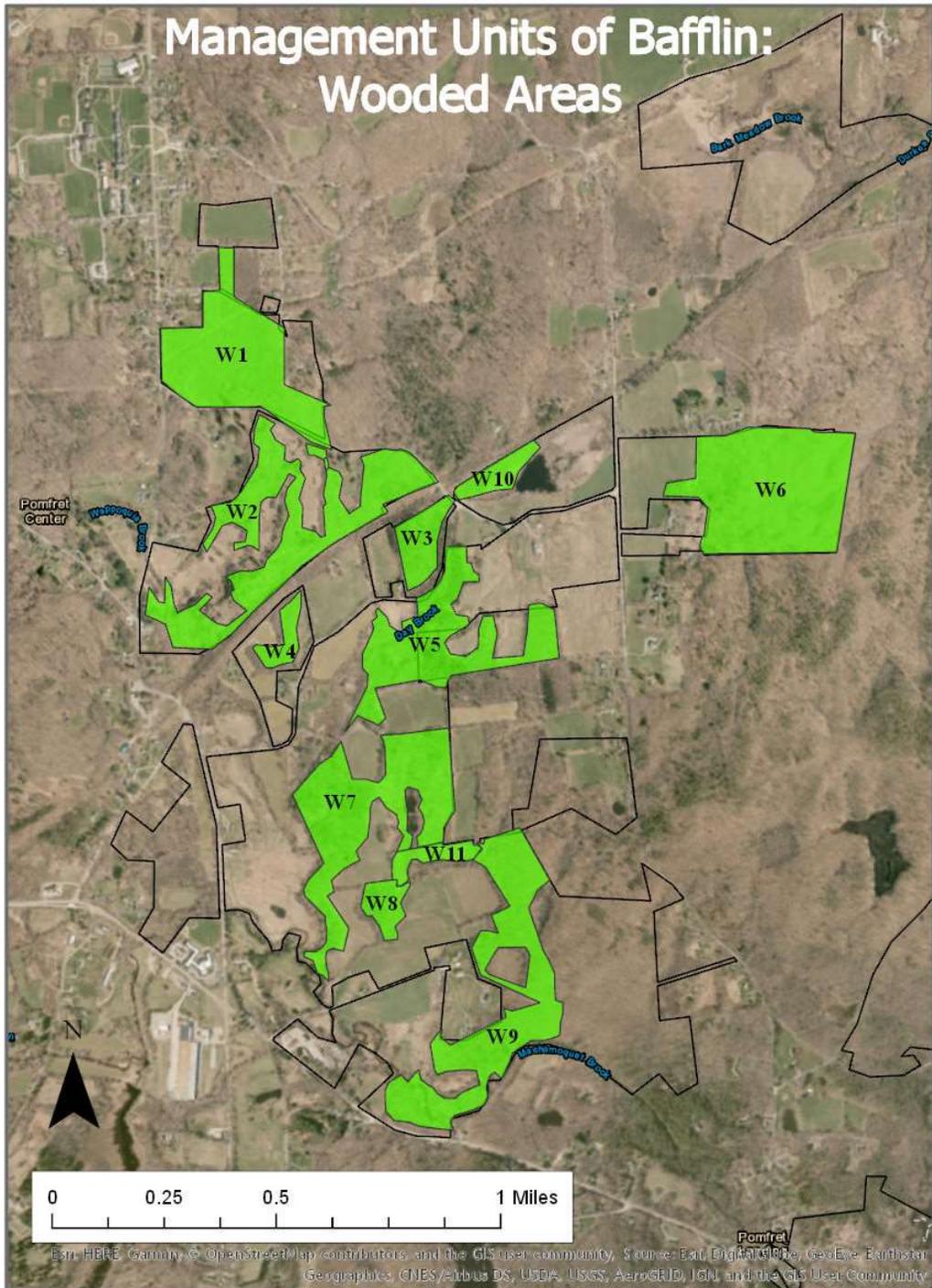
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community. Source: Esri, DigitalGlobe, GeoEye, Earthstar  
Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### 3.1.4 Woodland Parcels

A significant portion of the IBA is comprised of wooded parcels. Difference in stand age, parcel size, tree species composition and other special habitat attributes determine the habitat suitability for different wildlife species in each MU. Detailed information on the nine woodland MUs is presented in Table 3-4.

<b>Table 3-4 Woodland Management Units in the IBA</b>		
<b>Management Unit</b>	<b>Description of Habitat and Current Management</b>	<b>Species Benefitted</b>
<b>W1: Woodland</b> — about 40 acres	An area composed primarily of silver maple, white ash, and elm. Invasive bittersweet is a problem in this area. Four patch cuts were done in this area to diversify forest age structure and attract new bird species. A portion of the unit contains an older age near-climax forest stand, comprised of Tulip, Red Oak, Sugar Maple, and Black Birch. Thanks to a CSP grant 60 trees will be created into snag trees in the spring of 2019. We marked mostly White Ash tree since they will likely die when the Emerald Ash Borer shows up.	American Woodcock, a pair of Barred Owls, Pileated Woodpecker, Wood Thrush, Red-eyed Vireo, and American Redstart are some of the nesting bird species observed in this area that are indicators of forest interiors.
<b>W2: Wooded Sections of Old Golf course</b> — about 65 acres	This area is composed of early successional woodlands interspersed throughout the former golf course. It is composed of white pine, oak, poplar, aspen, and there are inclusions of Norway Spruce. Some sections of this woodland have been clear-cut to increase the early successional habitat. Brush piles were created are created with most of the cut material.	Eastern Towhee, Scarlet Tanager, Rose-breasted Grosbeak, Pine Warbler, Blue-winged Warbler, Chestnut-sided Warbler. Blue-gray Gnatcatcher, Black and White Warbler, Ovenbird are some of the nesting species.
<b>W3: Woodland</b> — about 9.7 acres	This section includes a stand of mostly White Pine with a mix of oak. The understory has a mix of native and invasive shrubs.	Pileated Woodpecker, Wood Thrush, Veery, Pine Warblers, Ovenbirds, American Redstarts are some of the nesting species.
<b>W4: Woodland</b> — about 6.6 acres	This section is mainly a red maple swamp with an understory of native and non-native shrubs. In the dry section mature shagbark hickory and old apple trees are found. Some of the area is early succession marshy swamp. The early successional area is periodically set back in the winter by cutting down some of the largest saplings.	American Redstart, White-eyed Vireo, Gray Catbirds, Northern Cardinals, Blue-winged Warblers, and Song Sparrows are some of the breeding residents.
<b>W5: Woodland</b> — about 42 acres	A hemlock ravine is located in this section. It has declined quite bit due to the Hemlock Woolly Adelgid. Three sections of this block are managed for early successional habitat. One section is comprised of black cherry, apple, gray dogwood, red cedar and some invasive plants. Yearly a percentage of the largest small trees is cut down in the winter. A grove of large shagbark hickory border this section. The second section is mainly black cherry sprouts, some crabapple, and invasive shrubs like honeysuckle and multiflora rose. Every few years, large sections of this are cut down. The third section is was created in 2017. The whole section was clear-cut except the old apple trees. A couple more apple trees were planted and we are in the process of killing all the invasive plants. In the more mature sections of the forest is a large grove of white pine, sugar maple, red maple, and ash. The understory is thick with invasive bushes like Japanese Barberry, Privet, and multiflora rose. A wetland shrubby area with small trees, this section is very difficult to get through.	Great Horned Owls and Pine Warblers nest in the large pines. Other species found nesting in this section include: Louisiana Waterthrush, Veery, Wood Thrush, Black and White Warbler, American Redstart, Blue-winged Warblers, Gray Catbirds, American Woodcock, Chestnut-sided Warbler, and Scarlet Tanager to name a few. It's a very productive forest for bird diversity.
<b>W6: Woodland</b> — about 55 acres	This mature forest is composed of oak, hickory, and Black Birch, and to a lesser extent, White Pine. The third largest Black Birch in the state is located in this area. The section supports a good native shrub development. A portion of the unit is an interspersed palustrine forested and scrub/shrub wetland with dense stands of	The parcel supports Bobcat, Gray Fox, and Fisher. Canada Warbler, Ovenbird, Yellow-throated Vireo, Scarlet Tanager, Eastern Wood Pewee, Red-eyed Vireo, Wood Thrush, Veery and Pileated Woodpecker are some of the avian species

	Sweet Pepperbush. Several rock outcroppings and ledges are found in the eastern portion of the parcel. Some invasive shrubs like privet and barberry are present. Some control has taken place.	commonly found here. Area had contained a Long-eared Owl winter roost in the past but these birds have not been relocated in recent years. This is due to the decline of the planted Scotch Pine grove from an invasive insect.  Large vernal pools with impenetrable thickets occur here supporting breeding songbirds such as Northern Waterthrush, Yellow Warbler, Gray Catbird, and Canada Warbler. The Canada Warblers aren't present every year.
<b>W7: Woodland</b> — about 45 acres	Two clear-cuts were done in this section to create a soft edge and increase the bird diversity in this section. The first 3 acre cut was completed in 2013 leaving just a few large white pine that were girdled to create snags. Invasive plant control has been meticulous with about 99% control and great native tree and shrub regeneration. Gray birch, raspberry, blackberry, pitch pine, and blueberry are some of species. Continual invasive control is planned. The second (2017) clear-cut was about 7 acres in size and adjacent to the first. So far we have decent invasive control but more is needed. The 2018 season was very rainy and bad conditions for spraying. The remaining sections of this forest are mature white pine with red oak, sugar maples and ash. The understory has a fair amount of invasive shrubs like barberry and winged euonymus.	Some of the birds found nesting include: Indigo Bunting, Scarlet Tanager, Baltimore Oriole, Pine Warbler, Black and White Warbler, Ovenbird, Prairie Warbler, Song Sparrow, Eastern Towhee, Wood Thrush, Veery, and Chestnut-sided Warbler.
<b>W8: Woodland</b> — about 6.4 acres	Part of this forest is a wetland forest of mainly red maple and a thick understory of native and invasive shrubs. The dry ground contains oak and some old apple trees. There is a section of Common Buckthorn that needs to be removed.	Gray Catbirds, Cardinals, Eastern Towhee, Song Sparrow are some of the birds. Not really surveyed well.
<b>W9: Woodland</b> — about 56 acres	This section is connected to a larger forest to the east so a greater diversity of birds needed forest interior are found in this section. It's composed of red and white oak, black birch, maple, hemlock and ash. Some of the forest is lowland forest near the Mashamquet Brook. Closer to the fields it's a young forest with many invasive shrubs mostly barberry and multiflora rose.	Some of birds found here include: Wood Thrush, Worm-eating Warbler, Black and White Warbler, Veery, Scarlet Tanager, Baltimore Oriole, Eastern Wood Pewee, Ovenbird, and Barred Owl.
<b>W10: Woodland</b> — 5 acres	This section is an old field that is managed for early to mid-successional growth. Black cherry, red-stemmed dogwood, blackberry, quacking aspen, raspberry, and red cedar dominant the area. With large areas of milkweed and goldenrod. Invasive plants including multiflora rose and bittersweet are common. Several bluebird nest boxes are present. A trail goes through the edge. Some of the largest trees are cut down periodically if the beavers aren't doing it themselves. Some invasive control is done.	One of the best sections of the sanctuary to easily find an assortment of birds. Some of the nesting species include: White-eyed Vireo, Blue-winged Warbler, Gray Catbird, Common Yellowthroat, American Redstart, Rose-breasted Grosbeak, Indigo Bunting, Song Sparrow, Warbling Vireo, American Woodcock, and Eastern Towhee. Great location in the fall to find migrants.
<b>W11: Woodland</b> — about 4 acres	These two fields are now out of production as of 2018. Since they are small and narrow we will now manage them as an early successional habitat. We plan on planting some patches of evergreens, most likely Norway spruce since they are deer resistant. This area is lacking an evergreen component. We will let what wants to grow in it colonize naturally for now. We will attempt to control the invasive plants. Will install bluebird nest boxes.	Most likely Blue-winged Warblers, Indigo Bunting, Song Sparrows, Eastern Towhees, Common Yellowthroat, Gray Catbirds will colonize these locations.



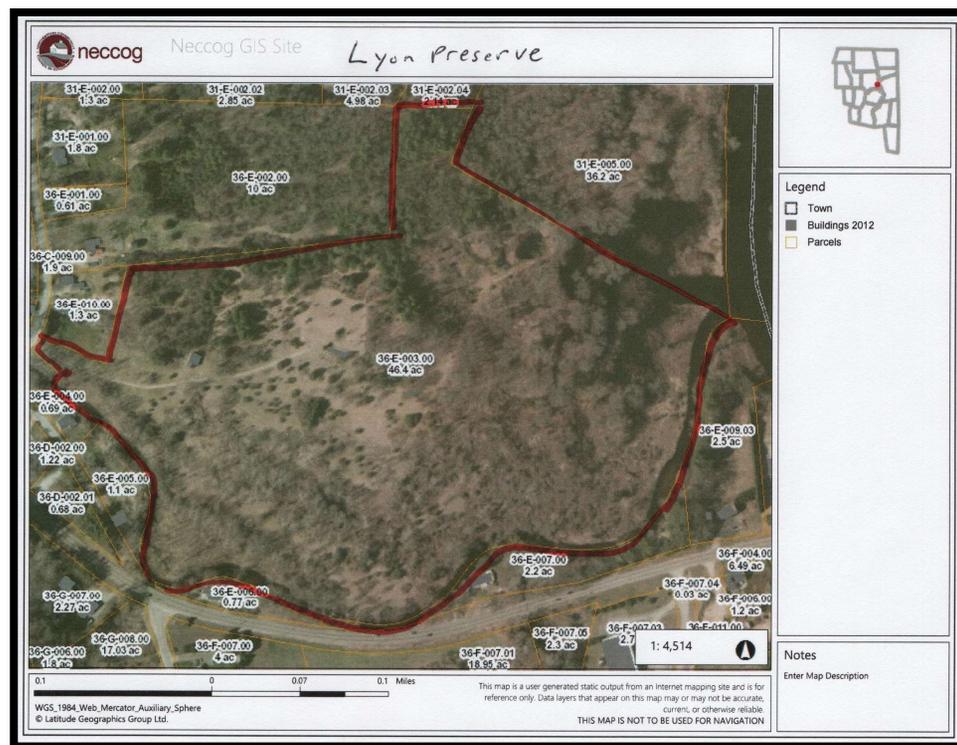
**Figure 10.**  
Location of  
Wooded (W)  
Management Units  
in the IBA

Map: HERE, Garmin, © OpenStreetMap contributors, and the GIS user community. Source: Esri, DigitalGlobe, GeoEye, Earthstar  
Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### 3.1.5 Wyndham Land Trust properties included in the Bafflin Sanctuary Complex

