

# Information Sheet on Ramsar Wetlands (RIS) – 2009-2015 version

Available for download from [http://www.ramsar.org/ris/key\\_ris\\_index.htm](http://www.ramsar.org/ris/key_ris_index.htm).

*Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8<sup>th</sup> Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9<sup>th</sup> Conference of the Contracting Parties (2005).*

## Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 14, 3rd edition). A 4th edition of the Handbook is in preparation and will be available in 2009.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

## 1. Name and address of the compiler of this form:

Debbie Maurer, 1899 West Winchester Road,  
Libertyville, IL 60048 USA  
[dmaurer@lcfpd.org](mailto:dmaurer@lcfpd.org)  
847-968-3285

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Designation date

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Site Reference Number

## 2. Date this sheet was completed/updated:

## 3. Country:

USA

## 4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

**Chiwaukee Illinois Beach Lake Plain**

## 5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or  
b) Updated information on an existing Ramsar site

## 6. For RIS updates only, changes to the site since its designation or earlier update:

### a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

**If the site boundary has changed:**

- i) the boundary has been delineated more accurately ; or
- ii) the boundary has been extended ; or
- iii) the boundary has been restricted\*\*

and/or

**If the site area has changed:**

- i) the area has been measured more accurately ; or
- ii) the area has been extended ; or
- iii) the area has been reduced\*\*

\*\* **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

**b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:**

**7. Map of site:**

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

**a) A map of the site, with clearly delineated boundaries, is included as:**

- i) a **hard copy** (required for inclusion of site in the Ramsar List): ;
- ii) an **electronic format** (e.g. a JPEG or ArcView image) ;
- iii) a **GIS file providing geo-referenced site boundary vectors and attribute tables**

**b) Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundary is the same as existing protected natural areas and open space or follows physical boundaries such as shoreline, roads, wetland community boundary, and ravine slopes.

**8. Geographical coordinates** (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

- Center: 42°27'38.76" N, 87°48'32.88" W
- Northeast: 42°32'55.19" N, 87°49'03.13" W
- South: 42°24'57.60" N, 87°48'42.15" W
- Southwest: 42°23'12.73" N, 87°49'43.24" W

**9. General location:**

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Chiwaukee Illinois Beach Lake Plain is located in the states of Wisconsin and Illinois in the United States of America. Within the Great Lakes Basin along the south western coast of Lake Michigan, the site is directly south of the City of Kenosha, Wisconsin with its southern boundary extending into the City of Waukegan, Illinois. The site is approximately 25 miles south of Milwaukee, Wisconsin and approximately 35 miles north of Chicago, Illinois.

**10. Elevation:** (in metres: average and/or maximum & minimum)

- Average: 179 m.
- Minimum: 176m (average elevation of Lake Michigan).
- Maximum: 188 m (elevation of the western reach of the Glen Flora tributary and wetlands).

**11. Area:** (in hectares)

1,584 hectares

**12. General overview of the site:**

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Ramsar Site, known as the Chiewaukee Illinois Beach Lake Plain (hereafter referred to as the “Lake Plain”), contains the highest quality coastal dune and swale ecosystem in southeast Wisconsin and northeast Illinois, supporting six globally rare and representative fen, sedge meadow, freshwater marsh and seep community types associated with the southwest Great Lakes Morainial sub eco-region. The unique geology and hydrology of this ecosystem is driven by historic glaciation, wind and wave action, Lake Michigan water levels, ground water inflows, and in the more recent past, surface water inflows. Because of the shallow topography among dune and swale communities within the complex, wetland community boundaries can easily expand, contract and shift significantly over time. In addition, many wildlife species including wetland dependent reptiles and birds rely on these uplands to complete their life cycle or for regular foraging. Therefore where dune and swale topography is present, narrow bands of upland savanna and prairie are not excluded from the designation area.

The publicly and privately protected ecosystem connects 14 different community types, seven are wetland communities. The Lake Plain wetlands and associated upland prairie and savanna complex provides habitat for over 930 native plant species and 300 animal species, including 63 state-protected species. Two (2) federally protected wetland-dependent species are found within the Lake Plain, including the only highly viable population of *Platanthera leucophaea* [eastern prairie fringed orchid] in the region, and *Charadrius melodus* [piping plover]. The Lake Plain serves as important breeding habitat for many wetland-dependent bird species and provides critical stop-over habitat for at least 310 migratory bird species. A portion of the Lake Plain is designated an Important Bird Conservation Area (825 hectares) by the National Audubon Society and 5.1 square kilometers is designated as critical habitat area for the federally endangered piping plover. Due to the ecological, geological and biological significance of the area, the Lake Plain has been recognized with the dedication of two National Natural Landmarks. It is also recognized as a Conservation Opportunity Area by State Wildlife Action Plans (both Illinois and Wisconsin) and nearly 60% of the area is dedicated as Nature Preserve (861 hectares, 48% of the total area), State Natural Area (165 hectares, 9%), or State Scientific Area (34 hectares, 2%). Locally the area is recognized as a Conservation Focus Area by over 300 regional organizations, associations, and experts who make up the Chicago Wilderness consortium.

In addition to the biodiversity supported by this area, the Lake Plain provides critical ecosystem services, including protection of Lake Michigan water quality; Lake Michigan is used by more than 8.5 million people as a primary source for drinking water in northeast Illinois alone. Five major tributaries and several minor tributaries flow into and through the Lake Plain prior to reaching Lake Michigan, the largest include: Barnes Creek, Dead Dog Creek, Kellogg Creek, Bull Creek and the Glen Flora Tributary. Over thousands of years, these tributaries cut through the glacial material to create unique coastal ravine communities that support many regionally rare northern relic plant species that are associated with seepage of groundwater along steep, clay loam slopes.

The southern basin of Lake Michigan is the most urbanized area in the Great Lakes system. Positioned between two major metropolitan areas (Chicago to the south and Milwaukee to the north) and directly adjacent to numerous smaller municipalities, the Lake Plain provides significant tourism opportunities for local communities, supporting over 2 million visitors a year, engaging community members in volunteer conservation stewardship, and providing high quality examples of coastal wetland communities for education and scientific research.

**13. Ramsar Criteria:**

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

**14. Justification for the application of each Criterion listed in 13 above:**

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

***Criterion 1: Contains a representative, rare, or unique example of a natural or near natural wetland type found within the appropriate biogeographic region.***

The Ramsar Site supports six representative wetland community types of exemplary high quality and which are designated with a global conservation status ranking\* of imperiled or vulnerable as described by the Association for Biodiversity Information and the Nature Conservancy in *Plant Communities of the Midwest, Classification in an Ecological Context* (2001).

\* The **Conservation Rank** field gives the global *conservation status rank* of the association. The global rank is a numerical assessment of the rarity and imperilment of the association across its entire range of distribution. Ranks are primarily based on the number of occurrences, state conservation status rank(s), the geographic range of the type, and its long-term decline in abundance (e.g., pre-European settlement abundance versus current abundance). Other factors include permanence, intrinsic fragility and vulnerability, threats, and the number of occurrences that are protected.

The ranks are defined as follows:

- **CRITICALLY IMPERILED:** Generally 5 or fewer occurrences and/or very few remaining acres or very vulnerable to elimination throughout its range due to other factor(s).
- **IMPERILED:** Generally 6-20 occurrences and/or few remaining acres or very vulnerable to elimination throughout its range due to other factor(s).
- **VULNERABLE:** Generally 21-100 occurrences. Either very rare and local throughout its range or found locally, even abundantly, within a restricted range or vulnerable to elimination throughout its range due to specific factors.
- **APPARENTLY SECURE:** Uncommon, but not rare (although it may be quite rare in parts of its range, especially at the periphery). Apparently not vulnerable in most of its range.
- **SECURE:** Common, widespread, and abundant (though it may be quite rare in parts of its range, especially at the periphery). Not vulnerable in most of its range.

Below is a description of each wetland type of significance found within the Lake Plain and the associated Ramsar Wetland Type Classification.

**Great Lakes Interdunal Wetlands, Pannes; Ramsar Wetland Type- Ts (seasonally flooded meadows, sedge meadows).**

**DESCRIPTION:** Herbaceous vascular plants have <30% cover, trees and shrubs together have <30% cover, and trees alone have <5% cover. Several variants of this community occur, correlating with depth to the mean annual water table (centers of swales versus highest portions of swales) and distance inland from the lakeshore (exposed duneland versus sheltered inland/duneland). The species composition of the community resembles alkaline shrub/herb fens, especially in the zone of groundwater emergence.

The best examples of panne within the Lake Plain occur at Illinois Beach State Park and Hosha Prairie. Sixty-six acres of panne are found within the Lake Plain, primarily at Illinois Beach State Park.

**CONSERVATION RANK:** *Globally Imperiled* (the total number of occurrences is unknown). Thirty-six have been documented: 2 in Illinois, 6 in Indiana, 3 in Michigan, and 5 in Wisconsin. No other occurrences have been documented, but the community also occurs in Ontario. It is found in 14 ecoregional subsections. Sizes of 29 occurrences range from 1 to 430 acres, totaling 1326.

Southern Great Lakes Shore Emergent Marsh; Ramsar Wetland Type- Tp (freshwater marshes and pools).

**DESCRIPTION:** Typical dominants include the emergents *Schoenoplectus tabernaemontani* (= *Scirpus tabernaemontani*) and *Typha* spp. (*Typha angustifolia*, *Typha X glauca*, *Typha latifolia*).

