

Information Sheet on Ramsar Wetlands (RIS)

2009-2012 version

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Designation date

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Site Reference Number

John Hartig, U.S. Fish and Wildlife Service
Detroit River International Wildlife Refuge
Large Lakes Research Station
9311 Groh Road
Grosse Ile, MI 48138, USA
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2. Date this sheet was completed/updated: April 2009

3. Country: USA

4. Name of the Ramsar site: Humbug Marsh

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. N/A

7. Map of site:

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:

The boundary follows the existing protection boundary of the Humbug Marsh portion of the Detroit River International Wildlife Refuge.

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

Approximate Center of Site: 42N 6'29"; 83W 11'23"

Extremes of latitude: 42N 6'52" and 42N 6'0"

Extremes of longitude: 83W 11'2" and 83W 12'0"

9. General location:

Humbug Marsh is a 188 hectare wetland/upland complex located in southeast Michigan, within the cities of Trenton and Gibraltar. The area represents the last mile long stretch of natural shoreline on the U.S. mainland of the Detroit River, which carries the outflow of water from Lake St. Clair to Lake Erie in the Great Lakes basin. (See Annex 1: Statewide Locational Map, Annex 2: Contributing Watershed, Ramsar Site Boundary)

10. Elevation:

Average Elevation: 176.5m above sea level

(See Annex 4: Site Topography)

11. Area:

188 hectares

12. General overview of the site:

The wetlands, upland, open water, and island habitat within Humbug Marsh are an important part of the Lake Huron- Lake Erie corridor, which serves as a connection between the lower and upper Great Lakes. Humbug provides habitat for a number of rare plant and animal species and each year the open water habitat between the mainland and the island serves as spawning and nursery habitat for many species of game and forage fishes. Tens of thousands of migrating waterfowl, passerines, and raptors pass through the Detroit River corridor each year and many stop over in Humbug marsh.

The international importance of Humbug Marsh has been previously recognized by its inclusion in North America's only International Wildlife Refuge – the Detroit River International Wildlife Refuge (Refuge). In addition, this area is part of an Important Bird Area, designated by the National Audubon Society; a Biodiversity Investment Area, designated by the U.S.-Canada State of the Lakes Ecosystem Conference; is recognized as one of 34 Waterfowl Habitat Areas of Major Concern in the North American Waterfowl Management Plan; and is part of an American Heritage River designated by U.S. Presidential Order.

13. Ramsar Criteria:

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

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

Criterion 2: Importance to threatened, endangered and vulnerable species and ecological communities

Numerous bird counts have been conducted in Humbug Marsh at different times of the year. Those surveys have proven that the marsh provides habitat for a number of sensitive, locally rare bird species including: Michigan Endangered Species: *Falco peregrinus* (Peregrine Falcon); Michigan Threatened Species: *Buteo lineatus* (Red-shouldered Hawk), *Gavia immer* (Common Loon), *Haliaeetus leucocephalus* (Bald Eagle), *Nycticorax nycticorax* (Black-crowned Night Heron), *Pandion haliaetus* (Osprey), *Sterna caspia pallas* (Caspian Tern), *Sterna burondo* (Common Tern); Michigan Special Concern Species: *Accipiter cooperii* (Cooper's Hawk), *Circus cyaneus* (Northern Harrier), *Dendroica cerulea* (Cerulean Warbler), *Sterna forsteri* (Forster's Tern).

Additionally, this site supports the *Elaphe vulpina gloydi* (eastern fox snake), a species protected throughout its range and listed as Threatened by the State of Michigan (Mifsud 2005).

Criterion 3: Importance for Maintaining Biological Diversity

Because Humbug Marsh represents a significant portion of the last unaltered wetlands in the Detroit River corridor and the last mile of natural shoreline on the river's U.S. mainland, it serves as a vital habitat for a large variety of endemic fish, birds, and plants that are regionally rare and may otherwise be extirpated from the area.