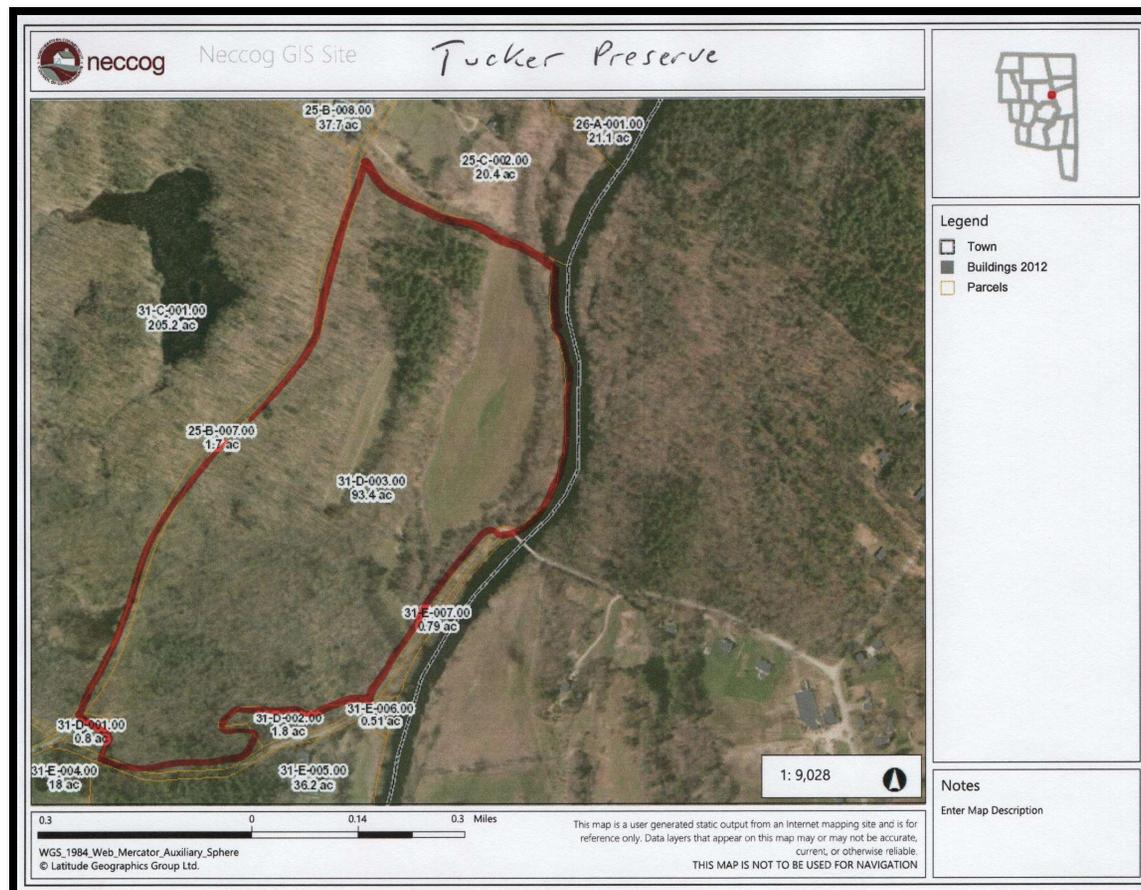
#### Lyon Preserve: 46 acres – owned by Wyndham Land Trust

This property is one of the best birding locations in the area. The majority of the property is managed in early to mid-successional habitat. It has two types of this habitat. One is dry upland dominated by red cedar, white pine, pin oak, black cherry, and aspen. The second is a floodplain area with mostly shrubs and scattered larger cottonwoods and oaks. The semi-open meadows are mowed once a year in the winter or early spring. Some of the largest trees are removed each year to maintain the shrub-land habitat. There is a grove of large white pine where Barred Owls frequent. A small wildlife food plot is located on this property. A couple of small shallow ponds are in the thickets. A trail traverses this property. Many bluebird nest boxes, several Wood Duck boxes, and a Screech Owl box are maintained here. A 1700's barn is located on the property that is referred to as the "Bat Barn". A large maternity colony of most big brown bats live in the barn. The last survey in 2017 counted at least 146 individuals. A couple of smaller bats were also observed, the species type couldn't be identified. This data is held by the Ct DEEP. This is the location the Ct Audubon Society does its Saw-whet Owl banding each fall. The main invasive plants are autumn olive, bittersweet, multiflora rose, and Cyprus spurge. Some invasive plant control is done. Autumn olive use to cover the vast majority of the property, there is less and less each year. Some of the nesting species include: Prairie Warbler, Blue-winged Warbler, Pine Warbler, Black and White Warbler, Indigo Bunting, Brown Thrasher, Black-billed Cuckoo, Orchard Oriole, Baltimore Oriole, American Redstart, Wood Thrush, Veery, American Woodcock, White-eyed Vireo, Red-eyed Vireo, Cedar Waxwing, Mockingbird, Wood Duck, and Blue-gray Gnatcatcher. Broad-winged Hawk, Bald Eagle, Fox Sparrow, Rough-winged Swallow, Bank Swallow, are observe here often. Northern Shrike and Bullock's Oriole have been observed here as well in the past.



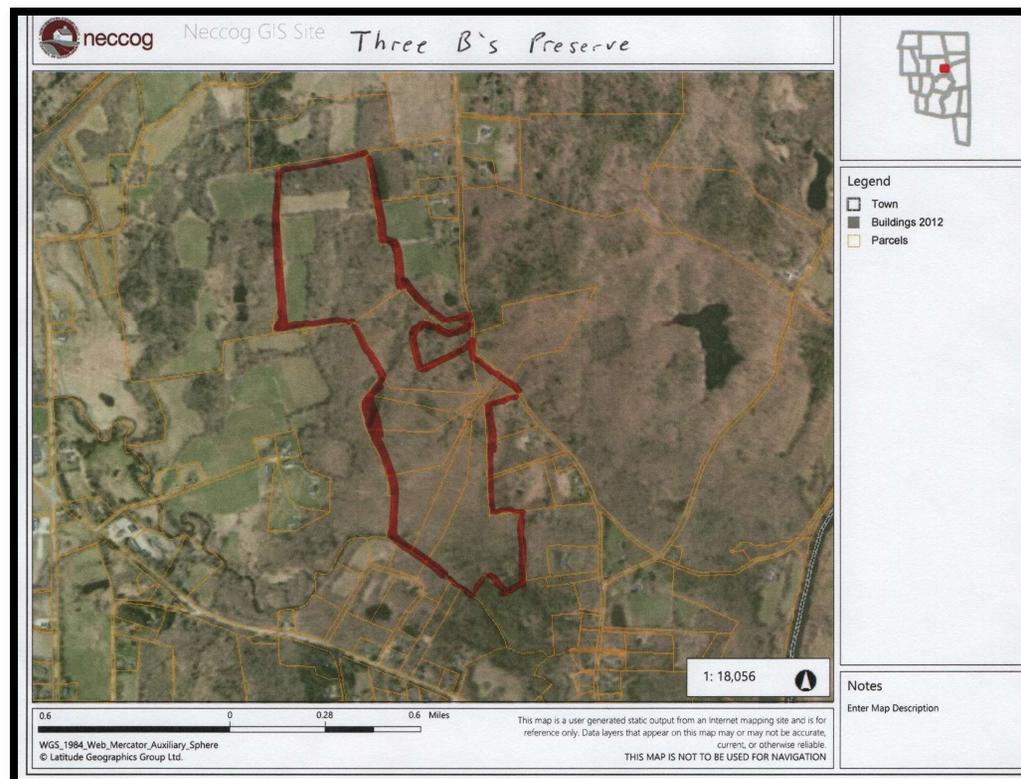
### Tucker Preserve: 94 acres – owned by Wyndham Land Trust

About 75% of this property is mature oak forest, with a large stand of white pine and some small groves of hemlock. Two small and one large cornfield is on this property. Some corn is left standing each year to benefit wildlife. A long shrubby thicket with large trees lines the Quinebaug River. About an acre or two of flooded shrub/willow land that attracts many birds. The main invasive plants are bittersweet and multiflora rose along the edge of the fields. A horse trail is permitted on this property. The flooded shrub/willow area reliably attracts migrants like Wilson's Warbler, Canada Warbler, Black-throated Blue Warbler, and Magnolia Warbler. Some of the nesting species include: Baltimore Oriole, Orchard Oriole, Blue-winged Warbler, Yellow Warbler, Veery, Wood Thrush, Gray Catbird, Black-billed Cuckoo, Great-horned Owl, Red-tailed Hawk, Blue-gray Gnatcatcher, Yellow-throated Vireo, Warbling Vireo, and American Redstart. Rough-winged Swallows nest on the nearby bridge. Bald Eagles and Common Mergansers are observed yearly.



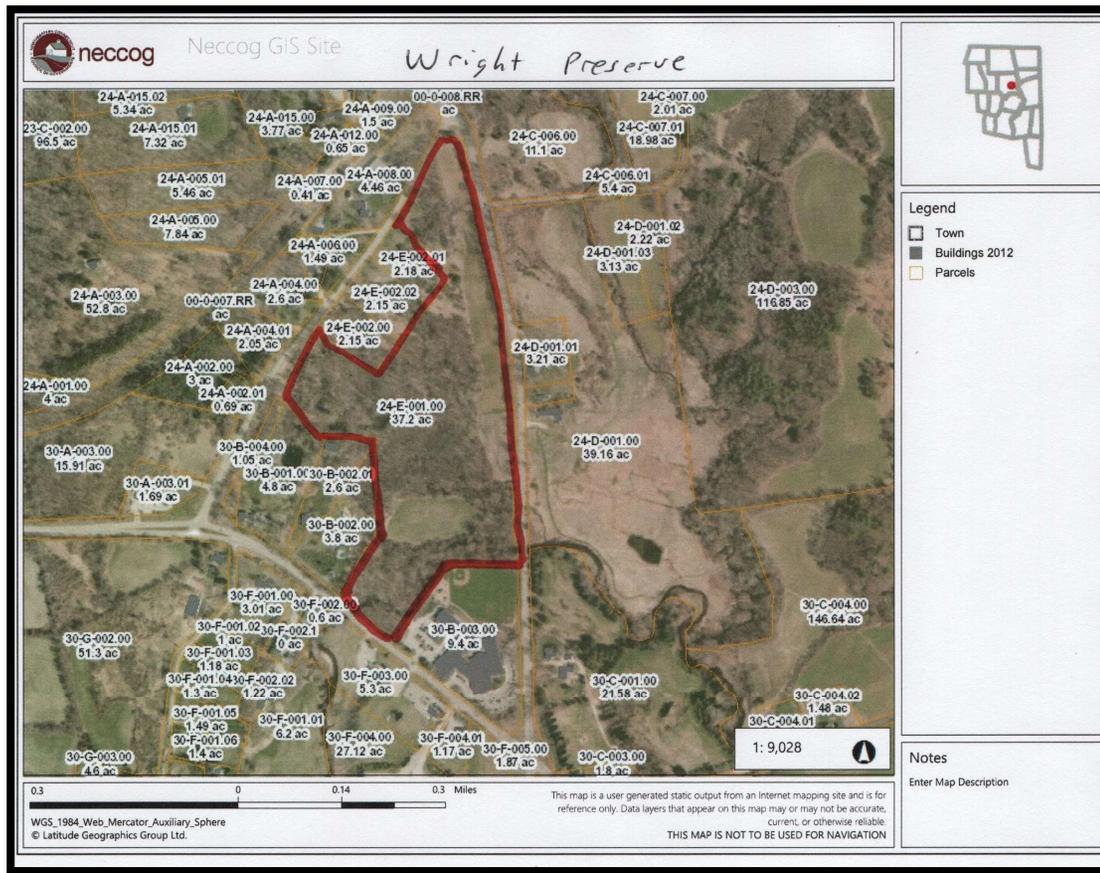
### Three B's Preserve: 134 acres – owned by Wyndham Land Trust

Three B's is named because the names of the three previous owners are Bosworth/Butts/Buttner and we consolidated the name. This preserve fills in the most of the eastern boundary of the Bafflin Sanctuary. Most of the preserve is upland oak/black birch forest with some nice ledge outcroppings. A couple of small hemlock stands are present and a mountain laurel thicket near the Mashamoquet Brook add to the diversity. A large vernal pool thick with swamp azalea and sweet pepperbush provides good understory nesting for forest interior birds. A forested wetland with a small stream flows through with a mix of native and invasive shrubs. A section consisting of about 3 acres is managed for early successional habitat. Three agricultural fields that are rotated between corn and hay are also located on the preserve. A couple of hiking trails connecting to the Bafflin Sanctuary traverse sections of the preserve. Several Bluebird nest boxes are present. Some of the birds known to nest are: American Redstart, Blue-winged Warbler, Worm-eating Warbler, Scarlet Tanager, Eastern Wood Pewee, Ovenbird, Black-throated Green Warbler, Great-horned Owl, Barred Owl, Chestnut-sided Warbler, Pine Warbler, Yellow-throated Vireo, Red-eyed Vireo, White-eyed Vireo, Veery, Wood Thrush, Pileated Woodpecker, Great-crested Flycatcher, and Gray Catbird. Hooded Warbler is suspected of nesting in the past.



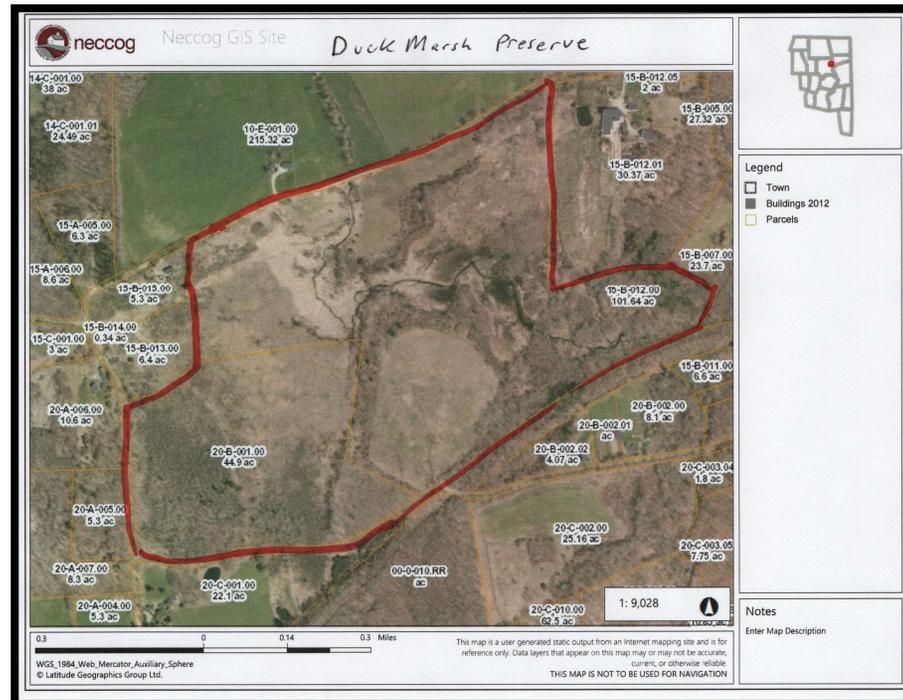
## Wright Preserve: 37 acres – owned by Wyndham Land Trust

Located just across Route 169 from the Bafflin Sanctuary. One cornfield and one hayfield are present on this preserve. A large wildlife food plot is planted in sunflower, millet, and sorghum. Several bluebird boxes are maintained. A short loop trail traverses the property. An impenetrable forested/shrubby swamp covers about 3 acres. The remaining forest is an oak/red maple/ash forest with a high percentage of invasive shrubs in the understory. The property looks as though gravel was mined 50 plus years ago and has reverted to forest. Some of the known nesting bird species include: American Redstart, Gray Catbird, Veery, Wood Thrush, White-eyed Vireo, Red-eyed Vireo, Rose-breasted Grosbeak, Green Heron, Black-and-white Warbler, Blue-winged Warbler, Baltimore Oriole, and Common Yellowthroat. Large numbers of native sparrows utilize the food plot from September through December.