The best examples of freshwater marshes within the Lake Plain occur at Spring Bluff and Chiwaukee Prairie, within the deep water interdunal swales and at Illinois Beach State Park, especially adjacent to the Dead River and within interdunal swales connected to the Dead River.

**CONSERVATION RANK:** *Globally Vulnerable and Apparently Secure*. This type is found in at least 24 sites in the southern Great Lakes, as part of a number of different Great Lakes Wetland Complexes, but many are disturbed.

Lake Plain Wet Prairie, Wet Sand Prairie; Ramsar Wetland Type- Ts (seasonally flooded meadows)

**DESCRIPTION:** Average vegetation height is 1-2 m with little bare ground exposed. The dominant species are graminoids, although forbs and small trees and shrubs are common.

The best examples of wet sand prairie within the Lake Plain occur at Illinois Beach State Park, Spring Bluff Nature Preserve and Chiwaukee Prairie State Natural Area where the best examples can be found slightly upslope from interdunal swales.

**CONSERVATION RANK:** *Globally Imperiled and Globally Vulnerable*. There are probably fewer than 100 occurrences of this community range wide. It is reported from Ohio, Indiana, Michigan, Ontario and Vermont. Currently 19 occurrences have been documented from Indiana and Michigan. There are probably less than 4000 acres range-wide. Currently over 370 acres have been documented; the average documented size is about 37 acres.

Cinquefoil - Sedge Prairie Fen, Graminoid Fen or Low Shrub Fen; Ramsar Wetland Type- U (fens).

**DESCRIPTION:** Graminoids dominate, though forbs and dwarf-shrubs can be prominent. Shrub swamps or tall-shrubfens often surround the core fen area.

The best examples of graminoid fen within the Lake Plain occur at Illinois Beach State Park, Chiwaukee Prairie Scientific Area and Chiwaukee Prairie State Natural Area. In Chiwaukee Prairie 60 acres of fen community have been identified and mapped.

**CONSERVATION RANK:** *Globally Vulnerable and Apparently Secure*

Twigrush Wet Prairie; Ramsar Wetland Type- Ts (seasonally flooded meadows, sedge meadows)

**DESCRIPTION:** The dominant species include *Carex lasiocarpa* and/or *Cladium mariscoides*. *Carex sartwellii* and occasionally *Calamagrostis canadensis*, *Calamagrostis stricta*, or *Carex stricta* may be locally dominant.

The best examples of twigrush wet prairie within the Lake Plain occur at Illinois Beach State Park and Chiwaukee Prairie Scientific Area.

**CONSERVATION RANK:** *Globally Imperiled*. There are probably fewer than 50 occurrences of this community range-wide. It is reported from Ohio where it is found only in the Oak Openings region in the northwest part of the states.

Skunk Cabbage Seepage Meadow, seep: Ramsar Wetland Type – Xf (Tree-dominated intermittent inland wetland)

**DESCRIPTION:** This is an herbaceous-dominated community. Tree and shrub cover may vary, particularly from overhanging upland trees, but trees and shrubs rooted in the stand are less than 25% cover. Forbs dominate the community.

The best examples of skunk cabbage seepage meadows within the Lake Plain occur within the Glen Flora ravine, along the Dead Dog Creek tributary and within vernal pools at Spring Bluff.

**CONSERVATION RANK:** *Apparently Secure.* This community is found throughout the upper Midwestern region of the United States and adjacent Canada, where it develops around spring heads and in broader areas of groundwater discharge. The type extends from Indiana and possibly Ontario and Ohio, west to Minnesota and Iowa.

***Criterion 2: Supports vulnerable, endangered, or critically endangered species or threatened ecological communities***

The Lake Plain provides suitable and or critical habitat for two United States Federally Threatened and Endangered species that are associated with wetland communities, including one plant species and one bird species and supports two globally imperilled wetland communities, panne and wet sand prairie (see community descriptions above).

*Platanthera leucophaea* (eastern prairie fringed orchid); Federally Threatened

The Lake Plain supports the only highly viable population of EPFO in the Prairie (Lake Michigan Lake Plain) physiographic region. This population occurs in Chiwaukee Prairie State Natural Area. A highly viable population typically has more than 50 flowering plants; a population trend that is stable or increasing over a monitoring period of 5 years; available habitat of at least 50 hectares (125 acres) in size; assurances of ongoing management to reduce impacts from drainage, invasive non-native plant species or woody vegetation encroachment; and protection through long-term conservation easements, legal dedication as nature preserves, or other means. The Chiwaukee Prairie State Natural Area fits all of the above criteria. The species recovery goal in this physiographic region is two highly viable populations. Efforts to reintroduce new populations to other portions of the Lake Plain have resulted in the establishment of a few isolated small populations (less than 5 flowering individuals found annually) at Illinois Beach State Park. Furthermore, large portions of the Lake Plain represent potentially suitable habitat area for the recovery of this species since there are large protected sedge meadow and prairie habitats in various successional stages that are currently being managed with prescribed fire, hydrologic restoration and invasive species control that could provide for colonization of additional new populations and refugia. Because the Lake Plain is large in size with a mosaic of areas of potentially suitable habitat, it represents an important complex for the recovery of this species.

*Charadrius melodus* (piping plover); Federally Endangered

The Great Lakes population of piping plovers was listed as endangered under provisions of the U.S. Endangered Species Act on January 10, 1986 (final rule (50 FR50726). Critical habitat was designated on the Great Lakes breeding grounds on May 7, 2001 and for all populations of piping plovers on the wintering grounds on July 10, 2001. The Great Lakes population had declined from a historic size of several hundred breeding pairs to 17 at the time of listing. From 1986-2002, the population fluctuated between 12 and 51 breeding pairs, with breeding areas remaining largely confined to Michigan. The restricted breeding range of this population creates a gap in the distribution of piping plovers across North America, with the Great Lakes population isolated from the two other breeding populations (Atlantic and Northern Great Plains). The current size of the Great Lakes population makes it extremely vulnerable to chance demographic and environmental events that could extirpate the species from the Great Lakes region.

On May 7, 2001 the USFWS designated 10.2 km of shoreline in the Lake Plain at Illinois Beach State Park, owned by Illinois Department of Natural Resources, and Hosha Prairie owned by Zion Park District (as well as land owned by the Johns Manville Corporation, NRG Energy, City of Waukegan and

North Shore Sanitary District not included in this nomination), as critical habitat for the piping plover. This represents 3% of the total Great Lakes shoreline designated as critical habitat for this species (323 km). Critical habitat is defined as (i) the specific areas within the geographical area occupied by a species on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management consideration or protections; and (ii) specific areas outside the geographic area occupied by a species upon a determination that such areas are essential for the conservation of the species. The southern portion of the Lake Plain has also been designated as an Important Bird Area by the National Audubon Society. After an absence from breeding in Illinois of over thirty years, piping plovers were once again documented as nesting at Waukegan Beach in summer 2009, just outside of the Ramsar site's boundary. Four eggs were laid; however when adults abandon the nest, the eggs were taken to the Lincoln Park Zoo for hatching and release in Michigan. Biologists continue to monitor the southern portion of the Lake Plain annually during the breeding season for adult piping plovers.

Pannes and wet sand prairies are considered globally imperilled communities. The Lake Plain supports 60 acres of high quality pannes, primarily at Illinois Beach State Park, the only remaining pannes in Illinois and Southeast Wisconsin. This community is at risk of degradation due to changes in hydrology and invasive species. High quality wet sand prairies occur throughout the Lake Plain and are also threatened by hydrologic alteration and invasive species.

The Lake Plain also provides breeding and foraging habitat for one of the largest known populations of an Illinois state-threatened turtle species, *Emydoidea blandingii* (Blanding's turtle), which requires large tracks of contiguous wetland and upland habitat to successfully complete its life cycle. It relies on the wetland communities for over-wintering and the adjacent upland prairie savanna communities for nesting in the summer (this species was listed as threatened in Wisconsin until 2013, there is currently a petition to re-list the species). This species is also considered Endangered according to IUCN's Red List. Since 2006, researchers have been tracking the Blanding's Turtle community in Spring Bluff and Chiwaukee Prairie, allowing for the development of population models and conservation strategies to help ensure the conservation of sustainable populations of this species.

#### ***Criterion 4: Migration Corridor***

Lake Michigan's shoreline is acknowledged as one of the most important flyways for migrant songbirds in the United States by ornithologists and bird watchers worldwide. In all, more than 300 species of birds have been recorded in the Lake Plain since 2000. The Lake Plain provides the largest, near contiguous, block of stopover habitat for migratory birds along the entire Illinois coast and south western Lake Michigan coast in Wisconsin. Volunteer monitors who inventory hawk migrations annually have documented 68,202 migrating individuals between 2000 and 2013. The Bird Conservation Network has documented over 310 species of birds within the Lake Plain, 161 have been observed during the breeding season and 18 are listed as endangered, or threatened by state or federal law (see Annex I). Lake Michigan's shore, with its comparatively rich feeding and nesting opportunities, makes a huge contribution to the survival of many migratory birds that pass through Illinois and Wisconsin.