In a recent survey, approximately 51 species of native fish were found within or very close to Humbug Marsh (MDNR unpublished Data 2006). Certain forage fish species such as *Lepisosteus osseus* (longnose gar), the Michigan Threatened Species *Luxilus chrysocephalus* (striped shiner) and bullhead catfish (*Ameiurus nebulosus*, *A. natalis*, and *A. melas*) are not likely to leave marsh areas to travel through the Detroit River (Goodyear et al. 1982). *Opsopoeodus emiliae* (pugnose minnow), a state listed endangered species, is also likely to use the protected areas of Humbug Marsh where the fast current of the Detroit River is slowed by the island and wetlands. See Appendix A: Fish Species Observed in or Near Humbug Marsh.

Over 90 native plant species are known to occur within the Humbug Marsh complex, at least 12 of which have a coefficient of conservatism value greater than 5. This means the area has maintained some of its pre-settlement character, despite the pressures of development, influx of invasive plants, and other ecosystem alterations (Reznicek et al. 2005). See Appendix B: Plant Species with a Coefficient of Conservatism of 5 or higher Observed in the Humbug Marsh Wetland/Upland Complex.

Over the past several years, a number of bird surveys have taken place in Humbug Marsh. Data from Christmas Bird Counts (2004-2007), North American Migration Counts (2005-2006) and The Big Sit (2007-2008) show that at least 154 native bird species from 39 different families use the Marsh and associated upland (Bird Watcher's Digest 2007 and 2008, Craves and Fowler 2003, Craves 2006). The number of avian species increases during fall and spring migrations, when thousands of birds make their way through the lower Detroit River. In addition to supporting migratory waterfowl, Humbug Marsh is known to be part of an important flyway for at least 17 species of raptors during their annual migrations. The area is considered essential for the preservation of migrating raptor species such as *Buteo platypterus* (Broad-winged Hawk) and *Accipiter striatus* (Sharp-shinned Hawk) by the Audubon Society, and thus, was designated as an Important Bird Area in September of 2007 (National Audubon Society 2009). See Appendix C: Birds Observed in Humbug Marsh.

Surveys conducted in 2005 showed that the number of present and potentially occurring species of reptiles and amphibians within the Humbug Marsh complex is greater than 25 species. Many of these species are recognized by the Michigan Wildlife Action Plan, prepared by the Michigan Department of Natural Resources, as Species of Greatest Conservation Need. Most importantly,

Finally, Humbug Marsh provides habitats for a large diversity of odonates, some of which are regionally rare. A 2007 survey found twelve species of damselflies from two families and 25 species of dragonflies from five families (Craves 2007). See Appendix D: Odonata and Lepidoptera species Observed in Humbug Marsh.

As loss of habitat continues to threaten endemic species of southeast Michigan, strongholds such as the Humbug Marsh will become increasingly important in preserving the ecological integrity of the Great Lakes ecosystem as a whole.

Criterion 4: Importance as Habitat for Plants or Animals in Critical Stages of their Lifecycles

Humbug Marsh and the lower Detroit River are located at the intersection of two highly important migratory bird flyways (Atlantic and Mississippi Flyways), making it a prime location for waterbird stopover during fall and spring migration periods. In winter months, Humbug Marsh and the adjacent open water of the Detroit River provide critical waterfowl breeding, staging and feeding habitat. Resident and migrant birds frequently overwinter and nest several kilometers downstream from Humbug Marsh at Pointe Mouillee State Game Area, but these birds regularly make trips upstream to the Humbug area for feeding and breeding. Single day Christmas Bird Counts have shown that hundreds of *Bucephala clangula* (Common Goldeneye), *Cygnus columbianus* (Tundra Swan), *Aythya americana* (Redhead), *Aythya affinis* (Lesser Scaup), and *Aythya valisineria* (Canvasback) routinely use the marsh. Less common sightings have included *Lophodytes cucullatus* (Hooded Merganser) and *Anas acuta* (Northern Pintail). Many of these waterbirds, including the Canvasbacks that are prized by hunters, rely on the growth of *Valisneria americana* (wild celery) as a primary food source. As extensive dredging and shoreline hardening occurred throughout the lower Detroit River and western Lake Erie, habitat suitable for supporting wild celery became scarce. Since 1998, however, Great Lakes water levels have been falling, allowing wild celery to re-establish in Humbug Marsh, and providing essential food to a variety of waterbirds (U.S. Fish and Wildlife Service 2005). In addition to waterbirds, a significant number of passerines and raptors pass through Humbug Marsh during migration. *Accipiter cooperii* (Cooper's Hawk), *Pandion haliaetus* (Osprey), *Haliaeetus leucocephalus* (Bald Eagle), several owl species, and a number of other special concern raptors are among those that regularly travel through and stopover at the site. See Appendix C.