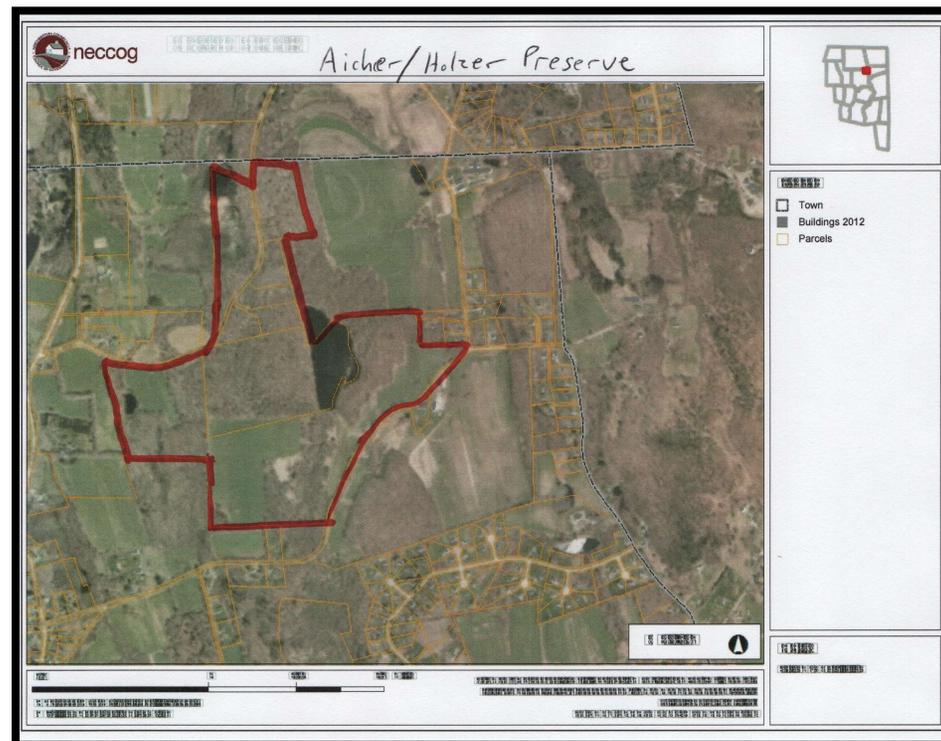
## Duck Marsh Preserve: 146 acre – owned by Wyndham Land Trust

One of the top bird watching locations in the area. A stream flows through the property, which doesn't freeze even during the coldest periods attracting duck such as Mallards, Black Ducks, Pintail and sometimes wintering Common Snipe. Large areas of the property are wetland marshes, forested wetlands, and a section with many standing dead trees from past beaver flooding. At one time there were three beaver dams on the property. It was referred to as a major duck factory by many. Some heavy flooding one year blew out the dams about 10 years ago and they haven't built any dams since. The food supply of alders, willows, and maples are plentiful. The Ct DEEP has recently (Feb. 2019) expressed an interest in possibly installing a water control system on the property. The invasive plant phragmites is a major problem. We have the Ct DEEP spray the phragmites three years in a row and it still came back and has actually increased. When the area was flooded just about every duck species including Brant, Rudy Ducks, and Northern Shoveler has been observed. American Bittern, Sora, Virginia Rails, Common Moorhen, Pied-billed Grebe, Green-winged Teal, all have nested here when it was flooded. Huge numbers of wood ducks and mallards could be observed with broods from the two observation blinds. Great Egrets, Green Herons, Great-blue Herons, and Snowy Egrets were often observed as well. Two hayfields are managed for grassland birds, by mowing after July 15<sup>th</sup>. Savannah Sparrows, American Kestrel, and Bobolinks are confirmed nesters. Meadowlarks have been observed in the non-breeding season. There is about 10 acres or more of early to mid-successional habitat. There is an observation platform on the top of the hill of the larger field. Many bluebird nesting boxes, a kestrel nest box, and several Wood Duck nest boxes are located here. In the migratory period, many hawk species such as Red-shouldered, Cooper's, and Sharp-shinned can be observed. Some of the known nesting birds include: Brown Thrasher, American Woodcock, Blue-winged Warbler, Yellow Warbler, Warbling Vireo, Veery, Gray Catbird, Yellow-billed Cuckoo, Black-billed Cuckoo, American Redstart, Great-crested Flycatcher, Willow Flycatcher, Rough-winged Swallow, Mockingbird, Chestnut-sided Warbler, Common Yellowthroat, Orchard Oriole, Rose-breasted Grosbeak, Indigo Bunting, Eastern Towhee, and White-eyed Vireo. Common Snipe are often found in March and April. Eastern Screech Owls and Great-horned Owls possibly nest here. Short-eared Owls, Northern Harriers, and American Kestrels often winter in the marsh. Northern Shrike can be found here some years including 2019.



**Aicher/Holzer Preserve: 200 acres – owned by Wyndham Land Trust**

There are three hayfields and one cornfield located on this property. The two larger hayfields are cut after July 15<sup>th</sup> and have nesting Bobolinks, American Kestrels, and many Red-winged Blackbirds. A large pond and a small pond are located on this preserve as well. The smaller pond is ringed most of the way with alders providing good nesting areas. The larger pond attracts a great number of bird species. In the Spring Ring-necked Ducks, Common Goldeneye, Mallard, Black Duck, Wood Duck, Green-winged Teal, Hooded Mergansers, and Common Mergansers are observed for many weeks. Wood Ducks, Hooded Mergansers, and Mallards nest around the pond. In the summer many Green Herons and Great Blue Herons are observed hunting around the pond. In the fall, hundreds of Canada Geese rest daily on the pond and Pied-billed Grebes annually stop over. Many raptors are observed regularly including Bald Eagle, Red-tailed Hawk, Northern Harrier, Cooper’s Hawk, and Red-shouldered Hawk. Barred and Eastern Screech Owls are suspected nesters. This property is the source of the brook that flows through the Duck Marsh Preserve. A large section of wetland forest consisting of mostly red maple and a thick shrub understory comprised of native and non-natives attracts many birds like Common Yellowthroat, Gray Catbird, Brown Thrasher American Woodcock and most years Rusty Blackbirds stopover in migration. A large area of early to mid-successional habitat exists as well. Indigo Buntings, Blue-winged Warblers, Chestnut-sided Warblers, American Redstarts, Eastern Towhees, and Orchard Orioles are some of the nesting species. Most of the forested area has been logged over many years ago thus there is a thick understory with many invasive shrubs. Veery, Wood Thrush, Ovenbird, Scarlet Tanager, Black-and-white Warbler, and Red-eyed Vireo are some of the common nesting species. An 8 acre marshy beaver impoundment attracts some of the following species during the nesting season: Sora, Virginia Rail, Wood Duck, Baltimore Oriole, Swamp Sparrow, and Song Sparrow. A trail is maintained through the property. Many Eastern Bluebird nest boxes, a Kestrel box, and a couple of Wood Duck boxes are maintained here.



### *3.1.6 Other protected properties within the IBA area*

About an additional 628 acres are protected with conservation easements within the IBA area. Three are farms that sold their development rights to the Ct Department of Agriculture. Three are properties that sold their development rights to the Town of Pomfret after they bonded \$4 million to protect open space in town. An additional three properties are the excess land that neighbors added easements on their land to protect for the future. Much of these properties are in active agriculture with no management for birds. Corn or hay are produced on most and a new apple orchard was planted on one property in 2018. Maple syrup lines run through the forest on one of the easements. The forest land these easements protect add to the connectivity of the open space corridors. A 222 acre parcel of State Forest land is located in the IBA boundary as well. As does a stretch of the state Airline Trail.

## **3.2 Monitoring**

Included in the bird monitoring efforts is an ongoing study to assess productivity and survivorship in the preserve's songbird populations. A Monitoring Avian Productivity and Survivorship (MAPS) banding program is run in the Bafflin Sanctuary as a cooperative effort between the CAS (CAS) and Carol Millard of the Biology Department of Saint Joseph College in West Hartford. Mrs. Millard holds a Master Bander permit issued by the US Fish and Wildlife Service and oversees the capturing and banding of local birds. CAS' Andy Rzeznikiewicz and Paula Coughlin are licensed sub-permittees in this banding effort and provide support throughout the study, while other CAS staff and volunteers assist in the effort.

The Bafflin Sanctuary MAPS station runs seven six-hour banding sessions each summer. Data from all MAPS stations in the US is centrally collected at the Point Reyes Bird Observatory in California, allowing for large scale analysis, detection and monitoring of trends in species diversity, distribution, and productivity. Bird populations can fluctuate dramatically on a local scale, but the regional analysis of larger, cumulative data sets provides a more accurate picture of population status. The Bafflin Sanctuary MAPS station has been in operation since 2001. Between 2001 and 2018, over 3200 birds of 50 different species were captured and banded. The composition of the species that are most frequently captured depends to a large degree on the habitat surrounding the station's nets. Species commonly banded at the station include Gray Catbird, Wood Thrush, Veery, House Wren, Common Yellowthroat, Blue-winged Warbler, Ovenbird, and Black-capped Chickadee, and are typical of the woodland edge habitat where the Bafflin MAPS station is located. Noteworthy birds captured during previous banding sessions include Black-billed Cuckoo, Pileated Woodpecker, American Crow, American Woodcock, Chestnut-sided Warbler, Louisiana Waterthrush and Lawrence's Warbler. For a complete list of the species for which data has been collected, see the sidebar on page 21. In addition many bird banding demonstrations for the public or school groups are done in the spring and fall. These programs document the progress of the migration season and the timing of which species are moving through the preserve.

## **3.3 Research**

Students and faculty from the Yale School of Forestry and Environmental Studies (FES) have conducted research in the Bafflin Preserve. Dr. Oswald Schmidt and his students plan to continue research at the preserve now and in the future. Past research has centered on the productivity of Orthoptera as a function of habitat complexity. Research planned for the summer of 2014 will address pollinator abundance and diversity in grasslands under various disturbance scenarios. The results of these research studies are used to inform management decisions at the Bafflin Preserve and elsewhere within the IBA.

## **3.4 Public Outreach/Education**

### *3.4.1 Outreach and Education*

Public outreach and education is achieved via scheduled environmental education programs, community science volunteer monitoring, center displays, and lectures presented and coordinated by the CAS center. The center has a dedicated staff member for volunteer coordination. In addition, the CAS center sponsors guided bird and nature walks within the IBA. A synopsis of these public outreach and education programs and events are provided in the following sections. The center has a past history of active citizen science volunteer monitoring. Recent contributions from volunteers have included the following projects:

Activity	Year Implemented	Details
Monitoring Avian Productivity and Survivorship (MAPS) Banding	2000 - present	Bafflin Sanctuary data available for 13 years. Banding early June-early August. Carol Millard, Master Bander. Total volunteer hours <b>6,279</b> (2000-2012).
Four Fall Banding Sessions for Saw-whet Owl	2007 - present	(Included in volunteer hours figures above). Banding during fall migration (3 banding sessions); banding site on Wyndham Land Trust property
Mammal Monitoring	2003 - present	Trained volunteers monitor 3 study sites, quarterly, documenting track and sign of large mammals which require diverse habitats, important to the preservation of open space and wildlife corridors present in northeast CT. Protocol – <i>Keeping Track, Inc.</i> Total volunteer hours <b>4,558</b> (2003-2012)
Vernal Pool Inventory Monitoring	2003 - 2018	Spring: trained volunteers survey vernal pools documenting vernal pool amphibian breeding sign. Protocol – Wildlife Conservation Society. Total volunteer hours <b>1,762</b> (2004-2012).
Stream Water Quality Monitoring, Stream Walk	2003 – 2013	Summer: trained volunteers survey tributaries to the Quinebaug River watershed, documenting areas of concern. Protocol – NRCS <i>Stream Walk</i> . Total volunteer hours <b>785</b> (2003-2012)
Rapid Bio Assessment Monitoring	2003-2013	Fall: trained volunteers survey aquatic macroinvertebrates (water quality indicators). Protocol – CT DEEP <i>Rapid Bioassessment of Wadeable Streams</i> . Total volunteer hours <b>864</b> (2003-2012).

### 3.4.2 Public Access

A system of walking trails allows public access to enjoy bird watching, photography, nature interpretation, hiking, and scientific study. An observation deck was constructed for public viewing just off Day Road overlooking the wetland area in the late 1990's and was reconstructed in 2015. It is used regularly year round by the general public. A number of other projects have been conducted over the years to improve public access. The following is a brief representative list of projects that serve to illustrate the Center's and stakeholder's efforts:

- Pedestrian Bridge, Trail Steps and Directional Signs: Jason Fortin, Pomfret Troop, Eagle Scout Project, 2008
- Trail Stabilization, Trail Steps, and Directional Signs: Aaron Landry, Woodstock Troop, Eagle Scout Project 2007
- Interpretive Trail Signs: Ryan Embree, Woodstock Troop 27, Eagle Scout Project, 2006
- Kiosk and Trailhead Installation: Colin Cummings, Putnam Troop 25, Eagle Scout Project, 2005
- Three new pedestrian bridges. Rectory School, 2016,2017,2019
- Two new boardwalks, Rectory School, 2015 and 2018.

In addition to the Center trails and supplemental improvement projects, the CT DEEP Airline Trail bisects the Bafflin Sanctuary and Wyndham Land Trust Parcels. Working with CT DEEP, CT DOT, Town of Pomfret and Northeast Connecticut Council of Governments, the following projects have either been implemented or are scheduled for implementation to improve public access to this state trail system.

- A pedestrian cross walk in place as of April 2009, in 2019 a pedestrian bridge will be constructed over Route 44/169.
- Trailhead parking area and pavilion

A goal for CAS staff is to regulate and monitor access provided by the existing trail system. No plans for additional trail networks are planned on existing land holdings for the near future. Access to parcels obtained via future acquisitions are to be evaluated on a case-by-case basis.

# Chapter 4: Conservation Concerns, Threats & Opportunities

## 4.1 Farmland management

Improper management of farmland habitat poses a risk to the grassland bird species using the sanctuary. Working with local partners, CAS will mitigate risks by implementing safe mowing dates. Other risks will be addressed as they emerge.

## 4.2 Non-native, invasive plants/animals

Due to the intensively managed character of the primarily agricultural Pomfret region, conditions are continually created that favor pioneering species. Non-native invasive species are among the most successful and prolific pioneer plants and a significant number of these undesired species is found in the Bafflin Sanctuary. In some cases the spread of these invasive plants is limited to few isolated stands, while other species are widespread throughout the complex. Table 4-1 indicates the non-native invasive plant species currently present and the relative status of each in the sanctuary.