Ornithologists at Chicago's Field Museum of Natural History estimate that on average, more than five million migrating songbirds pass up and down the coast of Lake Michigan, including the Chiwaukee Illinois Beach Lake Plain. This represents a significant fraction of the total number of migrant songbirds moving through the entire North American continent. Most of these species are "passerines" or land birds, which migrate at night (to avoid predators, mainly hawks and falcons, which migrate by day) and alight in any scrap of open space they find when dawn breaks. Passerines avoid flying over water if at all possible and especially when winds are from the west, tend to crowd right up against the lake shore while flying, a pattern that has been documented by use of Doppler radar by the Illinois Natural History Survey. The entire Lake Michigan shoreline is especially important as a navigational aid, bringing species both to and through the area. The lake acts as a natural "funnel" for birds passing around the lake to destinations north, northwest and northeast (from the south and southwest) during spring migration (including Willets, Sanderlings, Bonaparte's Gulls, various terns and a variety of passerines, especially warblers) and for species that are heading south and east around the bottom of the lake (including such diverse species as loons, Tundra Swans, scoters and other ducks, various hawks especially Broad-winged,

accipiters, and falcons, Sandhill Cranes, jaegers, and Black-throated Blue, Connecticut, and Mourning Warblers) in fall. One of the most important roles of lakes, ponds, and impoundments, such as sand pond found within Illinois Beach, is as resting habitat for migrating waterbirds. These open-water habitats are often the only deep-water habitat available for loons, grebes, scaup, Common Goldeneyes, Buffleheads, and mergansers, all of which dive to catch food. Similarly, gulls and terns forage over open water during migration. Lake Michigan and its immediate shoreline provide most of this type of habitat for a large percentage of waterbirds passing through the area during migration. At low water, the edges of lakes are also used by shorebirds, herons, and egrets.

**15. Biogeography** (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

**a) biogeographic region:**

The Ramsar Site occurs within an ecoregion that comprises portions of southern Minnesota, Wisconsin, and Michigan and northern portions of Illinois and Ohio, known as the Midwest Broadleaf Forest Province. The ecological sub-region known as the “Southwestern Great Lakes Morainal Section (222K)” affects the climate of the region resulting in warm to hot summers and frequent growing season water deficits, especially in late summer.

**b) biogeographic regionalisation scheme** (include reference citation):

McNab, W. H, D.T Cleland, J. A Freeouf, J. E Keys Jr., G.J. Nowacki, and C. A. Carpenter. 2007. Description of “Ecological Subregions: Sections of the Coterminous United States” First Approximation. United States Department of Agriculture Forest Service. The terrain of the Site is nearly level lake plain underlain by lacustrine sand deposits and steep sloped ravine tributaries. The subregion encompasses 17,330 square miles, 4.71% of the larger province.

**16. Physical features of the site:**

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

**Geology and Geomorphology** - The Lake Plain is located within the Wheaton Morainal Country subdivision of the physiographic division called the Great Lakes Section of the Central Lowland Province. The bedrock of the Lake Plain is dominated by sedimentary bedrock (dolomite). The sedimentary bedrock is alkaline (calcareous), forming soils that are nutrient- and moisture-rich loams and clays. Bedrock is overlain by glacial sediment and landforms created during the last glaciation (Wisconsin Episode, ~ 17,000 years ago), including several moraines, that, in combination with recent (within the last 4000 years) long-shore transport processes (waves, near shore currents), create the prevalent physiographic features of the coastal dune and swale system. The Lake Plain is composed of a set of beach ridges and dunes with intervening swales that formed by fluctuating lake levels after the final retreat of glacial ice from the Lake Michigan basin during and after the last glacial episode (Chrzastowski 2000). The beach ridges consist of sand and gravel that were built up by wave action. Dune sand caps many of the beach ridges. The swales are the intervening low-lying spaces where wetlands often form and are commonly underlain by organic matter. The western most portion of the Lake Plain is characterized by a bluff and ravine system. The ravines formed from surface water runoff following a path of least resistance to the swales within the downstream lake plain. Over time, the runoff deepened the channels and steep ravines formed. Often the incision of the ravines intersected with the ground water table and water seeped out of the steep ravine banks, creating unique wetland micro sites along otherwise dry ravine slopes. Tree dominated wetlands also formed along the banks and meanders of the tributaries. Surficial sediments of the Lake Plain consist of a broad range of materials that include organic-rich sand, silt and clay in the wetland swales and ravine slopes to well-sorted medium sands in the dunes, localized deposits of concentrated coarse sand pebbles and cobbles along the beach.

**Origins** - The evolution of the Lake Plain is well understood. It is a unique, migratory, coastal landform. About 17,000 years ago the Lake Michigan lobe of the Wisconsin glaciation receded northward forming a pro-glacial lake in southern lakes Michigan. The Lake Plain originated from coastal processes including wave dynamics, the movement of sediment by wave action, short and long-term changes in Lake Michigan lake levels, and the influence of coastal ice. Lake levels fluctuated dramatically between 17,000 and 2500 years ago as outflows were dammed and opened by retreating ice and moraines and as the Great Lakes basins responded to isostatic adjustment (removal of weight of ice caused the earth's crust to lift up). Sand and gravel that ultimately became the majority of the beach ridge/dune and swale portion of the Lake Plain were transported from eroded glacial deposits, including a delta that formed to the north in the Pike /Root river waterway. This material was eroded, transported and deposited by wave action and marked the beginning of the development of the dune and swale topography. Littoral transport was responsible for the formation of the dune and swale topography under the influence of wave action and wave-induced currents. During the past 3800 years there has been continued erosion of glacial relict deposits, including the delta and deposition along the Lake Michigan coast to form what today is call the Chiwaukee Illinois Beach Lake Plain. The ridges and swales found within the southern portion of the Lake Plain represent the youngest geologic features in the Lake Plain compared to those in the northern area of the Lake Plain known as Chiwaukee Prairie. The ravines formed in response to lake-level fluctuations. During low lake level phases, rivers and streams flowing into ancestral Lake Michigan down-cut into the substrate present when lake levels were tens to hundreds of feet lower than today. In response to lower lake levels, erosion occurred along the river and stream channels draining to the lake, resulting in the incision of the ravines.

**Hydrology and Water Quality** - Water levels within the wetland communities of the Chiwaukee Illinois Beach Lake Plain are influenced by Lake Michigan water levels, ground water, and surface water inflows, primarily from an urbanized watershed. Water levels in wetland communities can vary significantly during the growing season due to the interaction between lake levels and the high infiltration rates found with the sandy soils of the shallow swales where most wetlands are found. Water levels in emergent marsh communities generally remain near or above land surface for most or all of the year, can experience surface water levels up to 2.5 feet above ground level during the spring and early summer months, but experience complete draw down at or below ground level during dry periods in late July and August. Sedge Meadows experience surface waters that are shallower than emergent marshes during the wettest months, on average 0.75 feet above land surface, but 0.5 to 2.0 feet below land surface in dry months. Wet prairies experience surface waters that are shallower during the wettest months, on average 0.5 feet above land surface in late winter and early spring, but 0.5 to 1.5 feet below land surface in dry months (Kay et.al 2009). Groundwater driven communities such as fens often show less fluctuation in ground water levels compared to emergent marsh and wet meadows, possibly due to the regular inflow of ground water and or the high organic content and moisture holding capacity of the soils that underlie these communities (Kay et.al. 2009). The seeps of the ravine communities play an important role in creation of wet microsites on otherwise dry clay slopes. These seeps provide a location where ground water daylights and flows across the ravine slope. Tributaries in the lake plain are generally perennial features, although many are significantly influenced by high volumes of runoff from urbanized areas or agricultural areas. Wetlands that are closer to or more directly influenced by tributaries that flow into the Lake Plain generally experience some level of degradation as indicated by the presence of invasive plant species and a loss of more conservative native vegetation.

Recent monitoring of water quality in the Lake Plain has indicated that surface water inputs from tributaries that receive storm water runoff show elevated pollutants from roadways, urban development, and agriculture, including road salts, copper, nitrate, sulfate, ortho-phosphate, and total dissolved solids, with highest levels at the inputs on the urbanized, western side of the wetland complex. Monitoring also clearly demonstrated that surface water outflows from the Lake Plain to Lake Michigan have lower nutrients and other anthropogenically influenced analytes due to wetland processes that remove and dilute pollutants. For example, Biological and hydraulic processes in the wetlands reduce the concentration of nitrate and chloride in the water exiting the coastal wetland complex into Lake Michigan by as much as 85 and 75 percent, respectively. Dissolved phosphorous concentrations have been found to decrease in some locations in the Lake Plain by about 60 percent. Water quality at outflows to Lake

Michigan also have higher mean calcium, iron, and dissolved NVOC, indicative of general wetland conditions, groundwater inputs, and high-quality wetland environments (Kay et.al 2009, Miner 2012).

Several man-made ponds and ditches occur throughout the Lake Plain. Although these features are not natural they are important open water areas for wetland dependent species, such as the Blanding's turtle, especially during times of drought and as resting areas for migratory species searching for protected open water habitat. Several of the tributaries that flow into the Lake Plain and ultimately Lake Michigan provide a critical link for fish to spawn up stream, although because of the dynamic nature of littoral drift, wave action and wetland hydrology, these tributaries can intermittently become blocked from Lake Michigan by sand and gravel deposits.

**Climate** - The climate of the Lake Plain is typical of many continental locations, in that there are rather wide temperature fluctuations. The average high temperatures (degrees Fahrenheit) in the summer (June through August) are in the 70s and 80s with average lows in the 50s. Winter (December through March) highs are generally in the 20s and 30s with lows in the teens and 20s. There is an average of five and a half months without frost each year. Precipitation is highest during April through September (averages of 3.31 to 3.97 inches per month) and lowest in January (1.71 inches) and February (1.24 inches), with a yearly average of 34.20 inches.

#### **17. Physical features of the catchment area:**

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The total drainage area west of the Lake Plain is about 96 square kilometers with 46% of the area in Wisconsin and 54% in Illinois (Chrzastowski 2000). Land use in the watershed is primarily urban and agricultural, with greater urbanization in Illinois, and more agricultural lands in Wisconsin. The climate of the catchment area is the same as the Lake Plain. The general geology of the catchment, like the Lake Plain, is the result of glacial processes and influenced by the dramatic fluctuations in Lake Michigan lake levels of the past 12,000 years. The catchment area has a rolling topography with little topographic relief except for within the ravine communities.

#### **18. Hydrological values:**

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The wetlands found within the Chiwaukee Illinois Beach Lake Plain provide several hydrological functions and values. Because the Lake Plain has substantial areas of standing water through which water entering the Lake Plain must flow before discharging to Lake Michigan filtering of sediments, nutrients and pollutants is a significant value of these wetlands (and ironically a significant threat to the wetlands as well). The wet areas account for the large improvements in water quality prior to water entering Lake Michigan because they are the locations where sediment deposition, dilution, chemical uptake and precipitation onto organic matter occur. The degree of attenuation is consistently highest where there is the longest residence time for water (Kay et. al., 2009). Wetlands found along the base of the ravine slopes and along the tributary edges play an important role in protecting the stream banks from accelerated erosion due to highly flashy and high velocity stormwater inflows. Groundwater recharge areas occur within the catchment area, but not specifically in the designation area. Several of the wetland types of high conservation concern, such as fens, rely on these recharge areas to maintain the groundwater upwellings that are critical for the hydrologic and chemical characteristics necessary to support calcifiles and other fen species. Because the Lake Plain is located at the bottom of the watershed, it provides little in the way of flood control; however, at a very local level, the wetlands provide flood control for the North Point Marina located directly east of Spring Bluff and the residences of the Carol Beach subdivision found within the northern portion of Chiwaukee Prairie.

**19. Wetland Types**

**a) presence:**

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss •  Tp   Ts  •  U  • Va •  
 Vt •  W  •  Xf  • Xp •  Y  • Zg • Zk(b)

Human-made: 1 •  2  • 3 • 4 • 5 • 6 • 7 • 8 •  9  • Zk(c)

**b) dominance:**

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Type	Name (In order of dominance)	Hectares
Ts	Sedge Marshes and Seasonally Flooded Meadows	~ 600
Tp	Permanent Freshwater Marshes	~ 500
U	Fens	~ 24
W	Shrub-dominated Freshwater Marshes	~ 15
2	Ponds	~ 9
9	Drainage Channels	~ 4
M	Permanent Streams	~ 3
Xf	Tree-dominated wetlands	~ 1
Y	Freshwater Springs	~ 1

**20. General ecological features:**

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Throughout the Lake Plain, emergent marshes play a significant role in natural functioning of the coastal system, providing areas of deep water that are critical to wildlife, especially turtle species, during drought conditions, and providing important storage during storm events and filtration of surface water. The hydrology of the freshwater marsh community allows water to accumulate longer than in the surrounding landscape, with far-reaching consequences for the natural environment. These wetlands become the locus of organisms that require or can tolerate moisture for extended periods of time, and the wetland itself becomes the breeding habitat and nursery for many organisms that require water for early development.

Sedge meadows, fens and wet prairies provide floristically rich areas adjacent to and within interdunal swales that are critical to the high diversity of invertebrate species known within the Lake Plain (Hey and Associates, 2000). In addition, these wetland communities provide critical nesting habitat for numerous wetland dependent bird species, including rails, bitterns, cranes, ducks, herons, egrets, and numerous song birds. These wetlands are also critical overwintering habitat for reptiles, such as the Blanding’s turtle.

Seeps within the slopes of the ravines and tree dominated wetlands found adjacent to ravine tributaries and vernal pools within the sand savannas support floristically rich plant communities. These are often characterized by plant species that are northern relics, those that are found on the southern end of their range and are able to grow within the ravines and wooded wetlands of the Lake Plain due the moderating effects of Lake Michigan and, within the ravines the unique micro-climates found along the steep protected slopes and tributary channels. These wooded wetlands also provide habitat for a suite of bird

species that are found within open canopy woodlands, such as the red-headed woodpecker, a species of greatest concern identified in each state's wildlife action plan.

In addition to the wetland communities, sand prairies and savannas are found within the Ramsar Site. These communities, although not wetland, provide important habitat for many wetland dependent species. For example, the Blanding's turtle requires sparsely vegetated upland sand prairie for nesting and basking. Many wetland bird species will utilize these upland habitats for foraging. Franklin's Ground Squirrel (*Spermophilus franklinii*), a mammal listed as a species of Special Concern in Wisconsin and Illinois and is also found within Chiwaukee Prairie. This semi-colonial species prefers dense grassy, shrubby marshland as well as brushy and partly wooded areas.

The ecosystem services provided by the Chiwaukee Illinois Beach Lake Plain include the following:

- Regulating Services –
  - Groundwater discharge
  - Cycles and moves nutrients
  - Decomposition
  - Flood Storage
  - River bank stabilization
  
- Supporting Services –
  - Contributes to the dispersal of seeds
  - Biodiversity
  - Generates and preserves soils
  - Pollination
  - Soil, sediment and nutrient retention
  - Carbon storage
  
- Inspirational Cultural Services (music, art, architecture)
  
- Recreation and Tourism Cultural Services
  - Hunting,
  - Picnics,
  - Nature observation
  
- Scientific and Educational Cultural Services
  - Educational Opportunities,
  - Major Scientific Study
  - Long-term Monitoring

## 21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Forty-four (44) state protected plant species are known to occur in the Lake Plain. All of these species are considered unique and limited in their range, therefore the Lake Plain provides important habitat for the conservation of these species within the region. See Annex II for the list of State endangered and threatened plant species found within the Ramsar Site.

As mentioned under Criterion 1, the Ramsar Site contains significant wetland types. Below is a description of the flora found within each wetland type.

### Great Lakes Interdunal Wetlands, Pannes; Ramsar Wetland Type- Ts (seasonally flooded meadows, sedge meadows).

The physiognomy and floristics of the herbdominated intermediate zone of the swale are emphasized in this description and include *Calamagrostis canadensis*, *Carex* spp., *Cladium mariscoides*, *Eleocharis quinqueflora*, *Equisetum variegatum*, *Juncus balticus*, *Dichanthelium acuminatum* var. *fasciculatum* (= *Panicum implicatum*), *Rhynchospora capillacea*, *Schoenoplectus acutus* (= *Scirpus acutus*), and *Typha* spp.

Apart from the dominants, characteristic species include *Carex viridula*, *Oligoneuron ohioense* (= *Solidago ohioensis*), *Hypericum kalmianum*, *Panicum flexile*, *Scleria verticillata*, *Lysimachia quadriflora*, *Packera paupercula* (= *Senecio pauperculus*), *Eleocharis* spp. (including *Eleocharis quinqueflora* (= *Eleocharis pauciflora*)). (White and Madany 1978, Homoya et al. 1985, Hiebert et al 1986, Chapman et al. 1989).

Interdunal wetlands are found on the sandy soils of wet depressions in wind-deposited dune systems of the Great Lakes. The substrate is 75-100% sand. Organics and silts occur in small amounts in depressions of exposed dunelands, and in larger amounts in sheltered, inland wet depressions.

**Southern Great Lakes Shore Emergent Marsh; Ramsar Wetland Type- Tp (freshwater marshes and pools).**

Apart from the dominant species mentioned in criteria 1, this type also contains *Thelypteris palustris* is a common fern. *Impatiens capensis* may be common in open parts of the marsh. Floating and rooted aquatics include *Ceratophyllum demersum*, *Lemna minor*, *Nymphaea odorata*, *Potamogeton gramineus*, *Sagittaria latifolia*, and *Spirodela polyrrhiza* (Minc and Albert 1998). Water depth generally exceeds 0.3 m.

**Lake Plain Wet Prairie, Wet Sand Prairie; Ramsar Wetland Type- Ts (seasonally flooded meadows)**

This type is characterized by the presence of *Calamagrostis canadensis*, *Carex aquatilis*, *Carex pellita* (= *Carex lanuginosa*), and *Spartina pectinata*. *Andropogon gerardii*, *Symphotrichum ericoides* (= *Aster ericoides*), *Juncus balticus*, *Panicum virgatum*, *Oligoneuron ohioense* (= *Solidago ohioensis*), and *Sorghastrum nutans* are all common components of this community.

This community occurs on level, sandy glacial outwash, sandy glacial lake plains, and deposits of dune sand in silty/clay glacial lake plains. Soils are sandy or sandy loam soil, rarely with clay or silt loam. There is often a clay layer below the surface that impedes drainage and prevents groundwater from moving to the surface (Comer et al.1995b). These conditions result in temporary flooding in the winter and spring and drought in the summer and fall. The soil is neutral to somewhat alkaline (Chapman 1984). The subsurface clay was deposited on the beds of glacial lakes, whereas the sand was deposited on lake beaches or by alluvial processes (Comer et al. 1995b).