Table 4.1. Invasive plants, their distribution within the IBA, and their status		
Species	Distribution within the IBA	Status
Asiatic bittersweet	Widespread	Controlled as needed
Autumn- olive	Localized	Mostly controlled
Black locust	One small grove known	Contained
Common buckthorn	Isolated spots	
Common reed	One large infestation and several smaller stands known	
Cypress spurge	Located in one area	
Dame's Rocket	Widespread	
Garlic mustard		Increasing
Glossy buckthorn		Mostly controlled
Japanese barberry	Widely distributed	Controlled in many areas
Japanese honeysuckle	General areas (one or two locations)	
Japanese Knotweed	General areas (two infestations)	
Multiflora rose	Widespread	Increasing
Narrowleaf bittercress	Widespread	Increasing
Norway Maple	Found in several locations	Mostly controlled

Porcelain-berry	One spot	Tenacious and proving hard to eliminate
Purple loosestrife	Widespread	Subject to bio-control project (see below)
Shrub honeysuckles	Widespread	
Spotted knapweed	Numerous locations	
Winged euonymus	Widely distributed	Controlled in many areas

Many of these invasive species are being controlled through different means (light mechanical or hand removal, spraying, mowing, etc.) and their removal or reduction is an important aspect of the sanctuary's management. Despite known impact to the native floristic composition of the state, some non-native plant species still provide important habitat function to some bird species. For instance, multiflora rose provides suitable nesting cover for native shrubland birds such as the state-listed Brown Thrasher. Therefore care must be taken not to impact Connecticut listed avifauna and other species during removal or control projects.

House Sparrows and European Starlings are of concern to the native birds that use the nest boxes. House Sparrow traps are used to control the House Sparrows. About 25 – 40 are removed yearly. The Starlings compete with American Kestrels and are a big problem. We do some control to keep the Starlings out. New ones often just keep coming. It takes more time and effort to control the starlings so only as some control is done.

Purple Loosestrife has established itself in MU WL 1. In an effort to get the infestation under control, University of Connecticut Extension staff released 3,000 *Galerucella* beetles in May 2001 in this area. An additional release of 500 adult weevils (*Hylobius transversovittatus*) was conducted in August 2001. The weevils were provided by Cornell University. According to extension staff, small monitoring plots were established and data collected annually. It was not until June 2008 that purple loosestrife control appeared to be underway. Small beetle larvae, egg clusters and visible damage were initially observed on plants, indicating establishment in this area. However during subsequent monitoring, the Purple Loosestrife was found to be increasing in density and spreading. Clearly further options will need to be explored as methods to control this plant are developed further.

Dogs are prohibited.

## 4.3 Development of adjacent lands

Much of the land surrounding the IBA is currently undeveloped (with the exception of some large residential parcels) and as such, adds value to the IBA as a supporting landscape matrix. Further development adjacent to the IBA is of conservation concern should it be slated for parcels that lie within known or presumed wildlife corridors that serve to connect two adjacent blocks of conservation land. Acquisition of these parcels for conservation by one or more of the IBA stakeholders is a high priority.

# Chapter 5: Conservation Goals

## 5.1 Habitat Management Measures

The overarching goal for habitat management is to seek out new opportunities for enhancements that benefit biodiversity conservation, and continue those that have generated favorable habitat responses. These opportunities include both discrete projects applicable to a single management unit and overall management protocols that are applicable across the preserve or among multiple management units.

A primary goal for management is to continue those improvements or enhancement measures that have been successful in maintaining favorable habitat conditions for species of conservation concern. For instance, some of the major matrix improvements that have generated favorable results and thus are goals for continued implementation include the following:

**Improving vegetation structural diversity:** Measures that add vegetation structural diversity within the various habitats on the site will increase overall avifaunal species richness by improving foraging height diversity. For instance, in most wooded MUs the goal is to have native vegetation associations well represented in each structural category (herbaceous, shrub, sapling, tree, and liana layers). Forests not managed for timber production should have uneven age classes in the tree layer.

**Development of Soft Edge, Irregular Ecotones:** Many shrubland birds, woodland birds, and forest “interior edge” species (See Askins, 1987), utilize the more diverse floristic structure of edge habitats that develop in natural ecotones. The variety of land uses throughout the IBA creates an abundance of edge habitat. However edge habitat created by abrupt changes in covert types may not develop the diversity of plant structure to which the shrubland bird specialists are attracted. Therefore, a major goal applicable to all management units is to create well-developed, soft-edge, transitional ecotones that offer abundant cover and food sources, low exposed perches, supra-canopy nest sites, liana tangles, brush piles, and standing dead wood trunks and limbs. Development of dense edges can also help to “seal” the edge against the spread of invasive plant species deeper into a forest block.

**Implementing Farmland Best Management Practices:** Due to the sensitivity of the native fish population in the Wappoquia Brook drainage, there is a need to ensure soil erosion generated in row crops (e.g. corn production) does not result in sedimentation to down-gradient receptor streams. Goals to ensure protection of these streams include implementation of Farmland Best Management Practices, the creation of grass buffer strips along edges of the fields to create softer edges and filter out sediments transported by stormwater from the bare soil of freshly plowed fields, protection of bordering vegetated wetlands adjacent to the drainages (i.e., allow no agricultural exemptions to wetland preservation in favor of farming), and the placement of several incrementally spaced buffer strips ascending and perpendicular to slope on steeper parcels.

**Creation of Wildlife Food Plots:** Several wildlife food plots are planted each spring attracting numerous bird species in the late summer and through the early winter. The plot is fertilized annually with manure and seeded with a mix is 3:1 sunflower to sorghum, buckwheat, and millet around the edges. This plot attracts sparrows, Bobolinks, Indigo Bunting, American Goldfinch, Common Yellowthroat and a wide variety of migrant passerines. A goal to enhance habitat matrices is to expand these efforts to most if not all agriculture fields.

**Conservation Mowing:** Conservation mowing within the grassland MUs to maintain these early successional habitats (favoring grassland nesting birds and aerial insectivores) is a primary goal for the CAS at the Bafflin Preserve. The core grasslands around the center are important to breeding grassland bird species of conservation concern and thus the maintenance of these fields as early successional grasslands is a priority conservation measure.

**Artificial Nest Box Structures:** Nest box provision and maintenance benefitting the cavity-nesting suite of avifauna has been an improvement measure that has long been implemented at the Bafflin Preserve. Nest box provision and maintenance has benefitted such cavity nesting birds as American Kestrel, Wood Duck, Purple Martin, Eastern Bluebird, Tree Swallow, and House Wren.

**Invasive Species Control:** CAS plans to continue invasive plant species control work and is ever vigilant to prevent new invasions and to keep existing ones at bay until funds and personnel become available for further work toward elimination of the invasion center. As part of their community service work, Woodstock Boy Scout Troop 26 spent two days clearing and cutting back Oriental Bittersweet and Multiflora Rose in the area westerly and downstream of the peat wetland. CAS routinely pursues NRCS grant funding to conduct work at the IBA and grant items typically include invasive plant control work. Both sources of assistance will continue to be pursued in the on-going battle against the spread and proliferation of non-native invasive plants.

## 5.2 Land Acquisition

It is a goal of CAS to continue vigilance for land donation or acquisition possibilities. Past additions to the IBA have occurred via involvement by CAS, Wyndham Land Trust, or both. These additions have been key to expanding the total number of acres protected for wildlife, have helped to protect new habitats or have provided important linkage between or among protected parcels. The most recent properties protected in IBA area were easements held by the State or the Town of Pomfret. Several additional parcels were protected by The Wyndham Land Trust.

The overall goal for land acquisition opportunities is to fill in the missing pieces for habitat linkage among these protected lands. Most of the key parcels needing protection are to the north of the Ct Audubon Sanctuary. One is 200 acre farm with a tremendous number of nesting Bobolinks and Savannah Sparrows. The other properties are mostly forestlands with some agricultural fields on them.

## 5.3 Monitoring

A number of monitoring projects have been initiated on the site in the past with favorable results. It is a goal of the center's staff to continuing the success of these programs within the IBA as they are integral components of adaptive management. Brief descriptions follow:

**Monitoring Avian Productivity and Survivorship (MAPS)** - A MAPS station (a summer bird banding area) is located on part of the old golf course (MU G1). The master bird bander is Carol Millard, and the Bafflin Preserve Manager Andy Rzeznikiewicz is a sub-permittee under her permit. They conduct banding sessions seven times spanning the first week of June until the first week of August (about every ten days). Volunteers have also assisted the banders in the past and on occasion some summer campers have observed the banding efforts. The banding group has been operating the station since the summer of 2001, with plans on continuing for as long as possible into the future.

**Purple Loosestrife Biological Control Agent Release and Monitoring Program** - Staff at the CAS Bafflin Preserve center are closely following the success of the purple loosestrife biological control efforts in the state (see Section 5.1.2 above). Control efforts to date at the Bafflin Preserve have not shown promising results. Further site-specific monitoring, and overall monitoring of the biological control program for purple loosestrife in CT to date will be followed closely by center staff.

Mammal Monitoring Project - A Citizen science project that runs throughout the year with trained volunteers monitoring local study sites in Woodstock and Willington, quarterly (See Section 5.5.2, below).

**Citizen Science Monitoring** – In addition to regularly featured programs, the Center hosts specialized training for volunteer monitors who would like to acquire specialized skill sets in order to participate and contribute to volunteer citizen science monitoring. Continuing these programs is a primary goal for the preserve and thus the IBA itself, as it helps to generate faunal inventories thereby identifying the presence of indicator species, and priority conservation species. These findings then help to further refine habitat management decisions. Recent programs now or formerly offered include the following:

- Master Naturalist Volunteer Training Program – A training program designed by the CTDEEP and intended to teach citizens more about the natural sciences. It aims to train interested people in the natural sciences so that they may serve as land stewards, sanctuary volunteers, citizen scientists and related efforts.
- Mammal Monitoring Project – A citizen science project that runs throughout the year with trained volunteers monitoring local study sites in Woodstock and Willington, quarterly. As of 2013, this will be CAS’ 12th year of documenting the presence of large mammals such as fisher, river otter, mink, black bear, and bobcat. Volunteers are working to establish a study site in Canterbury. The public may begin or continue training to become a wildlife monitor by attending training hikes that suit their schedule.

## 5.4 Research

It is a priority goal of the CAS to continue to offer CAS lands within the IBA as research sites for Yale FES students and faculty. The Bafflin Preserve provides desirable grassland for research given their size and proximity to the Yale Forest in neighboring Easton, CT where students conducting research are typically housed for summer research. Staff of the CAS Center at Pomfret help to coordinate researchers from various CT universities so that the presence of researchers on the site do not impact sensitive environmental receptors (e.g., known breeding grassland birds of conservation concern). Yale FES has expressed interest in continued long-term research within the Bafflin Preserve’s grasslands. A priority goal for management is to continue these partnerships with academia so that site-specific research-generated data may inform management decisions in the IBA.

## 5.5 Public Outreach / Education

The Site offers a variety of venues for public outreach and education which is consistent with the CAS mission. One of the main goals of CAS is to provide educational opportunities and venues to the public. These include lectures, presentations, training programs, nature hikes, workshops, and demonstrations. The Center is very active in this regard. Some programs change from year to year so that new topics periodically appear to keep the public interested. The Center also serves as a meeting place for nature-themed organizations, a local office of the Eastern CT Conservation District is maintained and staffed on site, and the Center runs summer camps for school aged children. A primary goal of CAS is to continue our commitment to conservation and environmental education throughout Connecticut. Our State of the Birds Report for 2012 addressed the question “Where is the next generation of conservationists coming from?” and outlined a plan for statewide initiatives. The new Grassland Bird Conservation Center at Bafflin is the hub of environmental outreach and education for the IBA. CAS will continue to implement environmental education programs for all age groups and to support state and regional efforts toward the same. In addition, trails will remain open to the public to encourage access to outdoor activities such as bird watching, photography, nature interpretation, hiking, and scientific study.

# Chapter 6: Action Plan

## 6.1 Land Management

Opportunities for beneficial management of specific avifauna of conservation concern and biodiversity in general abound within the IBA and adjacent areas. These opportunities are discussed by major land use (i.e., MU) categories and by general management issues in the ensuing paragraphs.

### 6.1.1 Fields

With regard to rare grassland bird management in particular, mowing/haying is the single most important activity likely to impact reproductive success. Recommended management that would likely enhance the existing habitat for grassland bird species and other avifauna are as follows:

#### **Hayfields**

Since a majority of existing hayfields support local farming operations, they will likely remain as such while these farm remain in operation. In their existing condition as a dense, tall, cool-season grassland, these sites appear to provide some suitable habitat to Bobolinks and Savannah Sparrows. The proliferation of these populations may depend upon proper management of the hayfields. In our area (i.e., the Northeast) Bobolinks require fields comprised of a mixture of grasses and broad-leaved forbs. Studies have shown that breeding densities are highest in fields with a high litter cover and high grass to legume ratio. These conditions typically develop in fields greater than approximately 8 years old. Nests are almost always at the base of broad-leaved forbs. Therefore, having some forb component to the grassland is a necessary habitat attribute. Nest sites are often found on the hilltops or hillsides.

The following plan of action will help to reduce impact to breeding grassland birds and improve general habitat:

- Defer mowing for non-forage hay (e.g., bedding straw or erosion control bales) until after breeding season.
- For forage hay plots, first identify areas that the birds are using and avoid harvest in those areas until at least after breeding season.
- Control invading autumn olive, multiflora rose, and other non-native invasive plants from field edges, and
- Control public/vehicle/and pet access onto the site.

#### **Row Crops**

Recommended management that would likely enhance the existing habitat in the row crop area as habitat for avifauna include the following:

- Plant cover crops of grasses, grains, and legumes after harvest to prevent soil erosion during winter to increase organic matter and soil fertility, and to provide cover and feeding areas for birds and other wildlife after harvest and through the winter.
- Consider adding strip crops of grasses or close-growing crops within the planted row crop area, especially within rills or dead furrows, and around downslope perimeters. This will add vegetation diversity to the planted field, prevent soil loss, provide nesting areas within the field for some grassland bird species, and maintain water quality of on-site and down gradient wetlands and watercourses.
- Control invasive plants

## General

Landscape accents in the form of wildflower gardens could be added to improve aesthetics and provide additional resources for Lepidoptera. A conservation mix of grasses and forbs that will provide both nectar plants for adult Lepidoptera, and host plants for larvae is recommended. As many species of Lepidoptera larvae provide food for avifauna, the addition of these wildflower gardens will also be an improvement to the IBA. Since these sites are exposed to direct sunlight for at least 5 hours per day, wildflowers adapted to direct sunlight and upland soils should be selected. A conservation mix containing New England aster – which attracts many species of butterflies, purple coneflower – an excellent nectar plant for mid-season butterflies, black-eyed susan – favored by Pearl Crescents, Monarchs, and fritillaries, and stiff goldenrod – an excellent late season nectar plant that attracts American Lady, Monarch, fritillaries, sulphurs, coppers, and hairstreaks – would be suitable for these sites.

### 6.1.2 Woodlands

The existing forested areas of the IBA should be conserved where possible due to their importance to forest avifauna, wildlife and flora. The forested areas of the IBA are valuable habitat to obligate forest interior species of birds and other animals that require extensive home ranges (Wilcove, 1987). To increase the habitat value of existing woodlands adjacent to the IBA, the following management measures should be considered as time and effort allow:

- Release from competition (by clearing or pruning) beneficial mast-producing tree species such as cherry, oaks, hickories, sassafras, American beech, etc.
- Eliminate or control spread of non-native invasive plant species in areas where they threaten high value habitats
- Prevent loss of wildlife habitat value caused by the removal of non-native species by replanting with native species (e.g., replace *Rosa multiflora* with a native woody, thorny fruit producing shrub such as a robust *Rubus* species, etc.)
- Increase area and development of soft edge ecotones (as opposed to hard, abrupt induced edges) via establishment of shrub or dense herbaceous understory vegetation strata below the canopy. Use native mast-producing shrubs or seed-producing herbaceous plants with high nutritional value to avifauna, and suitable to the climate and existing soil type within the IBA
- Choose plants that fruit asynchronously during migration so that a food source is available throughout the season. Include plants with food sources that will linger into the winter and even late winter season (e.g., *Ilex verticillata*, *Rhus typhina*). Intermix plants whose fruits provide sources of protein with those that provide carbohydrate rich fruits, and
- Increase habitat value by establishing, conserving, or enhancing existing habitat attributes that benefit wildlife. Examples include establishing coniferous inclusions within a deciduous forest; establishing rock, wood, or brush piles, retaining dead branches or trunks with cavities (as safety permits), etc.