**Cinquefoil - Sedge Prairie Fen, Graminoid Fen or Low Shrub Fen; Ramsar Wetland Type- U (fens).**

Diagnostic species include the prairie grasses *Andropogon gerardii* and *Spartina pectinata*, prairie forbs such as *Arnoglossum plantagineum* (= *Cacalia plantaginea*), *Filipendula rubra*, *Liatris spicata*, *Silphium terebinthinaceum* (more eastern), *Oligoneuron ohioense* (= *Solidago ohioensis*), and the sedges *Carex aquatilis*, *Carex haydenii*, *Carex hystericina*, *Carex leptalea*, *Carex sterilis*, and *Carex stricta*. Other characteristic species include *Doellingeria umbellata* (= *Aster umbellatus*), *Eupatorium maculatum*, *Gentianopsis virgata* (= *Gentianopsis procera*), *Lobelia kalmii*, *Lysimachia quadriflora*, *Muhlenbergia glomerata*, *Oxypolis rigidior*, *Pedicularis lanceolata*, *Pycnanthemum virginianum*, *Thalictrum dasycarpum*, and *Thelypteris palustris*. The most characteristic shrubs of this type is *Salix candida*, but *Cornus sericea*, and *Salix discolor* can also be found. Open areas around spring discharges are often sparsely vegetated, and contain *Cladium mariscoides*, *Eleocharis elliptica*, *Eleocharis rostellata*, *Lobelia kalmii*, *Parnassia glauca*, *Rhynchospora capillacea*, *Schoenoplectus acutus* (= *Scirpus acutus*), and *Triantha glutinosa* (= *Tofieldia glutinosa*). (Anderson 1996, Chapman et al. 1989, MNNHP 1993, White and Madany 1978).

This community is found on muck (peaty muck), through which flows groundwater rich in calcium and magnesium carbonates. Soils are saturated mucks, with neutral to slightly alkaline pH. Sites typically lie next to lakes, less commonly along streams and rivers, all of which occur in glacial outwash, ice contact topography or coarse-textured end moraines (Chapman et al. 1989).

**Twigrush Wet Prairie; Ramsar Wetland Type- Ts (seasonally flooded meadows, sedge meadows)**

Stand composition is quite variable, and other species include *Carex atherodes*, *Carex buxbaumii*, *Carex cryptolepis*, *Carex pellita*, *Coreopsis tripteris*, *Eleocharis elliptica*, *Euthamia caroliniana* (= *Euthamia remota*), *Gentiana andrewsii*, *Hypericum kalmianum*, *Liatris spicata*, *Lobelia kalmii*, *Lythrum alatum*, *Prenanthes racemosa*, *Sorghastrum nutans*, and *Oligoneuron riddellii* (= *Solidago riddellii*). Scattered shrubs such as *Salix petiolaris* may occur. The wettest areas tend to favor *Carex sartwellii*, *Iris versicolor*, and *Dulichium arundinaceum*. Shrubs including *Salix discolor*, *Salix petiolaris*, *Ilex verticillata*, *Physocarpus opulifolius*, and the non-native *Frangula alnus* (= *Rhamnus frangula*) may increase in drier areas (Schneider and Cochrane 1997). Stands occur in low-lying, sandy areas where the groundwater is at or near the surface for much of the year. Soils are typically muck over sand. Stands are seasonally flooded, and water depth may vary in spring from several centimeters to almost 0.5 m. (Schneider and Cochrane 1997).

**Skunk Cabbage Seepage Meadow, seep; Ramsar Wetland Type – Xf (Tree-dominated intermittent inland wetland)**

This community is characterized by the presence of *Symplocarpus foetidus* and *Angelica atropurpurea*, the leading dominant and indicator species. Other forbs and ferns present include *Caltha palustris*, *Chelone glabra*, *Epilobium coloratum*, *Impatiens capensis* (= *Impatiens biflora*), *Pedicularis lanceolata*, *Pilea pumila*, *Saxifraga pennsylvanica*, *Solidago patula*, and *Thelypteris palustris*. Graminoid cover is generally low, less than 25%, and may include *Carex bromoides*, *Carex comosa*, *Carex lacustris*, *Carex stricta*, and *Carex trichocarpa* (MNNHP 1993, White and Madany 1978). This community develops around spring heads and in broader areas of groundwater discharge, where water flows to the surface in a diffuse rather than concentrated flow. Stands can occur along the lower slopes of glacial moraines, ravines and in deep glacial melt water-cut river valleys at the bases of slopes separating stream terraces. Soils are seasonally to more-or-less permanently saturated (MNNHP 1993).

***Platanthera leucophaea* (eastern prairie fringed orchid); Federally Threatened**

Eastern prairie fringed orchid (EPFO) occurs in a wide variety of habitats, from mesic prairie to wetlands, such as sedge meadows, freshwater marsh edges, and even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. Early decline was due to the loss of habitat, while current decline is mainly due to the loss of habitat specifically from the drainage and development of wetlands. As a result of this decline, on September 28, 1989, the U.S. Fish and Wildlife Service (USFWS) listed the EPFO as threatened under the Endangered Species Act (Act) of 1973, as amended (U.S. Fish and Wildlife Service 1989). In September 1999 a recovery plan was completed by the USFWS which delineates reasonable actions needed to recover and/or protect this orchid (Bowles, Eastern Prairie Fringed Orchid Recovery Plan, 1995). Only a few population census counts in the United States have exceeded 500 individual flowering EPFO plants, and these numbers are from successional habitats that fluctuate widely over time. Less than 30 percent of the populations in the United States have full legal protection and only about 20 percent are adequately protected and managed (Bowles, Eastern Prairie Fringed Orchid Recovery Plan, 1995).

**Invasive Plant Species. Major species of management concern include:**

- *Typha angustifolia*
- *Typha x. glauca*
- *Phalaris arundinacea*
- *Phragmites australis*
- *Rhamnus cathartica*
- *Frangula alnus*
- *Lonicera spp.* (Bush Honeysuckles)
- *Leymus arenarius*
- *Celastrus orbiculatus*

**22. Noteworthy fauna:**

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Seventeen (17) state protected animal species are known to occur in the Lake Plain.

Common Name	Scientific Name	Status	Habitats
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	SE	Palustrine Wetlands; Breeding, Foraging
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	ST	Mesic Prairie / Foraging
Henslow's sparrow	<i>Ammodramus henslowii</i>	SE	Wet Prairies / Breeding, Foraging
King rail	<i>Rallus elegans</i>	SE	Palustrine Wetlands; Breeding, Foraging
Least bittern	<i>Ixobrychus exilis</i>	SE	Palustrine Wetlands; Breeding, Foraging
Pied-billed grebe	<i>Podilymbus podiceps</i>	SE	Palustrine Wetlands; Breeding, Foraging
Upland sandpiper	<i>Bartramia longicauda</i>	SE	Foredune and Beach; migration, foraging
Veery	<i>Catbarus fuscescens</i>	ST	Wet Woods / Migration, Foraging
Hoary elfin	<i>Incisalia polios</i>	SE	Sand Savanna / Breeding, Foraging
Leafhopper	<i>Paraphlepsius lupalis</i>	SE	Breeding, Foraging
Redveined leafhopper	<i>Aflexia rubranura</i>	ST	Prairies / Breeding, Foraging
Cisco	<i>Coregonus artedii</i>	ST	Lacustrine; Foraging
Lake whitefish	<i>Coregonus clupeaformis</i>	ST	Lacustrine; Foraging
Longnose sucker	<i>Catostomus catostomus</i>	ST	Riverine; Breeding, Foraging
Blanding's turtle	<i>Emydoidea blandingii</i>	ST	Palustrine Wetlands; Breeding, Foraging
Kirtland's watersnake	<i>Colaptes kirtlandii</i>	SE	Palustrine Wetlands; Breeding, Foraging
Franklin's Ground Squirrel	<i>Spermophilus franklinii</i>	SE	Shrubby wetlands and uplands

**23. Social and cultural values:**

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

Three prehistoric archaeological sites are found within the Lake Plain, all within the Ramsar Site: Barnes Creek, Chesrow Site and Lucas Site. Little is known about the Barnes Creek site other than it is a prehistoric site with the following periods of significance 0 AD to 1499 AD. The Chesrow site is the most researched and is known to have two activity areas atop and along the lakeward side of a former beach. The area is covered with sand banks and hollows where remnants and relics of Paleoindian occupancy were recovered. Studies have determined that the sand banks and ridges of this area were actually remnants of the various beaches associated with the glacial stages of Lake Michigan. Excavation of the southern area provided evidence of chert processing in the form of heat alteration and subsequent bifaces productions. Tools, including complex drills and cores, hammer stones, flake tools, cutting and scrapping tools, and projectile points, were also found. One particular chipped stone tool recovered, a Paleoindian fluted point, was dated to ca. 9500-8000 B.C. A small amount of debitage was found at the Lucas site.

The wetlands within the Lake Plain provide a vast array of recreation opportunities and value for tourism. Wetlands provide ideal places for wildlife viewing, hiking and biking (along the trail systems and adjacent roadways), fishing (in manmade ponds), hunting, and land stewardship through volunteerism.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, tick the box  and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

**24. Land tenure/ownership:**

a) within the Ramsar site:.

<b>Land Owner</b>	<b>Hectares of Land Owned</b>	<b>Type</b>
Wisconsin Department of Natural Resources	70	Public
The Nature Conservancy	47	NGO
Village of Pleasant Prairie	21	Municipal
University of Wisconsin Parkside	36	Public
Lake County Forest Preserve District	93	Public
Village of Winthrop Harbor	11	Municipal
Illinois Department of Natural Resources	1215	Public
Zion Park District	7	Public
Waukegan Park District	4	Public

b) in the surrounding area:

The areas surrounding the designation area are privately and publically owned.