### 6.1.3 General

Other conservation measures are available to maintaining the IBA and adjacent areas as productive habitat. Not only will implementation of these measures help to conserve the IBA habitat they may also provide aesthetic benefit to the preserve. The following measures should be considered to conserve or enhance the wildlife value of the IBA:

- Select plants that provide nutritious food (especially for the various guilds – granivores, frugivores, nectarivores, and herbivores), cover, nesting sites or a combination thereof to incorporate into landscape plantings
- Erect nest boxes for desirable bird species such as Purple Martins, Tree Swallow, and Barn Owl. Bat houses should also be erected to encourage insectivorous bats to forage and proliferate in the area.

## 6.1.4 Invasive species Management

The IBA contains a number of non-native invasive plants. Elimination of all these species from the IBA habitats could potentially be labor intensive. Due to the presence of sensitive environmental receptors, the application of herbicides should be avoided whenever alternative control measures are feasible. Selection of an apparent feasible control method should be based upon cost, available labor, effectiveness, limitations, response of the target plant species and availability of follow-up monitoring, control, and replacement with native shrub species. The first goal in invasive species management at the IBA should be consistent with the efforts of the Invasive Plant Atlas of New England (IPANE) assessment group. That is: “No New Invasions”. Master Conservationists in training and site Stewards can assist by being vigilant to colonization by additional non-native invasive species. From there, efforts can expand to the control and elimination of established invasive plants throughout the IBA.

It would be unrealistic to think that all invasive plant species can and will be removed from the IBA permanently. The surrounding landscape offers abundant opportunity for seed dispersal to the preserve from non-native ornamental and other colonizing invasive plant stock. In areas where invasive plants provide a desired function in the preserve, they can be replaced with native plants that provide the same and additional functions (e.g. shade, food source, cover, general aesthetic improvement, etc.). The focus of control efforts should be within and surrounding the most valuable areas within the IBA, then expand outward from there as resources allow. However, care must be taken not to impact the habitat of state listed species during control or removal projects. For instance, removal of Multiflora Rose could impact shrubland birds via removal of suitable nesting habitat. It would be prudent to inventory all non-native invasive plant species, assess their extent and coverage and possible impact, prioritize species based on the urgency and need for control; and find suitable native or non-invasive analogs that will replace the habitat functions lost upon the removal of the target invasive species. It may be desirable in some instances to establish the replacement vegetation species on-site first to provide the functions that will eventually be removed.

The Invasive Plant Atlas of New England (IPANE) is a project designed to provide comprehensive and timely information about the status and distribution of invasive plants in New England. The goals of the project are multi-faceted but are generally designed to:

- Facilitate education and research that will lead to a greater understanding of the dynamics of plant invasions
- Support the early detection of new invasions, and
- Enable rapid management responses to new invasions.

The project has produced a web-accessible atlas that will include images and descriptive information regarding the invasive and potentially invasive flora of New England. Collection databases constructed from herbarium specimens and current field records will be used to document the dates and locations of invasive plant occurrences. This information will be used to generate maps that will depict the distribution and spread of invasive plants across New England. As a result of the IPANE project, an on-line interactive resource will be produced that is accessible to the public. This resource will be available to, and will provide comprehensive information for, students, researchers, land managers, conservationists, scientists, government agencies, the green industry, and the interested public. Volunteers in the IPANE project are periodically trained to inventory habitats throughout New England in an effort to determine the presence and absence of invasive plant species. The data collected by the professionals and volunteers within the program is used to continually update the collection databases (Merhoff et al., 2003a). Survey areas are based on USGS 7.5 minute

### Invasive Plant Control Plan of Action

- Monitor high value areas of IBA to assure “No New Invasions”
- Assess the status of known invasive plants in the IBA and map baseline extent
- Prioritize invasive species based upon urgency and need for control
- Eliminate satellite invasion areas first
- Once satellite invasion areas are eliminated, implement control measures along main invasion fronts
- Progress inward to invasion center as time and resources allow
- Replace lost food and cover and seal forest edges with densely vegetated ecotones of native plants

series topographic quadrangles. Within these quadrangles, numerous public-accessible lands are selected by the coordinator and assigned to a volunteer for inventory. The preserve is an excellent survey location for this program, if it has not already been covered by a volunteer. Volunteers could be trained through the IPANE program to survey the IBA for invasive plant species.

The priority for action should be to check the status of IPANE inventory/census in USGS Quadrangles that cover the IBA and adjacent areas. If coverage is lacking, the SSG should collect the requisite information and submit forms to IPANE. The IPANE atlas can provide information on new invasive species documented from nearby areas and so serve as an early warning system for the preserve's Land Manager. Therefore, the IPANE should be reviewed regularly in an effort to remain vigilant for new invasions to the area so that rapid detection and response teams can be dispatched.

## 6.2 Land Acquisition

The Wyndham Land Trust's mission is the conservation of open space. The Land Trust maintains over 4200 acres on 50 plus preserves; most of which provide access to the public. Many of the preserves are linked together, creating large tracts of un-fragmented, or undeveloped habitat. Acquisition of other large grassland parcels (meadows, pastures, abandoned row cropland) proximal to the IBA should be considered as these fields could provide satellite breeding areas for bird species of conservation concern. To the extent possible, further development on currently undeveloped land adjacent to and surrounding the preserve should be prevented through acquisition of the land, acquisition of the development rights, or other means. In the absence of available land for acquisition, CAS, WLT, and other stakeholders could also consider the following:

- Investigating incentives for beneficial land management on private lands adjacent to the IBA, thereby creating a supportive landscape buffer by reaching out to land-holding "conservation partners"
- Using conservation easements and purchase of development rights as potential land protection tools to be considered for properties abutting the preserve

## 6.3 Monitoring/Research

Monitoring should be conducted at each site to definitively determine the breeding status (e.g., location of highest nesting density, etc.) of listed bird species in order to set management goals. The use of the site by breeding American Kestrels, Saw-whet Owls, Long-eared Owls, Purple Martins, Brown Thrashers, Bobolinks, Savannah Sparrows, as well as winter roosts for Long-eared Owls, and any other state listed birds or other fauna at the IBA should be reported to the CTDEEP NDDDB in order to keep their records current. The information obtained from the NDDDB is not necessarily based upon comprehensive or site-specific field investigations, and the change in species distributions over time necessitates periodic updates of the database. These efforts can also be used to monitor Brown-headed Cowbird populations.

There is potential for additional state listed fauna to occur within or adjacent to the IBA. For instance, some of the wooded interspersed wetlands within or adjacent to the IBA offers potential habitat for the state special concern Northern Ribbon Snake (*Thamnophis sauritus septentrionalis*), and the extensive grasslands have potential for Smooth Green Snake. Therefore, it is recommended that surveys be conducted for these species to determine their presence on property. Documentation of other state listed fauna on site would help illustrate the importance of the site to the state's biodiversity when applying for habitat improvement grants and other funding opportunities.

Monitoring for satellite invasion areas for non-native invasive plant species should be conducted where sensitive habitats occur on site (see section above). These may be areas of exceptional diversity or areas representative of near pristine conditions. Control efforts should focus on satellite invasion areas, invasion fronts, and invasions core areas in that order of priority to realize optimal control effort benefit, and to further the primary goal of the Connecticut Invasive Plant Working Group of "No new invasions".

Researchers in the fields of ecology, botany, ornithology, and other sciences related to natural resource management should be notified of the availability of the preserve as a potential site available for student research and monitoring projects. On-going monitoring and research data obtained via university research projects may be a cost effective way for owner/operators to obtain data upon which to base future natural resource management decisions. CAS Sanctuaries Management and Conservation Services will explore cooperative research agreements with UCONN and Yale University FES that would address the following:

- Impact of current conservation mowing on insect diversity and productivity
- Impact of current conservation mowing on pollinator community structure, and
- The feasibility of sustaining, expanding and enhancing the Pitch Pine stand at MU W7.

### *6.3.1 Citizen science Monitoring Projects*

The preserve has a volunteer coordinator on staff that manages citizen science project efforts. Citizen monitoring projects now or formerly conducted at the Bafflin Preserve are identified in Section 3.4.1. Not only do these projects help provide the information necessary for effective conservation, they also get people out and directly involved with IBAs. Changes to these efforts are dictated by interest, funding for supplies, and priority. The following action plan is a framework outline of continued or anticipated community science monitoring efforts:

- Stewards and others birding within the IBA should continue to develop the eBird database by entering sightings obtained during bird walks, hawk watches, Christmas Counts and other outings
- Coordinate more closely with the Storrs CBC Coordinator Steve Morytko to provide better coverage of the IBA during the Christmas Bird Count
- Continue operation of MAPS migration banding station. Identify apprentice banders for future operations
- Continue to expand upon those activities identified in Section 3.4.1 to expand the time series of the data sets produced by those efforts
- Explore established community science opportunities that can help to identify data gaps within the IBA's natural resource inventory baseline information (see 2.4 and 2.5)
- Form an Invasive Plant early detection and rapid response team to periodically monitor for new plant species invasions and new satellite invasions of known invasive plants on site.

### *6.3.2 Public Outreach/Education*

Grassland Bird Conservation Center staff should work with teachers of local schools develop curricula that culminate in field excursions to the preserve. This will help to foster awareness and appreciation of the natural resources of the IBA in the youth of the community so that this appreciation will be passed down to future generations.

Another public outreach/education goal should be to expand the interpretive signage within the IBA. The signage would relay the information presented herein regarding the change in avifaunal community composition with the seasons, and other applicable topics. Locations for additional signage could include the pull-off areas along Day Road and other local and state roads, and where the Airline Trail bisects the IBA.

A project developed by the Cornell Lab of Ornithology and the National Audubon Society, eBird, provides a simple way for birders to record their sightings in North America. Information entered into the eBird Database can be retrieved at any time by the person recording the data. Birders can also access the entire historical database to find out what other eBirders are reporting from various sites across North America. Data collected from backyards, as well as from notable birding destinations are eligible for entry. Sightings collected from the site that are entered into the database will help to promote education and outreach since the cumulative eBird database will be used by not only birders, but also scientists, conservationists, educators, and others searching to find out more about the status, distributions, and movement patterns of birds in North America (<http://www.ebird.org/content/About/WhatIsEBird.html>).

It is recommended that the Wyndham Land Trust also be informed of the potential to leverage expertise from nearby institutions to benefit from scientific research relating to the natural resources in the preserve. Potential example topics abound. They include but are not limited to:

- Inventory of all plants and animals in habitats
- The survivorship and fecundity of resident birds nesting within the hayfields
- Frequency and occurrence of cowbird parasitism on birds nesting within on-site habitats
- The response of native plant species to invasive species control
- The response of invasive plant species to various control techniques
- Studies of habitat usage by migrant landbirds to better understand migratory stopover habitat needs
- Establishment and monitoring of nocturnal listening stations ([www.oldbird.org](http://www.oldbird.org)) and Doppler radar studies (see <http://www.woodcreeper.com/> or <http://radar.weather.gov/ridge/radar.php?rid=okx&product=NOR&overlay=11101111&loop=no>) that could help quantify migratory stopover and help better understand where migrants are coming from and moving to
- Species use of constructed nest boxes deployed at the IBA, and
- Economic surveys/studies to help quantify the value of birding as a source of tourism to the area.

It is imperative for the CAS Center at Bafflin to continuously seek new topics and subject matter in order to keep the public interested in conservation and management within the IBA.

# Chapter 7: Methods of Evaluation

Feedback from the public will be one measure of success. Feedback can be solicited through response forms attached to or incorporated in newsletters, brochures, or e-mailings. Reduction in the number of complaints issued by stakeholders in response to management decisions that impact the IBA would be another measure of success.

Hard data collected as a result of any monitoring efforts that may be implemented within the IBA will demonstrate and quantify the degree of success obtained from restoration efforts. Surveys can be generated and circulated to stakeholders to solicit feedback on restoration efforts. Measures of success that can be quantified include but are not limited to the following:

- Populations of priority bird species stable or increasing. It's impossible to say whether what we do on the sanctuary for management is the main control factor. This is due to the fact that many of these birds winter a great distance in other countries for a greater percentage of the time than they spend on in Connecticut. It's not known how many grassland birds we have now. It seems that winter mortality is high. I would like the population numbers to be as high as the carrying capacity of our habitat, which I don't know.
- Percentage of area impacted by invasive plants in locations that control is conducted. In those areas reduction is hoped to be at least 90% within 3-5 years.
- New species of conservation concern documented as breeders on site of all species from birds to insects to plants.
- Additional acres protected. There are about 8 properties that would be of high value for conservation. The order of importance: Amaral Farms (211 acres), Pomfret School lands (265 acres), David Loos lands (42 acres), Morrisette farm (94 acres), Byrnes property (20 acres), Mancini farm (30 acres), Bill Loos estate (125 acres), and Higgins property (32 acres).
- Successful documentation of recaptures at the MAPS Station
- Native species richness stable or increasing, and
- Number of successful nests or fledged young of priority species produced each year.

Sightings data collected from birders using the IBA and reporting their sightings to eBird could also be used as a measure of success. For instance, data collected by birders entered into eBird could be monitored over time to determine species richness across or within seasons, document occurrences (frequency and duration) within the IBA and to illustrate trends. The names and contact information of people entering their sightings could help document usage of the site to estimate tourism attraction.

The abundance and diversity of certain insect groups could be measured among different field treatments to assess the impact of mowing regimes to the avian food base.

Stream bioassessments and taxonomic enumeration of aquatic invertebrate community can be used to monitor water quality over time and serve as early warning signs of organic enrichment.

Vegetation monitoring can be implemented at areas of invasive species control to monitor the status of invasive species removal. Nested plots of herbaceous, shrub, and tree coverage set across a treatment area can be used to gauge treatment success or to document the rate of re-growth or re-colonization of the target plant.

Finally, the number of priority conservation species exhibiting evidence of breeding each year should be documented and the number per MU compared each year especially before, during, and after management treatments. For instance, the center has American Kestrel banding numbers from 2008 (9 birds), 2010 (13 birds), 2011 (9 birds), and 2012 (5 birds). This time series could be used to establish a mean number of birds produced during a 5 year period. Significant deviations from this average

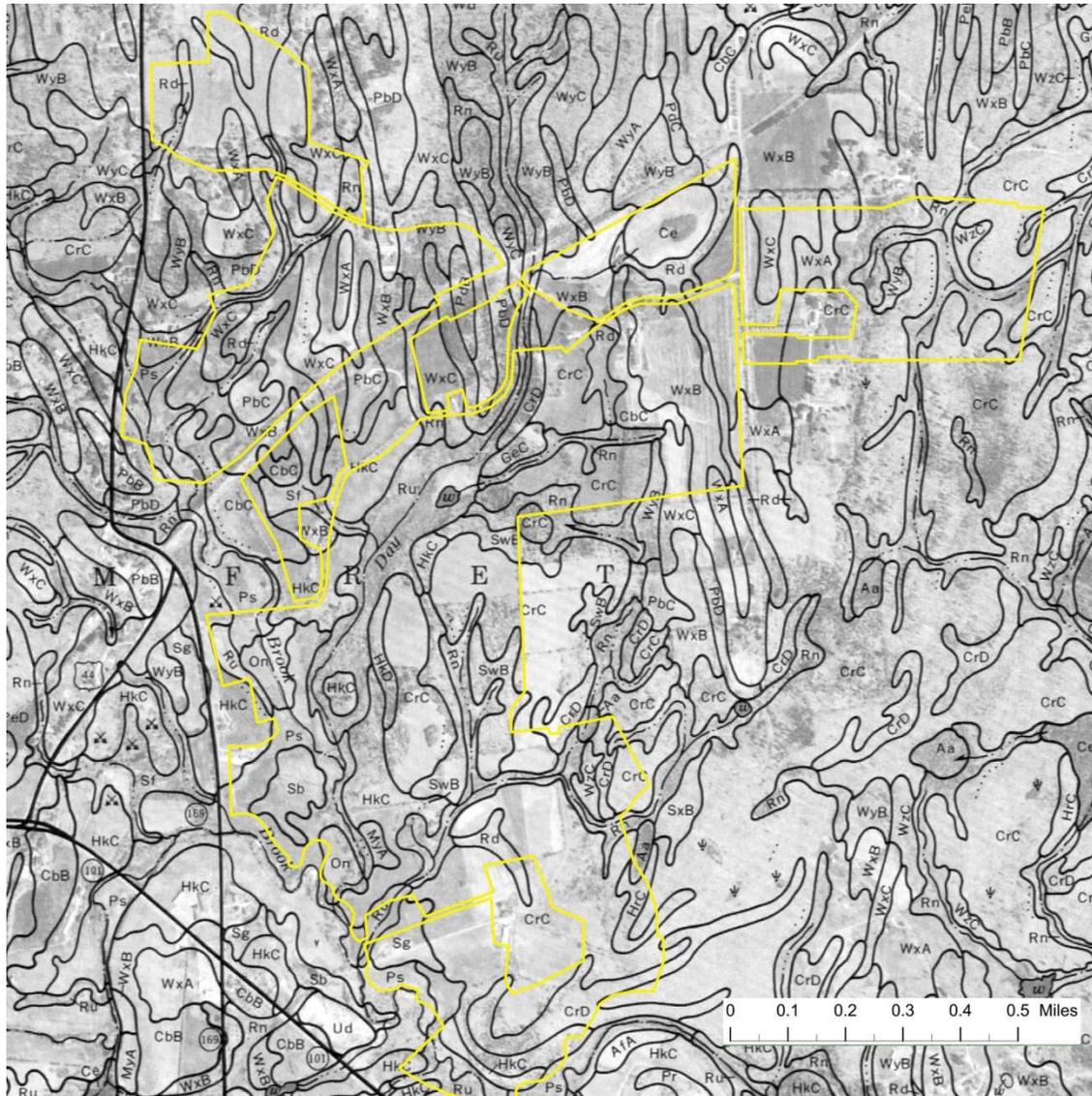
could serve as an early warning sign of potential habitat degradation or other threats. Similar numbers of young produced by other species of conservation concern (e.g., Eastern Meadowlark, Bobolink) could also be used as a performance metric for grassland management.

Similarly, other metrics of success can be developed by statistical analyses of existing time series data already collected for the IBA such as MAPs banding records, stream bioassessment results, CBC results, etc. CAS should collaborate with University of Connecticut, Connecticut College, Eastern CT State University, and Bird Conservation Research, Inc. for assistance in these analyses and eventual development of performance metrics as indices of biological integrity and other methodology.

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# Appendix 1: Bafflin Sanctuary Complex Soils



**Figure 11.** Soil types found in the Connecticut Audubon Society Bafflin Sanctuary Complex (sanctuary boundaries indicated by yellow outline). See text for explanation of soil type codes. Source: USDA Soil Conservation Service (1981).

## **Cr – Charlton-Hollis fine sandy loams, very rocky (CrC, CrD)**

The Charlton series consists of well-drained, non-stony to extremely stony soils formed in loamy glacial till derived mainly from schist and gneiss. Charlton soils are on hills, ridges, and steep side slopes of glacial till uplands. Slopes range from 3 to 35 percent.

## **GeC – Gloucester extremely stony sandy loam**

This soil is gently sloping to sloping and somewhat excessively drained. It is on ridges and hills of glacial till uplands. Slopes range from 3 to 15 percent.

## **Hk – Hinckley gravelly sandy loam (HkA, HkC, HkD)**

The Hinckley series consists of excessively drained soils formed in water-sorted sand and gravel deposits derived mainly from gneiss and schist. Hinckley soils are on outwash plains and stream terraces. Slopes range from 0-40 percent.

## **MyA – Merrimac sandy loam**

This soil is nearly level and somewhat excessively drained. It is on outwash plains in stream valleys. Slopes range from 0 to 3 percent.

## **On – Occum fine sandy loam**

The Occum series consists of well-drained soils formed in loamy alluvial sediments derived mainly from schist and gneiss. Occum soils are on flood plains along the major streams. Slopes range from 0 to 3 percent.

## **Pb – Paxton fine sandy loam**

The Paxton series consists of well-drained, non-stony to extremely stony soils formed in compact glacial till derived mainly from schist and gneiss. Paxton soils are on drumlins and rolling hills of glacial till uplands. Slopes range from 3 to 35 percent.

## **Ps – Pootatuck fine sandy loam**

The Pootatuck series consists of moderately well drained soils formed in loamy alluvial sediments derived mainly from gneiss and schist. Pootatuck soils are on flood plains along the major streams. Slopes range from 0 to 3 percent.

## **Rd – Ridgebury fine sandy loam**

The Ridgebury series consists of poorly drained, non-stony to extremely stony soils formed in loamy compact glacial till derived mainly from gneiss and schist. Ridgebury soils are in slightly concave areas and shallow drainageways of glacial till uplands. Slopes range from 0 to 3 percent.

## **Rn – Ridgebury, Leicester, and Whitman extremely stony fine sandy loams**

The Ridgebury series consists of poorly drained, non-stony to extremely stony soils formed in loamy compact glacial till derived mainly from gneiss and schist. Ridgebury

soils are in slightly concave areas and shallow drainageways of glacial till uplands. Slopes range from 0 to 3 percent.

**Ru – Rippowam fine sandy loam**

The Rippowam series consists of poorly drained soils that formed in recent alluvium derived mainly from gneiss and schist. Rippowam soils are on low flood plains of major streams and their tributaries. Slopes range from 0 to 3 percent.

**Sb – Saco silt loam**

The Saco series consists of very poorly drained soils that formed in recent alluvial sediments derived mainly from gneiss, schist, and granite. Saco soils are on the lowest parts of the flood plains of major streams and rivers. Slopes range from 0 to 2 percent but are dominantly 0 to 1 percent.

**Sg – Sudbury sandy loam**

The Sudbury series consists of moderately well drained soils that formed in water-sorted sand and gravel deposits derived mainly from gneiss and schist. Sudbury soils are in slight depressions and on gentle, concave slopes at the base of upland hills. Slopes range from 0 to 5 percent.

**SwB – Sutton very stony fine sandy loam**

This soil is gently sloping and moderately well-drained. It is near the base of slopes and in slight depressions in glacial till uplands. Slopes range from 3 to 8 percent.

**Wy – Woodbridge sandy loam (WyA, WyC)**

The Woodbridge series consists of moderately well drained, non-stony to extremely stony soils that formed in compact glacial till derived mainly from schist and gneiss. Woodbridge soils are on drumlins and hills of glacial till uplands. Slopes range from 0 to 15 percent.

**Wx – Woodbridge fine sandy loam (WxA, WxC)**

This Woodbridge series soil type is nearly level and moderately well drained. It is on the top and lower side slopes of large drumlins and hills on glacial till uplands. Slopes range from 0 to 3 percent.

**WzC – Woodbridge extremely stony fine sandy loam**

This Woodbridge series soil is gently sloping and moderately well drained. It is on tops of large drumlins and hills on glacial till uplands. Slope ranges from 3 to 15 percent.

# Appendix 2: Bafflin Sanctuary Complex Plant List

This list is comprised of plant species documented opportunistically during site visits and should be considered an overview of regularly encountered species rather than a complete inventory of the Bafflin Sanctuary Complex flora.

Common Name	Scientific Name	Family	
American Elderberry	<i>Sambucus canadensis</i>	Adoxaceae	
Northern Arrowwood	<i>Viburnum dentatum</i>	Adoxaceae	
Common Arrowhead	<i>Sagittaria latifolia</i>	Alismataceae	
Staghorn Sumac	<i>Rhus typhina</i>	Anacardiaceae	
Poison Ivy	<i>Toxicodendron radicans</i>	Anacardiaceae	
Purple-stemmed Angelica	<i>Angelica atropurpurea</i>	Apiaceae	
Queen Anne's Lace	<i>Daucus carota</i>	Apiaceae	
Common Milkweed	<i>Asclepias syriaca</i>	Apocynaceae	
Butterfly Weed	<i>Asclepias tuberosa</i>	Apocynaceae	
Jack-in-the-Pulpit	<i>Arisaema triphyllum</i>	Araceae	
Duckweed	<i>Lemna sp.</i>	Araceae	
Skunk Cabbage	<i>Symplocarpus foetidus</i>	Araceae	
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	Araliaceae	
New England Aster	<i>Aster novae-angliae</i>	Asteraceae	
Dandelion	<i>Taraxacum officinale</i>	Asteraceae	
Yarrow	<i>Achillea millefolium</i>	Asteraceae	
Common Ragweed	<i>Ambrosia artemisiifolia</i>	Asteraceae	
Aster spp.	<i>Aster spp.</i>	Asteraceae	
Common Mugwort	<i>Artemisia vulgaris</i>	Asteraceae	
Flat-topped White Aster	<i>Aster umbellatus</i>	Asteraceae	
*Spotted Knapweed	<i>Centaurea maculosa</i>	Asteraceae	
Cichory	<i>Cichorium intybus</i>	Asteraceae	
Canada Thistle	<i>Cirsium arvense</i>	Asteraceae	
Bull Thistle	<i>Cirsium vulgare</i>	Asteraceae	
Common Fleabane	<i>Erigeron philadelphicus</i>	Asteraceae	
Boneset	<i>Eupatorium perfoliatum</i>	Asteraceae	
Joe-pye-weed	<i>Eupatorium purpureum</i>	Asteraceae	
Common Flat-topped Goldenrod	<i>Euthamia graminifolia</i>	Asteraceae	
Tall Goldenrod	<i>Solidago altissima</i>	Asteraceae	
Stiff Goldenrod	<i>Solidago rigida</i>	Asteraceae	
Grass-leaved Goldenrod	<i>Solidago graminifolia</i>	Asteraceae	
Orange Hawkweed	<i>Hieracium aurantiacum</i>	Asteraceae	
Pineapple Weed	<i>Matricaria discoidea</i>	Asteraceae	
Sweet Everlasting	<i>Pseudognaphalium obtusifolium</i>	Asteraceae	
Purple Coneflower	<i>Echinacea purpurea</i>	Asteraceae	
Black-eyed Susan	<i>Rudbeckia hirta</i>	Asteraceae	
Canada Goldenrod	<i>Solidago canadensis</i>	Asteraceae	
Coltsfoot	<i>Tussilago farfara</i>	Asteraceae	
Daisy Fleabane	<i>Erigeron annuus</i>	Asteraceae	
Giant Burdock	<i>Arctium lappa</i>	Asteraceae	

\*Indicates Invasive non-native species

Wild Chamomile	<i>Anthemis arvensis</i>	Asteraceae
Winterberry	<i>Ilex verticillata</i>	Aquifoliaceae
Spotted Jewelweed	<i>Impatiens capensis</i>	Balsaminaceae
*Japanese Barberry	<i>Berberis thunbergii</i>	Berberidaceae
May-apple	<i>Podophyllum peltatum</i>	Berberidaceae
Alder	<i>Alnus serrulata</i>	Betulaceae
Yellow Birch	<i>Betula lutea</i>	Betulaceae
Gray Birch	<i>Betula populifolia</i>	Betulaceae
Black Birch	<i>Betula lenta</i>	Betulaceae
*Garlic Mustard	<i>Alliaria petiolata</i>	Brassicaceae
Tower Mustard	<i>Arabis glabra</i>	Brassicaceae
*Narrowleaf Bittercress	<i>Cardamine impatiens</i>	Brassicaceae
*Dame's Rocket	<i>Hesperis matronalis</i>	Brassicaceae
*Japanese Honeysuckle	<i>Lonicera japonica</i>	Caprifoliaceae
*Bush Honeysuckle species	<i>Lonicera spp.</i>	Caprifoliaceae
Morrow's Honeysuckle	<i>Lonicera morrowii</i>	Caprifoliaceae
Hobblebush	<i>Viburnum lantanoides</i>	Caprifoliaceae
Viburnum	<i>Viburnum recognitum</i>	Caprifoliaceae
Mouse-ear Chickweed	<i>Cerastium fontanum</i>	Caryophyllaceae
Deptford Pink	<i>Dianthus armeria</i>	Caryophyllaceae
Maiden Pink	<i>Dianthus deltoides</i>	Caryophyllaceae
Ragged-robin	<i>Lychnis flos-cuculi</i>	Caryophyllaceae
Bladder Campion	<i>Silene vulgaris</i>	Caryophyllaceae
*Burning Bush/ Winged Euonymus	<i>Euonymus alatus</i>	Celastraceae
*Oriental Bittersweet	<i>Celastrus orbiculatus</i>	Celastraceae
Sweet Pepperbush	<i>Clethra alnifolia</i>	Clethraceae
St. John's-wort	<i>Hypericum perforatum</i>	Clusiaceae
Fringed Loosestrife	<i>Lysimachia ciliata</i>	Clusiaceae
Bunchberry	<i>Cornus canadensis</i>	Cornaceae
Silky Dogwood	<i>Cornus amomum</i>	Cornaceae
Eastern Red Cedar	<i>Juniperus virginiana</i>	Cupressaceae
*Autumn Olive	<i>Eleagnus umbellatus</i>	Eleagnaceae
*Cypress spurge	<i>Euphorbia cyparissias</i>	Euphorbiaceae
Field Horsetail	<i>Equisetum arvense</i>	Equisetaceae
Highbush Blueberry	<i>Vaccinium corymbosum</i>	Ericaceae
Mountain Laurel	<i>Kalmia latifolia</i>	Ericaceae
Lowbush Blueberry	<i>Vaccinium angustifolia</i>	Ericaceae
Hog-Peanut	<i>Amphicarpa bracteata</i>	Fabaceae
Birdsfoot Trefoil	<i>Lotus corniculatus</i>	Fabaceae
Cow Vetch	<i>Vicia cracca</i>	Fabaceae
Alfalfa	<i>Medicago sativa</i>	Fabaceae
*Black Locust	<i>Robinia pseudoacacia</i>	Fabaceae
Rabbit's-foot Clover	<i>Trifolium arvense</i>	Fabaceae
Low Hop Clover	<i>Trifolium campestre</i>	Fabaceae
Red Clover	<i>Trifolium pratense</i>	Fabaceae
White Clover	<i>Trifolium repens</i>	Fabaceae
American Beech	<i>Fagus grandifolia</i>	Fagaceae
White Oak	<i>Quercus alba</i>	Fagaceae
Pin Oak	<i>Quercus palustris</i>	Fagaceae
Red Oak	<i>Quercus rubrum</i>	Fagaceae
Witchhazel	<i>Hamamelis virginiana</i>	Hamamelidaceae
Blue Flag	<i>Iris versicolor</i>	Iridaceae