**25. Current land (including water) use:**

a) within the Ramsar site:

Principal human activities within the Ramsar site include (listed in order of importance to the conservation and long-term protection of the Ramsar site):

- Research
  - i. Hydrological
  - ii. Ecological
  - iii. Wildlife
  - iv. Rare Plant
  - v. Archaeological
- Education
  - i. Primary Education
  - ii. Secondary Education
  - iii. College / University Education
  - iv. Citizen Scientists and Stewardship
- Recreation and Tourism
  - v. Walking / Hiking
  - vi. Biking
  - vii. Swimming
  - viii. Birding
  - ix. Fishing
  - x. Hunting\*

\* Hunting is only allowed on designated portions of Chiwaukee Prairie State Natural Area.

b) in the surroundings/catchment:

Principal human activities in the surrounding catchment:

The surrounding area has significantly different land cover and habitat types than the Ramsar Site; the surrounding area has greater urbanization and agriculture. More specific uses include:

- *Domestic Drinking Water* (from Lake Michigan) (use is projected to increase; domestic use for all communities in the Lake Michigan Watershed including City of Kenosha, the Village of Pleasant Prairie, Winthrop Harbor, City of Zion, Beach Park, and the City of Waukegan). Lake Michigan is connected hydrologically, both surface and ground water, to the Ramsar site
- *Residential Housing and Development* (projected to remain stable (in Illinois) or increase as populations increase (in Wisconsin)).
- *Commercial and Industrial Use and Development*
- *Recreation and Tourism* (use is increasing in Lake County, Illinois (by 4.6% in 2012) and Kenosha County, Wisconsin (by 3.8% in 2012)
  - i. Boating
  - ii. Fishing
  - iii. Swimming
  - iv. Golfing
  - v. Biking
  - vi. Dining
  - vii. Lodging
  - viii. Camping
- *Agriculture* (use is decreasing within watershed of the Ramsar Site in Illinois and Wisconsin)

**26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:**

a) within the Ramsar site:

- Invasive Plant Species. Major species of management concern include:
 

<ul style="list-style-type: none"> <li>• <i>Typha angustifolia</i></li> <li>• <i>Typha x. glauca</i></li> <li>• <i>Phalaris arundinacea</i></li> <li>• <i>Phragmites australis</i></li> <li>• <i>Rhamnus cathartica</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Frangula alnus</i></li> <li>• <i>Lonicera spp.</i> (Bush Honeysuckles)</li> <li>• <i>Lymus arenarius</i></li> <li>• <i>Celastrus orbiculatus</i></li> </ul>
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The above species alter the structural features of wetland communities in the Lake Plain, reducing light levels, compete with native species, alter foraging resources and nesting habitat, and modifying fuel loads which can impact prescribed fire management.

- Altered Hydrology
  - Historic ditching (1940's) has impacts on hydroperiod and surface flow paths
  - Stormwater runoff has impacted wetlands through increased surface flows of warm, sediment laden waters into the Lake Plain. Where ever storm water flows into the Lake Plain, invasive plant species are found.
- Decreased water quality
  - Chloride has increased from surface water runoff from roadways during winter months
  - Increased Nutrients
- Development (historically - residential housing, roadways, golf course, military camp)
- Erosion of ravine slopes and tributary banks
- Sedimentation
- Altered Fire Regime
  - Reduced fire frequency
- Fragmentation from roadways and historic developments
- Shoreline erosion
- Shoreline hardening to protect private lands and marina developments

b) in the surrounding area:

- Increasing impervious area (residential and industrial development, roadways)
  - Pollution
  - Increased stormwater runoff
    - Pollutant runoff
    - Nutrient runoff
  - Decreased infiltration and ground water recharge
- Conversion of grasslands and woodlands to conventional agriculture
  - Tiling and ditching
- Fragmentation
- Shoreline erosion
- Shoreline hardening
- Nuclear Power Plant – The Exelon nuclear power plant is not within the Ramsar Site and is currently being decommissioned, with an estimated completion date of 2020. The adverse impact of the power plant is the physical fragmentation of the north and south unit of Illinois Beach State Park. There are no adverse impacts of the power plant currently or anticipated in the future. Oversight of the decommissioning operations is being conducted by ZionSolutions Inc. ZionSolutions has an environmental division that is responsible for ensuring that the decommissioning is completed in a manner that meets all regulatory laws, including those that protect the adjacent wetlands, Lake Michigan, and other natural resources.

The past environmental factors were addressed in the Final Environmental Statement (December, 1972) which was required prior to construction of the plant and the issuance of the operating licenses for the Zion Nuclear Power Station in accordance with 10 CFR Part 50, Appendix D, implementing the requirements of the National Environmental Policy Act of 1969 (NEPA).

The Zion Nuclear Power Station is currently undergoing decommissioning and demolition and the present and potential factors of the decommissioning and demolition of the Zion Nuclear Station are addressed in the License Termination Plan (LTP) which was submitted to the NRC in December of 2014. The LTP concluded that there are no new significant environmental impacts associated with the decommissioning and demolition of the Zion Nuclear Power Station. The LTP is available on the NRC website.

## 27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

National Status:

National Natural Landmark (National Park Service)

- Illinois Beach Nature Preserve (585.18 hectares) designated in 1980
- Chiwaukee Prairie (38.04 hectares) designated in 1973
- Illinois Dunes North Natural Area, designated in 1943
- North Dunes Nature Preserve, designated in 1988

State Status:

Illinois Nature Preserves

- Illinois Beach State Park (335.48 hectares) dedicated October 16, 1964 – first designated nature preserve in Illinois
- Spring Bluff Nature Preserve (115.34 hectares) dedicated in October 1992

Wisconsin State Natural Areas

- Chiwaukee State Natural Area (165.92 hectares) designated in 1967

Non-statutory designations:

- Important Bird Conservation Area (825 hectares, 2004)  
<http://habitatproject.org/birds/ibacurrent.html>
- Excellence in Ecological Restoration by Chicago Wilderness, Spring Bluff Nature Preserve, 2013  
<http://www.chicagowilderness.org/what-we-do/restoring-nature-to-health/awardrecipients/>
- Wetland Gem by Wisconsin Wetlands Association, Chiwaukee Prairie, 2012  
<http://www.wisconsinwetlands.org/gemlist.htm>

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate): N/A

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

There is no single management plan for the entire Chiwaukee Illinois Beach Lake Plain, although partners are committed to working together to implement coordinated land management actions to achieve common conservation goals (see Lake Plain MOU).

d) Describe any other current management practices:

Current management practices within the Lake Plain include: hydrologic restoration (installation of water control structure, replacement of culverts, removal of surface water flow obstructions, removal of a vacated roadways that crossed a wetland community), invasive plant control (both woody and herbaceous species), prescribed burn management, streambank stabilization, in stream habitat restoration, ravine bank stabilization, and seeding and planting highly erodible slopes. Reintroduction of eastern prairie fringed orchid is underway. Management of human use through designated trails and signage occurs throughout the designation area. Monitoring of plants, wildlife and hydrology are on-going.

In September 2003, USFWS completed a "Recovery Plan for the Great Lakes Piping Plover. Very little suitable piping plover habitat remains in the Great Lakes region, and all the areas identified in the recovery plan, including the southern portion of the Lake Plain, are essential for the recovery of the species because these areas represent the habitat necessary to achieve the recovery goal of 100 breeding pairs in Michigan and 50 breeding pairs in the other Great Lakes States combined.

**28. Conservation measures proposed but not yet implemented:**

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Several Lake Plain Partners are working with the US Army Corps of Engineers to complete a comprehensive assessment of historic and current hydrologic conditions and development of a hydrologic restoration plan that identifies opportunities to restore historic flow patterns and mitigate stormwater inputs.

Waukegan Harbor Area of Concern Expanded Study Area Habitat Management Plan, 2013 (in progress).

Conversion of an existing roadway through Spring Bluff Nature Preserve to a pedestrian pathway with a platform overlook of the restoration area is proposed for construction in 2016. This would reduce the footprint of the roadway, limit vehicular traffic and encourage pedestrian and bike use through the preserve. No new trails are proposed.

### **29. Current scientific research and facilities:**

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Current research projects:

- Gary Glowacki, Reduction of populations of meso-predators and associated impacts on Blanding's turtle populations, 2013-2014.
- Rob Sulski, Raptor Migration Research and Education along the Lake Michigan Shoreline of Lake County Illinois. 2008 – current.
- Laura Smith, Graduate Research Assistant, Nelson Institute for Environmental Studies, University of Wisconsin – Madison. Plant-fungal linkages in perennial warm-season grasses.
- Dr. Robeti Howe. University of Wisconsin- Green Bay and UW-Green Bay's Cofl'in Center for Biodiversity. Great Lakes Coastal Wetland Monitoring Program; Avian and Amphibian Monitoring at Spring Bluff Nature Preserve. 2014
- David Rogers. University of Wisconsin-Parkside. Vegetation Monitoring to Assess the Effects of invasive Plant Management in Coastal Communities of the Chiwaukee Illinois Beach Lake Plain. 2010 – 2014
- James Miner. Illinois State Geological Survey. Monitoring and Assessment of Shallow Ground Water Resources in Relation to Hydrologic Restoration Actions within the Chiwaukee Illinois Beach Lake Plain.

### **30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:**

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Lake Plain offers a variety of CEPA activities including a nature center located at Illinois Beach State Park that provides information of the geologic history of the area, natural communities, including the wetlands, and the plants and animals that occur in the Lake Plain. Nature trails are located in Chiwaukee Prairie, Illinois Beach State Park, Fossiland Park, and Bowen Park (location of the Glen Flora Tributary) providing opportunity to explore a wide variety of natural communities in the Lake Plain, including wet prairies, pannes, sedge meadows, and marsh communities. The University of Wisconsin-Parkside and Carroll College annually visit the Chiwaukee Prairie portion of the Lake Plain for botany and ecology field trips. Bowen Park provides a newly renovated children's playground that is designed to engage children in nature-based play, providing educational play opportunities to learn about forest ecosystems. Bowen Park also offers summer and day camps for youth that include outdoor recreation at Bowen Park and nature studies that introduce youth to the unique natural areas found within the park.