Blue-eyed Grass	<i>Sisyrinchium angustifolium</i>	Iridaceae
Shagbark Hickory	<i>Carya ovata</i>	Juglandaceae
Ground Ivy	<i>Glechoma hederacea</i>	Lamiaceae
Field Mint	<i>Mentha arvensis</i>	Lamiaceae
Heal-all	<i>Prunella vulgaris</i>	Lamiaceae
Spicebush	<i>Lindera benzoin</i>	Lauraceae
Sassafras	<i>Sassafras albidum</i>	Lauraceae
Troutlily	<i>Erythronium americanum</i>	Liliaceae
Canada Lily	<i>Lilium canadense</i>	Liliaceae
Canadian Mayflower	<i>Maianthemum canadense</i>	Liliaceae
False Solomon's Seal	<i>Maianthemum racemosum</i>	Liliaceae
Smooth Solomon's Seal	<i>Polygonatum biflorum</i>	Liliaceae
Purple Trillium	<i>Trillium erectum</i>	Liliaceae
Sessile Bellwort	<i>Uvularia sessifolia</i>	Liliaceae
False Hellebore	<i>Veratrum viride</i>	Liliaceae
Clubmoss	<i>Lycopodium dendroideum</i>	Lycopodiaceae
*Purple Loosestrife	<i>Lythrum salicaria</i>	Lythraceae
Tulip Tree	<i>Liriodendron tulipifera</i>	Magnoliaceae
Indian Pipe	<i>Monotropa uniflora</i>	Monotropaceae
Yellow Pond-lily	<i>Nuphar lutea</i>	Nymphaeaceae
White Ash	<i>Fraxinus americana</i>	Oleaceae
Green Ash	<i>Fraxinus pennsylvanica</i>	Oleaceae
Sensitive Fern	<i>Onoclea sensibilis</i>	Onocleaceae
Royal Fern	<i>Osmunda regalis</i>	Osmundaceae
Cinnamon Fern	<i>Osmunda cinnamomea</i>	Osmundaceae
Common Wood-sorrel	<i>Oxalis acetosella</i>	Oxalidaceae
Yellow Wood-sorrel	<i>Oxalis stricta</i>	Oxalidaceae
Celandine	<i>Chelidonium majus</i>	Papaveraceae
Pokeweed	<i>Phytolacca americana</i>	Phytolaccaceae
White Pine	<i>Pinus strobes</i>	Pinaceae
Eastern Hemlock	<i>Tsuga Canadensis</i>	Pinaceae
Narrow-leaf Plantain	<i>Plantago lanceolata</i>	Plantaginaceae
American Plantain	<i>Plantago rugelii</i>	Plantaginaceae
Common Plantain	<i>Plantago major</i>	Plantaginaceae
English plantain	<i>Plantago lanceolate</i>	Plantaginaceae
Deertongue Grass	<i>Dichanthelium clandestinum</i>	Poaceae
Timothy	<i>Phleum pratense</i>	Poaceae
*Common Reed	<i>Phragmites australis</i>	Poaceae
Yellow Foxtail	<i>Setaria glauca</i>	Poaceae
Orchard Grass	<i>Dactylis glomerata</i>	Poaceae
Reed Canary-grass	<i>Phalaris arundinacea</i>	Poaceae
Bentgrass	<i>Agrostis spp.</i>	Poaceae
Kentucky Bluegrass	<i>Poa pratensis</i>	Poaceae
Fescue	<i>Festuca spp.</i>	Poaceae
Corn	<i>Zea mays</i>	Poaceae
*Japanese Knotweed	<i>Fallopia japonica</i>	Polygonaceae
Halberd-leaved Tearthumb	<i>Polygonum arifolium</i>	Polygonaceae
Fringed Bindweed	<i>Polygonum cilinode</i>	Polygonaceae
Arrow-leaved Tearthumb	<i>Polygonum sagittatum</i>	Polygonaceae
Climbing False Buckwheat	<i>Polygonum scandens</i>	Polygonaceae
Smartweed	<i>Polygonum sp.</i>	Polygonaceae
Curled Dock	<i>Rumex crispus</i>	Polygonaceae

Carolina Spring Beauty	<i>Claytonia caroliniana</i>	Portulacaceae
Swamp-candles	<i>Lysimachia terrestris</i>	Primulaceae
Starflower	<i>Trientalis borealis</i>	Primulaceae
White Baneberry	<i>Actaea pachypoda</i>	Ranunculaceae
Marsh Marigold	<i>Caltha palustris</i>	Ranunculaceae
Hepatica	<i>Hepatica nobilis</i>	Ranunculaceae
Common Buttercup	<i>Ranunculus acris</i>	Ranunculaceae
Hooked Crowfoot	<i>Ranunculus recurvatus</i>	Ranunculaceae
Tall Meadow-rue	<i>Thalictrum pubescens</i>	Ranunculaceae
*Glossy Buckthorn	<i>Frangula alnus</i>	Rhamnaceae
*Common Buckthorn	<i>Rhamnus cathartica</i>	Rhamnaceae
Woodland Strawberry	<i>Fragaria vesca</i>	Rosaceae
White Avens	<i>Geum canadense</i>	Rosaceae
Silvery Cinquefoil	<i>Potentilla argentea</i>	Rosaceae
Downy Cinquefoil	<i>Potentilla intermedia</i>	Rosaceae
Common Cinquefoil	<i>Potentilla simplex</i>	Rosaceae
*Multiflora rose	<i>Rosa multiflora</i>	Rosaceae
Common Blackberry	<i>Rubus allegheniensis</i>	Rosaceae
Black Cherry	<i>Prunus serotina</i>	Rosaceae
Rough Bedstraw	<i>Galium asprellum</i>	Rubiaceae
Bedstraw	<i>Gallium mullugo</i>	Rubiaceae
Partridge-berry	<i>Mitchella repens</i>	Rubiaceae
*Norway Maple	<i>Acer platanoides</i>	Sapindaceae
Red Maple	<i>Acer rubrum</i>	Sapindaceae
Sugar Maple	<i>Acer saccharum</i>	Sapindaceae
Butter-and-eggs	<i>Linaria vulgaris</i>	Scrophulariaceae
Monkey Flower	<i>Mimulus ringens</i>	Scrophulariaceae
Common Mullein	<i>Verbascum thapsus</i>	Scrophulariaceae
Nightshade	<i>Solanum dulcamara</i>	Solanaceae
Marsh Fern	<i>Thelypteris palustris</i>	Thelypteridaceae
New York Fern	<i>Thelypteris noveboracensis</i>	Thelypteridaceae
Narrow-leaved Cattail	<i>Typha angustifolia</i>	Typhaceae
Common Cattail	<i>Typha latifolia</i>	Typhaceae
American Elm	<i>Ulmus americana</i>	Ulmaceae
Stinging Nettle	<i>Urtica dioica</i>	Urticaceae
Blue Vervain	<i>Verbena hastata</i>	Verbenaceae
Hoary Verbena	<i>Verbena stricta</i>	Verbenaceae
American Dog Violet	<i>Viola conspersa</i>	Violaceae
Violet sp.	<i>Viola spp.</i>	Violaceae
*Porcelainberry	<i>Ampelopsis brevipedunculata</i>	Vitaceae
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	Vitaceae
Wild grape	<i>Vitis vinifera sylvestris</i>	Vitaceae

# Appendix 3: Bafflin Sanctuary Complex

## Butterflies and Moths

### Butterflies

*E-Established, C-Common, S-Sporadic*

<i>Euptychia cymela</i>	E	Little wood satyr
<i>Cercyonis pegala alope</i>	C	Blue eyed grayling
<i>Speyeria cybele</i>	C	Great spangled fritillary
<i>Danaus plexippus</i>	C	Monarch
<i>Lethe eurydice</i>	C	Eyed brown – <b><u>CT-ESA Special Concern</u></b>
<i>Ceononympha tullia inorata</i>	C	Inornate ringlet
<i>Euphydryas phaeton</i>	E	Baltimore
<i>Nymphalis j-album</i>	E	Compton tortoise shell
<i>Nymphalis antiopa</i>	C	Mourning cloak
<i>Nymphalis milberti</i>	S	Milbert's tortoise shell
<i>Melitaea harrisii</i>	C	Harris' checkerspot – <b><u>CT-ESA Special Concern</u></b>
<i>Boloria toddi ammiralis</i>	E	Meadow fritillary
<i>Phyciodes tharos</i>	C	Pearl crescent
<i>Polygonia comma</i>	C	Hop merchant
<i>Polygonia interrogationis</i>	C	Question mark
<i>Vanessa atalanta</i>	C	Red admiral
<i>Vanessa cardai</i>	C	Painted lady
<i>Precis lavinia zonalis</i>	S	Buckeye
<i>Limenitis arthemis astyanax</i>	C	Red spotted purple
<i>Everes comyntas</i>	C	Eastern tailed blue
<i>Lycaenopsis argiolus pseudoargiolus</i>	C	Spring azure
<i>Lycaena phlaeas americana</i>	E	American copper
<i>Colias eurytheme</i>	C	Alfalfa butterfly
<i>Colias philodice</i>	C	Common sulphur
<i>Papilio philenor</i>	S	Pipevine swallowtail
<i>Papilio polyxenes asterius</i>	E	Black swallowtail
<i>Papilio troilus</i>	C	Spicebush swallowtail
<i>Papilio glaucus</i>	C	Tiger swallowtail
<i>Pieris rapae</i>	C	European cabbage butterfly
<i>Eupargyreus clarus</i>	C	Silver spotted skipper
<i>Thorybes bathyllus</i>	C	Northern cloudy wing
<i>Pholisora catullus</i>	C	Common sooty wing

## Moths

A-Abundant, E-Established (but not common), C-Common, R-Rare

### SPHINGIDAE

<i>Pachysphinx modesta</i>	C
<i>Mandara sexta</i>	C
<i>Mandara quinquemaculata</i>	R
<i>Ceretomia amnytor</i>	E
<i>Ceretomia undulosa</i>	C
<i>Eumorpha pandorus</i>	E
<i>Hyles lineata</i>	R
<i>Hyles gallii</i>	A
<i>Sphinx kalmiae</i>	C
<i>Sphinx chersis</i>	E
<i>Sphinx drupiferarum</i>	R
<i>Sphinx eremitus</i>	E
<i>Sphinx gordius</i>	C
<i>Dolba hyloeus</i>	E
<i>Lapara bombycoides</i>	E
<i>Smerinthus amaiceusis</i>	C
<i>Paonais astylus</i>	E
<i>Paonais excaecatus</i>	C
<i>Paonais myops</i>	C
<i>Darapsa myron</i>	C
<i>Darapsa pholus</i>	C
<i>Darapsa versicolor</i>	E
<i>Lathoe juglandis</i>	C
<i>Sphecodina abbotti</i>	C
<i>Deidamia inscripta</i>	C
<i>Hemaris thysbe</i>	C
<i>Hemaris diffinis</i>	C
<i>Amphion floridensis</i>	E
<i>Xylophanes tersa</i>	R

### SATURNIDAE

<i>Hemileura lucina</i>	R
<i>Antherea polyphemus</i>	C
<i>Actias luna</i>	C
<i>Automeris io</i>	E
<i>Callosamia angulifera</i>	R
<i>Callosamia promethea</i>	E
<i>Hylophera cecropia</i>	E

### ARCTIIDAE

<i>Cisseps fulvicollis</i>	A
<i>Lycomorpha pholus</i>	R
<i>Ctenacha virginica</i>	C

<i>Hypoprepia fucosa</i>	C
<i>Halysidota harrisii</i>	E
<i>Halysidota tessellaris</i>	A
<i>Lophocampa caryae</i>	A
<i>Cygnia oregonensis</i>	E
<i>Cygnia tenera</i>	C
<i>Euchaetes egle</i>	E
<i>Cisthene packardii</i>	E
<i>Spilosoma congrua</i>	C
<i>Spilosoma latipennis</i>	E
<i>Spilosoma virginica</i>	C
<i>Estigmene acrea</i>	C
<i>Hypantria cunea</i>	A
<i>Holomolima opella</i>	C
<i>Holomolima laeta</i>	E
<i>Holomolima aurantiaca</i>	E
<i>Phragmatobia assimilans</i>	E
<i>Phragmatobia fuliginosa</i>	C
<i>Phragmatobia lineata</i>	E
<i>Pyrractia isabella</i>	A
<i>Grammia virgo</i>	R
<i>Grammia virguncula</i>	E
<i>Grammia arge</i>	E
<i>Grammia figurata</i>	E
<i>Apantesis nais</i>	C
<i>Holomolima clymene</i>	C
<i>Holomolima lecontel</i>	C
<i>Holomolima confusa</i>	R
<i>Hypercombe scribonia</i>	C
<i>Clemensia albata</i>	E
<i>Crambidia pallida</i>	E

### NOCTUIDAE

<i>Alypia octomaculata</i>	E
<i>Feralia comstocki</i>	R
<i>Feralia jocosa</i>	C
<i>Feralia major</i>	E
<i>Papaipema ptersii</i>	E
<i>Papaipema inquaesita</i>	C
<i>Papaipema cerussata</i>	E
<i>Papaipema nebris</i>	E
<i>Papaipema arctivoreus</i>	E
<i>Papaipema rigida</i>	E
<i>Papaipema cataphracta</i>	E

<i>Papaipema speciosissima</i>	E
<i>Eutlia pulcherrima</i>	E
<i>Allotria elonympha</i>	E
<i>Synedoida grandirina</i>	E
<i>Catocala gracilis</i>	C
<i>Catocala amica</i>	C
<i>Catocala micronympha</i>	E
<i>Catocala mira</i>	C
<i>Catocala serena</i>	E
<i>Catocala sordida</i>	E
<i>Catocala antinympha</i>	E
<i>Catocala crataegi</i>	E
<i>Catocala ultronis</i>	C
<i>Catocala grynea</i>	E
<i>Catocala praeclara</i>	E
<i>Catocala similis</i>	E
<i>Catocala blandala</i>	E
<i>Catocala connubialis</i>	E
<i>Catocala flebelis</i>	E
<i>Catocala obscura</i>	C
<i>Catocala residua</i>	C
<i>Catocala relicta</i>	E
<i>Catocala innubens</i>	E
<i>Catocala badia</i>	E
<i>Catocala paleogama</i>	E
<i>Catocala habilis</i>	C
<i>Catocala cerogama</i>	E
<i>Catocala subnata</i>	E
<i>Catocala concumbens</i>	C
<i>Catocala ilia</i>	C
<i>Catocala coccinata</i>	E
<i>Catocala piatrix</i>	C
<i>Catocala amatrix</i>	R
<i>Catocala parta</i>	R
<i>Catocala cara</i>	C
<i>Catocara neogama</i>	E
<i>Eparthenos nubilis</i>	E
<i>Derrima stellata</i>	R
<i>Eudryas grata</i>	E
<i>Eudryas unio</i>	E
<i>Psychomorpha epimenis</i>	E
<i>Schinia trifascia</i>	E
<i>Schinia florida</i>	C
<i>Schinia nundina</i>	C

<i>Schinia rivulosa</i>	E
<i>Schinia lynx</i>	E
<i>Schinia arcigera</i>	C
<i>Heliothesis subflexis</i>	E
<i>Heliothesis viriceus</i>	R

### NOTODONTIDAE

<i>Datana ministra</i>	C
<i>Datana drexlii</i>	E
<i>Datana contracta</i>	E
<i>Datana perspicua</i>	R
<i>Symmerista albifrons</i>	C
<i>Hyparpax aurora</i>	R
<i>Dasylophia anguina</i>	E
<i>Peridea ferruginea</i>	E
<i>Nadata gibbosa</i>	C
<i>Heterocampe obliqua</i>	E
<i>Heterocampe umbrata</i>	E
<i>Heterocampe guttivatti</i>	E
<i>Heterocampe biundata</i>	E
<i>Odontotia elegans</i>	E
<i>Pheosia rimosa</i>	C
<i>Nerice bidentata</i>	C
<i>Cerura scitiscrypta</i>	E
<i>Fercula borealis</i>	C
<i>Fercula cinera</i>	C

# Appendix 4: Bafflin Sanctuary Complex Bird List

The following list represents an overview of the bird species observed in the Bafflin Sanctuary Complex. The breeding status of possible, probable, or confirmed breeder is based upon the 2018 Breed Bird Atlas survey.