Two volunteer groups, the Chiwaukee Prairie Preservation Fund and the Friends of Illinois Beach are very active in the Lake Plain, fostering community engagement and support for the Lake Plain natural areas. The Chiwaukee Prairie Preservation Fund, established as a not-for-profit 501(c) 3 in 1985 started as a grassroots effort by community members in 1965 to acquire and protect the area of wetlands and prairie that today is known as Chiwaukee Prairie. The Chiwaukee Prairie Preservation Fund has been and remains integral to the acquisition and protection of lands within the Ramsar Site, and both volunteer groups are important to the long term restoration and management of these areas within the Ramsar Site. Both groups host monthly workdays that provide an opportunity for local community members to experience the natural areas, assist with controlling invasive plants, monitoring for rare plants, learning about the flora and fauna, and assisting with prescribed burn management.

### **31. Current recreation and tourism:**

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The wetlands within the Lake Plain are used for recreation, including, bird watching, hiking, and fishing (in manmade ponds). The majority of recreation within the wetlands is seasonal, occurring from April to November, with warm weather recreation occurring from June to September. Recreation generally occurs along established trails within the Lake Plain (grass trails, gravel trails, or roadways).

### 32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Chiwaukee Prairie State Natural Area and Scientific Area – Territorial and Functional Jurisdiction: Wisconsin Department of Natural Resources, 101 South Webster Street, Madison, Wisconsin, 53707; Land Division. *Contact: Sharon Fandel, 608-279-4768, Sharon.fandel@wisconsin.gov*

Carol Beach Parks and Open space, and Barnes Creek - Territorial and Functional Jurisdiction: The Village of Pleasant Prairie, 8600 Green Bay Road Pleasant Prairie, Wisconsin 53158; Public Works Department. *Contact: Kevin Meyers, 262-948-8930, kmeyers@plprairienvi.com*

Chiwaukee Prairie Scientific Area – Territorial and Functional Jurisdiction: University of Wisconsin Board of Regents, 1860 Van Hise Hall, 1220 Linden Drive, Madison, Wisconsin, 53706; University of Wisconsin-Parkside. *Contact: David Rogers, 608-572-0556, rogersd@unp.edu*

Spring Bluff Nature Preserve – Territorial and Functional Jurisdiction: Lake County Forest Preserve District, 1899 West Winchester Road, Libertyville, Illinois 60080; Natural Resource Division, Department of Planning, Conservation and Development. *Contact: Debbie Maurer, 847-968-3285, dmaurer@LCFPD.org*

Fossland Park, Dead Dog Creek Tributary – Territorial and Functional Jurisdiction: Village of Winthrop Harbor 830 Sheridan Road, Winthrop Harbor, Illinois 60096; Department of Parks and Recreation. *Contact: Scott Fuller, 847-746-3505, SFuller@whpd.org*

Illinois Beach State Park and Nature Preserve– Territorial and Functional Jurisdiction: Illinois Department of Natural Resources, One Natural Resources Way, Springfield, IL 62702; Office of Resource Conservation. *Contact: Brad Semel, 815-675-2386 ext.317, Brad.Semel@illinois.gov*

Hosha Prairie - Territorial and Functional Jurisdiction: Zion Park District, 2400 Dowie Memorial Drive, Zion, IL 60099; Zion Park District. *Contact: Marilyn Krieger, 847-746-5500 ext. 445, mkrieger@zionparkdistrict.org*

Bowen Park, Glen Flora Tributary – Territorial and Functional Jurisdiction: Waukegan Park District, 2000 Belvidere Road, Waukegan, Illinois 60085; Waukegan Park District. *Contact: Mike Trigg, 847-360-4724, mtrigg@waukeganparks.org*

### 33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Chiwaukee Prairie State Natural Area and Scientific Area – Management Authority: Wisconsin Department of Natural Resources, 101 South Webster Street, Madison, Wisconsin, 53707; Land Division. *Contact: Sharon Fandel, 608-279-4768, Sharon.fandel@wisconsin.gov*

Carol Beach Parks and Open space, and Barnes Creek - Management Authority: The Village of Pleasant Prairie, 8600 Green Bay Road Pleasant Prairie, Wisconsin 53158; Public Works Department. *Contact: Kevin Meyers, 262-948-8930, kmeyers@plprairienvi.com*

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Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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#### Management Plans

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- Chiwaukee Prairie Land Management Plan. 2003. The Nature Conservancy
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- Chiwaukee Illinois Beach Lake Plain Memorandum of Understanding. 2010.

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Please return to: **Ramsar Convention Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**  
Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • e-mail: [ramsar@ramsar.org](mailto:ramsar@ramsar.org)

## Annex I

### Bird species observed in the Chikwaukee Illinois Beach Lake Plain, 2000-2013

Acadian Flycatcher* (NL/T)	Common Grackle*	Lesser Scaup	Ruddy Duck
Alder Flycatcher*	Common Loon*	Lesser Yellowlegs	Ruddy Turnstone*
Alder/Willow Flycatcher (Traill's Flycatcher)	Common Merganser	Lincoln's Sparrow	Rusty Blackbird
American Avocet	Common Nighthawk*	Little Blue Heron	Sabine's Gull
<b>American Bittern (E/NL)</b>	Common Raven	Little Gull	Sanderling*
American Black Duck	Common Redpoll	Loggerhead Shrike	Sandhill Crane*
American Black Duck x Mallard (hybrid)	<b>Common Tern* (E/E)</b>	Long-billed Dowitcher	Savannah Sparrow*
American Coot*	Common Yellowthroat*	Long-eared Owl	Say's Phoebe
American Crow*	Common/Red-breasted Merganser	Long-tailed Duck	Scarlet Tanager*
American Golden-Plover	Connecticut Warbler	Louisiana Waterthrush	Scissor-tailed Flycatcher
American Goldfinch*	Cooper's Hawk*	Magnolia Warbler*	Sedge Wren*
American Kestrel*	Dark-eyed Junco	Mallard*	Semipalmated Plover
American Pipit	Dickcissel*	Mallard (Domestic type)	Semipalmated Sandpiper*
American Redstart*	Double-crested Cormorant*	Marsh Wren*	Sharp-shinned Hawk
American Robin*	Downy Woodpecker*	Merlin	Short-billed Dowitcher
American Tree Sparrow	Downy/Hairy Woodpecker*	Mississippi Kite	Short-billed/Long-billed Dowitcher
American White Pelican	Dunlin*	Monk Parakeet	Short-eared Owl
American Wigeon	Eared Grebe	Mountain Bluebird	Snow Bunting
American Woodcock*	Eastern Bluebird*	Mourning Dove*	Snow Goose
Anhinga	Eastern Kingbird*	Mourning Warbler*	Snow x Ross's Goose (hybrid)
Aythya sp.	Eastern Meadowlark*	Mute Swan*	Snowy Egret
Baird's Sandpiper	Eastern Phoebe*	Nashville Warbler	Snowy Owl
Bald Eagle*	Eastern Screech-Owl	Nelson's Sparrow	Solitary Sandpiper
Baltimore Oriole*	Eastern Towhee*	Northern Cardinal*	Song Sparrow*
Bank Swallow*	Eastern Whip-poor-will*	Northern Flicker*	Sora*
Barn Owl	Eastern Wood-Pewee*	Northern Goshawk	Spotted Sandpiper*
Barn Swallow	European Starling*	Northern Harrier*	Spotted Towhee
Barrow's Goldeneye	Evening Grosbeak	Northern Mockingbird*	Sterna sp.
Bay-breasted Warbler	Field Sparrow*	Northern Parula	Stilt Sandpiper
Belted Kingfisher*	Fork-tailed Flycatcher*	Northern Pintail	Surf Scoter
Black Scoter	<b>Forster's Tern* (E/E)</b>	Northern Rough-winged Swallow*	Surf/Black Scoter
Black Skimmer	Fox Sparrow	Northern Shoveler*	Swainson's Hawk
<b>Black Tern* (E/E)</b>	Franklin's Gull*	Northern Shrike	Swainson's Thrush*
Black Vulture	Gadwall	Northern Waterthrush	Swallow-tailed Kite
Black-and-white Warbler*	Glaucous Gull	Olive-sided Flycatcher*	Swamp Sparrow
Black-bellied Plover	Glaucous-winged Gull	Orange Bishop	Tennessee Warbler
<b>Black-billed Cuckoo* (T/NL)</b>	Golden Eagle	Orange-crowned Warbler	Thayer's Gull
Blackburnian Warbler*	Golden-crowned Kinglet	Orchard Oriole*	Thayer's x Iceland Gull (hybrid)
Black-capped Chickadee*	Golden-winged Warbler	Osprey*	Thayer's/Iceland Gull
<b>Black-crowned Night-Heron* (E/NL)</b>	Grasshopper Sparrow*	Ovenbird*	Tree Swallow*
Blackpoll Warbler*	Gray Catbird*	Pacific Loon	Trumpeter Swan
Black-throated Blue Warbler	Gray Partridge	Palm Warbler	Tufted Titmouse
Black-throated Green Warbler*	Gray-cheeked Thrush	Parasitic Jaeger	Tundra Swan
Blue Grosbeak*	Great Black-backed Gull	Pectoral Sandpiper	Turkey Vulture*
Blue Jay*	Great Blue Heron*	peep sp.	<b>Upland Sandpiper* (E/T)</b>
Blue-gray Gnatcatcher*	Great Crested Flycatcher*	<b>Peregrine Falcon* (T/E)</b>	Veery*
Blue-headed Vireo	<b>Great Egret* (NL/T)</b>	Philadelphia Vireo	Vesper Sparrow*
Blue-winged Teal*	Great Horned Owl*	Pied-billed Grebe	Virginia Rail*
Blue-winged Warbler	Greater Scaup	Pine Grosbeak	Warbling Vireo*
Bobolink*	Greater White-fronted Goose	Pine Siskin*	Western Grebe
Bohemian Waxwing	Greater Yellowlegs	Pine Warbler	Western Meadowlark*
Bonaparte's Gull*	Greater/Lesser Scaup	<b>Piping Plover* (E/E/FE)</b>	Western Sandpiper
Brewer's Blackbird*	Greater/Lesser Yellowlegs	Pomarine/Parasitic Jaeger	Western Scrub-jay
Broad-winged Hawk*	Green Heron*	Prairie Warbler	Whimbrel
Brown Creeper	Green-backed Heron	Prothonotary Warbler	White Ibis
Brown Thrasher*	Green-winged Teal	Purple Finch	White-breasted Nuthatch*
Brown-headed Cowbird*	Hairy Woodpecker*	Purple Martin*	White-crowned Sparrow*
Brown-headed Nuthatch	Harlequin Duck	Purple Sandpiper	White-eyed Vireo*
Buff-breasted Sandpiper	<b>Henslow's Sparrow* (NL/T)</b>	Red Crossbill	White-rumped Sandpiper
Bufflehead	Hermit Thrush	Red Knot	White-throated Sparrow
Cackling Goose	Herring Gull*	Red-bellied Woodpecker*	White-winged Crossbill
California Gull*	Herring x Glaucous Gull (hybrid)	Red-breasted Merganser*	White-winged Scoter
Canada Goose*	Herring x Great Black-backed Gull (hybrid)	Red-breasted Nuthatch*	Whooping Crane
Canada Warbler*	Hooded Merganser*	Red-cockaded Woodpecker	Willet*
Canvasback	Horned Grebe	Red-eyed Vireo*	Willow Flycatcher*
Cape May Warbler	Horned Lark*	Redhead	<b>Wilson's Phalarope (E/NL)</b>
Carolina Wren*	House Finch*	Redhead x Ring-necked Duck (hybrid)	Wilson's Plover
<b>Caspian Tern* (NL/E)</b>	House Sparrow*	Red-headed Woodpecker*	Wilson's Snipe*
Cassin's Sparrow	House Wren*	Red-necked Grebe	Wilson's Warbler*
Catharus sp.	Iceland Gull	<b>Red-shouldered Hawk* (NL/T)</b>	Winter Wren
Cattle Egret*	Indigo Bunting*	Red-tailed Hawk*	Wood Duck*
Cave Swallow	jaeger sp.	Red-throated Loon	Wood Thrush*
Cedar Waxwing*	Killdeer*	Red-winged Blackbird*	Worm-eating Warbler
Cerulean Warbler*	<b>King Rail* (E/NL)</b>	Ring-billed Gull*	Yellow Warbler*
Chestnut-sided Warbler*	Lapland Longspur	Ring-necked Duck	Yellow-bellied Flycatcher*
Chimney Swift*	Lark Sparrow*	Ring-necked Pheasant*	Yellow-bellied Sapsucker
Chipping Sparrow*	Laughing Gull	Rock Pigeon*	Yellow-billed Cuckoo*
Clark's Nutcracker	Le Conte's Sparrow	Rose-breasted Grosbeak*	Yellow-breasted Chat*
Clay-colored Sparrow*	<b>Least Bittern* (T/NL)</b>	Ross's Goose	Yellow-headed Blackbird
Cliff Swallow*	Least Flycatcher*	Rough-legged Hawk	Yellow-rumped Warbler*
Common Gallinule	Least Sandpiper	Ruby-crowned Kinglet	Yellow-throated Vireo*
Common Goldeneye	Lesser Black-backed Gull*	Ruby-throated Hummingbird*	<b>Yellow-throated Warbler* (NL/E)</b>