Common Name	Latin Name	Breeding Status	Notes
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Migrant	Historical Breeder
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Migrant	
Mute Swan	<i>Cygnus olor</i>	Vagrant	
Snow Goose	<i>Chen caerulescens</i>	Migrant	Blue phase and standard color
Greater White-fronted Goose	<i>Anser albifrons</i>	Vagrant	
Canada Goose	<i>Branta Canadensis</i>	Confirmed	
Brant	<i>Branta bernicla</i>	Vagrant	
American Black Duck	<i>Anas rubripes</i>	Migrant	Historical Breeder
Gadwall	<i>Anas strepera</i>	Migrant	
Mallard	<i>Anas platyrhynchos</i>	Confirmed	
Northern Pintail	<i>Anas acuta</i>	Migrant	
American Wigeon	<i>Anas Americana</i>	Migrant	
Wood Duck	<i>Aix sponsa</i>	Confirmed	
Northern Shoveler	<i>Anas clypeata</i>	Migrant	
Blue-winged Teal	<i>Anas discors</i>	Migrant	Historical Breeder
Green-winged Teal	<i>Anas crecca</i>	Migrant	Possibly one year breeding
Ring-necked Duck	<i>Aythya collaris</i>	Migrant	
Greater Scaup	<i>Aythya marila</i>	Migrant	
Common Goldeneye	<i>Bucephala clangula</i>	Migrant	
Bufflehead	<i>Bucephala albeola</i>	Migrant	
Ruddy Duck	<i>Oxyura jamaicensis</i>	Migrant	
Common Merganser	<i>Mergus merganser</i>	Migrant	

Hooded Merganser	<i>Lophodytes cucullayus</i>	Confirmed	
American Coot	<i>Fulica Americana</i>	Migrant	
Common Moorhen	<i>Gallinula chloropus</i>	Migrant	Possible one year of breeding
Herring Gull	<i>Larus argentatus</i>	Vagrant	
Ring-billed Gull	<i>Larus delawarensis</i>	Vagrant	
Great Blue Heron	<i>Ardea Herodias</i>	Migrant	
Little Blue Heron	<i>Egretta caerulea</i>	Vagrant	
Great Egret	<i>Ardea alba</i>	Migrant	
Snowy Egret	<i>Egretta thula</i>	Vagrant	
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	Migrant	
Green Heron	<i>Butorides virescens</i>	Probable	Confirmed in the past
American Bittern	<i>Botaurus lentiginosus</i>	Migrant	Confirmed in the past
Sandhill Crane	<i>Grus Canadensis</i>	Vagrant	
Glossy Ibis	<i>Plegadis falcinellus</i>	Vagrant	
Virginia Rail	<i>Rallus limicola</i>	Confirmed	
Sora	<i>Porzaa carolina</i>	Probable	Confirmed in the past
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Migrant	
Killdeer	<i>Charadrius vociferous</i>	Probable	Confirmed in the past
American Woodcock	<i>Scolopax minor</i>	Probable	Confirmed in the past
Common Snipe	<i>Gallinago gallinago</i>	Migrant	
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Migrant	
Lesser Yellowlegs	<i>Tringa flavipes</i>	Migrant	
Solitary Sandpiper	<i>Tringa solitaria</i>	Migrant	
Pectoral Sandpiper	<i>Calidris melanotos</i>	Migrant	
Dunlin	<i>Calidris alpina</i>	Migrant	
Spotted Sandpiper	<i>Actitis macularia</i>	Probable	Probable in the past
Least Sandpiper	<i>Calidris minutilla</i>	Migrant	Migrant
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Migrant	
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Migrant	
Wild Turkey	<i>Meleagris gallopavo</i>	Confirmed	
Ruffed Grouse	<i>Bonasa umbellus</i>	Extinct	Confirmed in the past
Ring-necked Pheasant	<i>Phasianus colchicus</i>	Yearly	Released birds from hunting
Northern Bobwhite	<i>Colinus virginianus</i>	Sometimes	Probable in the past/now released bird for hunting show up
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Migrant	
Cooper's Hawk	<i>Accipiter cooperii</i>	Probable	
Northern Harrier	<i>Circus cyaneus</i>	Migrant	

Red-tailed Hawk	<i>Buteo jamaicensis</i>	Confirmed	
Rough-legged Hawk	<i>Buteo lagopus</i>	Migrant	
Red-shouldered Hawk	<i>Buteo lineatus</i>	Probable	
Broad-winged Hawk	<i>Buteo platypterus</i>	Possible	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Migrant	
Golden Eagle	<i>Aquila chrysaetos</i>	Migrant	
Osprey	<i>Pandion haliaetus</i>	Migrant	
Turkey Vulture	<i>Cathartes aura</i>	Possible	
Black Vulture	<i>Coragyps atratus</i>	Possible	
American Kestrel	<i>Falco sparverius</i>	Confirmed	
Merlin	<i>Falco columbarius</i>	Migrant	
Peregrine Falcon	<i>Falco peregrinus</i>	Migrant	
Short-eared Owl	<i>Asio flammeus</i>	Migrant	
Eastern Screech Owl	<i>Megascops asio</i>	Probable	
Long-eared Owl	<i>Asio otus</i>	Migrant	Historically a winter resident
Great-horned Owl	<i>Bubo virginianus</i>	Confirmed	
Barred Owl	<i>Strix varia</i>	Possible	Confirmed in past
Barn Owl	<i>Tyto alba</i>	Vagrant	
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Migrant	
Mourning Dove	<i>Zenaida macroura</i>	Confirmed	
Rock Dove	<i>Columba livia</i>	Possible	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Probable	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Confirmed	
Common Nighthawk	<i>Chordeiles minor</i>	Migrant	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Probable	
Belted Kingfisher	<i>Ceryle alcyon</i>	Possible	Confirmed in past
Red-headed Woodpecker	<i>Melanerpes erthrocephalus</i>	Migrant	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Possible	
Yellow-shafted Flicker	<i>Colaptes auratus</i>	Probable	
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	Confirmed	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Confirmed	
Downey Woodpecker	<i>Picoides pubescens</i>	Confirmed	
Hairy Woodpecker	<i>picooides villosus</i>	Confirmed	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Confirmed	
Western Kingbird	<i>Tyrannus verticalis</i>	Vagrant	
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Probable	Confirmed in past

Eastern Phoebe	<i>Sayornis phoebe</i>	Confirmed	
Eastern Wood-pewee	<i>Contopus virens</i>	Probable	
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Migrant	
Acadian Flycatcher	<i>Empidonax virescens</i>	Migrant	Possible in past
Least Flycatcher	<i>Empidonax minimus</i>	Possible	
Willow Flycatcher	<i>Empidonax traillii</i>	Confirmed	
Alder Flycatcher	<i>Empidonax alnorum</i>	Possible	
Horned Lark	<i>Eremophila alpestris</i>	Migrant	
American Pipit	<i>Anthus rubescens</i>	Migrant	
Purple Martin	<i>Progne subis</i>	Confirmed	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Migrant	
Barn Swallow	<i>Hirundo rustica</i>	Confirmed	
Tree Swallow	<i>Tachycineta bicolor</i>	Confirmed	
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Probable	
Bank Swallow	<i>Riparia riparia</i>	Migrant	
Chimney Swift	<i>Chaetura pelagica</i>	Probable	
American Crow	<i>Corvus brachyrhynchos</i>	Confirmed	
Common Raven	<i>Corvus corax</i>	Possible	
Blue Jay	<i>Cyanocitta cristata</i>	Confirmed	
Black-capped Chickadee	<i>Poecile atricapillus</i>	Confirmed	
Tufted Titmouse	<i>Baeolophus bicolor</i>	Confirmed	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Confirmed	
Red-breasted Nuthatch	<i>Sitta Canadensis</i>	Migrant	
Brown Creeper	<i>Certhia americana</i>	Possible	
House Wren	<i>Troglodytes aedon</i>	Confirmed	
Winter Wren	<i>Troglodytes troglodytes</i>	Migrant	
Carolina Wren	<i>Thryothorus ludovicianus</i>	Confirmed	
Marsh Wren	<i>Cistothorus palustris</i>	Possible	
Sedge Wren	<i>Cistothorus platensis</i>	Confirmed	
Rudy-crowned Kinglet	<i>Regulus calendula</i>	Migrant	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Migrant	
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	Probable	
Brown Thrasher	<i>Toxostoma rufum</i>	Probable	
Gray Catbird	<i>Dumetella carolinensis</i>	Confirmed	
Northern Mockingbird	<i>Mimus polyglottos</i>	Confirmed	
Eastern Bluebird	<i>Sialia sialis</i>	Confirmed	

American Robin	<i>Turdus migratorius</i>	Confirmed	
Swainson's Thrush	<i>Catharus ustuatus</i>	Migrant	
Hermit Thrush	<i>Catharus guttatus</i>	Migrant	
Veery	<i>Catharus fuscescens</i>	Confirmed	
Wood Thrush	<i>Hylocichla mustelina</i>	Confirmed	
Northern Shrike	<i>Lanius excubitor</i>	Migrant	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Confirmed	
Bohemian Waxwing	<i>Bombycilla garrulous</i>	Vagrant	
Red-eyed Vireo	<i>Vireo olivaceus</i>	Confirmed	
Warbling Vireo	<i>Vireo gilvus</i>	Probable	
Philadelphia Vireo	<i>Vireo philadelphicus</i>	Migrant	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	Confirmed	
White-eyed Vireo	<i>Vireo griseus</i>	Confirmed	
Blue-headed Vireo	<i>Vireo solitarius</i>	Migrant	
Northern Parula Warbler	<i>Parula Americana</i>	Migrant	
Black-throated Green Warbler	<i>Dendroica virens</i>	Probable	
Prothonotary Warbler	<i>Protonotaria citea</i>	Migrant	
Black and White Warbler	<i>Mniotilta varia</i>	Confirmed	
Blackpoll Warbler	<i>Dendroica striata</i>	Migrant	
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Migrant	
Magnolia Warbler	<i>Dendroica magnolia</i>	Migrant	
Yellow-rumped Warbler	<i>Dendroica coronate</i>	Migrant	
Canada Warbler	<i>Wilsonia canadensis</i>	Possible	
Cape May Warbler	<i>Dendroica tigrina</i>	Migrant	
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Confirmed	
Bay-breasted Warbler	<i>Dendroica castanea</i>	Migrant	
Blackburnian Warbler	<i>Dendroica fusca</i>	Migrant	
American Restart	<i>Setophaga ruticilla</i>	Confirmed	
Pine Warbler	<i>Dendroica pinus</i>	Confirmed	
Prairie Warbler	<i>Dendroica bicolor</i>	Confirmed	
Palm Warbler	<i>Dendroica palmarum</i>	Migrant	
Blue-winged Warbler	<i>Vermivora pinus</i>	Confirmed	
Brewster's Warbler	<i>Vermivora pinus x chrysoptera</i>	Once	One banded on territory
Yellow Warbler	<i>Dendroica petechial</i>	Confirmed	
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	Confirmed	
Tennessee Warbler	<i>Vermivora peregrina</i>	Migrant	

Orange-crowned Warbler	<i>Vermivora celata</i>	Migrant	
Wilson's Warbler	<i>Wilsonia pusilla</i>	Migrant	
Hooded Warbler	<i>Wilsonia citrina</i>	Probable	
Lawrence's Warbler	<i>Vermivora pinus x chrysoptera</i>	Historical confirmed	Banded with newly fledged young and female Blue-wing.
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Migrant	
Nashville Warbler	<i>Vermivora ruficapilla</i>	Migrant	
Mourning Warbler	<i>Oporornis Philadelphia</i>	Migrant	
Common Yellowthroat	<i>Geothlypis trichas</i>	Confirmed	
Yellow-breasted Chat	<i>Icteria virens</i>	Migrant	
Northern Waterthrush	<i>Seiurus noveboracensis</i>	Probable	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	Probable	
Ovenbird	<i>Seiurus aurocapillus</i>	Confirmed	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Confirmed	
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Vagrant	
Brown-headed Cowbird	<i>Molothrus ater</i>	Confirmed	
Rusty Blackbird	<i>Euphagus carolinus</i>	Migrant	
Common Grackle	<i>Quiscalus quiscula</i>	Confirmed	
Bobolink	<i>Doichonyx oryzivorus</i>	Confirmed	
Eastern Meadowlark	<i>Stirnella magna</i>	Migrant	Historical nester
European Starling	<i>Sternus vulgaris</i>	Confirmed	
Orchard Oriole	<i>Icterus spurius</i>	Probable	
Baltimore Oriole	<i>Icterus galbula</i>	Confirmed	
Bullock's Oriole	<i>Icterus bullockii</i>	Vagrant	
Scarlet Tanager	<i>Piranga olivacea</i>	Confirmed	
Western Tanager	<i>Piranga ludovicianna</i>	Vagrant	
House Sparrow	<i>Passer domesticus</i>	Confirmed	
Dark-eyed Junco	<i>Junco hyemalis</i>	Migrant	
Snow Bunting	<i>Plectrohenax nivalis</i>	Migrant	
Northern Cardinal	<i>Cardinalis cardinalis</i>	Confirmed	
Common Redpoll	<i>Carduelis flammea</i>	Migrant	
House Finch	<i>Carpodacus mexicanus</i>	Confirmed	
Purple Finch	<i>Carpodacus purpureus</i>	Migrant	Probable historically
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Migrant	
American Goldfinch	<i>Carduelis tristis</i>	Confirmed	
Pine Siskin	<i>Carduelis pinus</i>	Migrant	Possible one year nester
Indigo Bunting	<i>Passerina cyanea</i>	Confirmed	

Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Confirmed
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Confirmed
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Migrant
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Migrant
Chipping Sparrow	<i>Spizella passerina</i>	Confirmed
Field Sparrow	<i>Spizella pusilla</i>	Confirmed
Swamp Sparrow	<i>Melospiza georgiana</i>	Probable
American Tree Sparrow	<i>Spizella arborea</i>	Migrant
Fox Sparrow	<i>Passerella iliaca</i>	Migrant
Song Sparrow	<i>Melospiza melodia</i>	Confirmed
Vesper Sparrow	<i>Pooecetes gramineus</i>	Migrant
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	Migrant
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Probable



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