Species in **bold** are protected under state (IL/WI) or federal law; E = State Endangered, T = State Threatened, Fe = Federally Endangered  
 \* Observed during breeding season (June) of at least one year between 2000 - 2013  
 Data from: Bird Conservation Network (<http://www.bcnbirds.org/>), E. Collins "Avian Surveys of Bowen Park and Selected Areas of Waukegan Dune Complex, and Lake County Forest Preserve District"

**Annex II**  
**State endangered and threatened plant species found within the Lake Plain**

Common Name	Scientific Name	Status	Habitats that will be Enhanced / Habitat Use
American sea-rocket	<i>Cakile edentula</i>	ST	Beach and Foredune
Balsam poplar	<i>Populus balsamifera</i>	SE	Sand Dunes and Mesic Prairie
Beaked rush	<i>Rhynchospora alba</i>	ST	Palustrine Wetlands (fens and interdunal swales)
Bearberry	<i>Arctostaphylos uva-ursi</i>	SE	Sand Savanna and Sand Prairie
Bearded wheat grass	<i>Elymus trachycalus</i>	SE	Mesic Prairie
Bog arrow-grass	<i>Triglochin palustre</i>	ST	Palustrine Wetlands (fens and interdunal swales)
Capitate spikerush	<i>Eleocharis olivacea</i>	SE	Palustrine Wetlands (interdunal swales)
Chestnut sedge	<i>Fimbristylis puberula</i>	SE	Palustrine Wetlands (interdunal swales)
Clustered broomrape	<i>Orobanche fasciculata</i>	SE	Dry Sand Prairie
Downey yellow-painted cup	<i>Castilleja sessiliflora</i>	SE	Dry Mesic Sand Prairie
Dune willow	<i>Salix sylvicola</i>	SE	Sand Dunes
Eastern prairie fringed orchid	<i>Platanthera leucophea</i>	SE, FT	Wet to Mesic Prairies
Elk sedge	<i>Carex garberi</i>	SE	Calcareous Beach Ridges and Palustrine Wetlands (swales)
Flat-leaved bladderwort	<i>Utricularia intermedia</i>	SE	Palustrine Wetlands (fens and interdunal swales)
Forked Aster	<i>Aster furcatus</i>	ST	Seeps
Golden sedge	<i>Carex aurea</i>	SE	Palustrine Wetlands (fens and sedge meadows)
Grass-pink orchid	<i>Calopogon tuberosus</i>	SE	Palustrine Wetlands (fens)
Ground juniper	<i>Juniperus communis</i>	ST	Sand Dunes
Horned bladderwort	<i>Utricularia cornuta</i>	SE	Palustrine Wetlands (fens and peaty sands)
Jack Pine	<i>Pinus banksiana</i>	SE	Sand Ridges
Kalm's St. John's Wort	<i>Hypericum kalmianum</i>	SE	Palustrine Wetlands (interdunal swales) and Mesic Sand Prairie
Little green sedge	<i>Carex viridula</i>	ST	Palustrine Wetlands (interdunal swales)
Marram (beach) grass	<i>Ammophila breviligulata</i>	SE	Beach, Foredune and Sand Dunes
Marsh phlox	<i>Phlox glaberrima</i>	SE	Palustrine Wetlands (interdunal swales)
Marsh speedwell	<i>Veronica scutellata</i>	ST	Palustrine Wetlands (marsh and fen)
Pale false foxglove	<i>Agalinis skinneriana</i>	ST	Wet to Wet-Mesic Sand Prairies
Pink milkwort	<i>Polygala incarnata</i>	ST	Mesic to Dry Prairies
Prairie indian plantain	<i>Arnoglossum plantagineum</i>	SE	Wet meadows
Purple flowering raspberry	<i>Rubus odoratus</i>	SE	Moist wooded areas
Purple milkweed	<i>Asclepias purpurascens</i>	SE	Sand savanna
Reddish bulrush	<i>Scirpus microcarpus</i>	SE	Palustrine Wetlands (marsh)
Richardsons rush	<i>Juncus alpinoarticulatus</i>	SE	Palustrine Wetlands (fens and interdunal swales)
Redroot	<i>Ceanothus ovatus</i>	SE	Sand Savanna and Sand Prairie
Roundleaf sundew	<i>Drosera rotundifolia</i>	SE	Peaty Sand
Pinweed	<i>Lechia intermedia</i>	ST	Dry Sand Prairie
Pitcher's thistle	<i>Cirsium pitcheri</i>	ST, FT	Beach, Foredune and Sand Dunes
Purple-fringed orchid	<i>Platanthera psycodes</i>	SE	Mesic Sand Prairies
Seaside arrow-grass	<i>Triglochin maritima</i>	ST	Palustrine Wetlands (fens and interdunal swales)
Seaside spurge	<i>Chamaesyce poligonifolia</i>	SE	Beach and Foredune
Small bladderwort	<i>Utricularia minor</i>	SE	Palustrine Wetlands (fens and interdunal swales)
Sticky False-asphodel	<i>Tofieldia glutinosa</i>	ST	Palustrine Wetlands (fens and interdunal swales)
Trailing juniper	<i>Juniperus horizontalis</i>	SE	Sand Dunes
Turbercle orchid	<i>Platanthera flava var herbiola</i>	SE	Wet-mesic Sand Prairie
Wood orchid	<i>Platanthera clavellata</i>	SE	Mesic Sand Prairie