The wetlands within Humbug Marsh are classified as Great Lakes Marsh, a natural community that has been ranked as a globally imperilled community by the Michigan Natural Features Inventory (Kost et al., 2007). As the shorelines of the Great Lakes were developed for industrial, commercial, residential, and recreational use, the marsh habitat essential for many Great Lakes species rapidly declined. While vast seas of emergent vegetation once controlled flooding, aided in groundwater recharge, and provided habitat, today most of this once common ecological community has been dredged, filled, or otherwise altered by humans. Each remaining portion of Great Lakes coastal wetland is important to maintaining the integrity of the lakes as a whole, but the wetlands within Humbug Marsh are particularly important due to the extensive loss of native habitat that has occurred within the Huron and Erie Lakeplain Ecoregion. This ecoregion lies in one of the most industrialized areas of the Midwest, and thus, has lost the majority of its original coastal wetlands. In the Detroit River, 97% of pre-settlement wetlands have been lost (Manny 2007).

Humbug Marsh is also a critical corridor along the Detroit River for herpetofauna, and serves as an important breeding, nesting, and developmental site for a number of amphibian and reptile species (Mifsud 2005).

Criterion 7: Importance to Indigenous Fish Biodiversity

The variety of habitats existing within Humbug Marsh allows fish with diverse life histories to thrive. In a fish survey that included Humbug and other surrounding islands in the Detroit River, 51 indigenous fish species representing fifteen different families were counted (MDNR unpublished data 2006). Since Humbug Marsh provides one of the last wetland areas in the Detroit River, the majority of fish species counted in the survey must use this location at some point in their lifecycle. A variety of life histories are represented among the many fish that utilize resources within Humbug. Primitive species include the jawless *Ichthyomyzon unicuspis* (silver lamprey), giant cartilaginous *Acipenser fulvescens* (lake sturgeon), bony scaled *Lepisosteus osseus* (longnose gar), and the living Mesozoic relic *Amia calva* (bowfin). More advanced species include bony fishes such as bottom feeding *Catostomus commersoni* (white suckers), predatory *Esox lucius* (northern pike) and many schooling chubs, minnows and shiners. Humbug Marsh is especially important for forage fish species, which rely on marsh habitat for most or all of their lifecycle. Introduction of invasive species has been a serious

problem in the Great Lakes; however, the majority of fish within Humbug- approximately 90% of fish species represented and 97% of the total fish population - are endemic species (MDNR unpublished data 2006). See Appendix A.

Criterion 8: Importance as a Food Source, Spawning, Nursery or Migration Area on which Fish Depend
Humbug Marsh and the surrounding Detroit River are known to be an extremely important habitat for migrating fish. Each year, over 3 million walleye, approximately 10% of the walleye population of Lake Erie, run the Detroit River (Francis 2005). Once the walleye spawn on rocky substrate within the river, larval fish travel to the marsh and use it as an essential nursery habitat. The vegetated areas of these wetlands provide spawning and nursery areas for *Perca flavescens* (yellow perch), *Esox masquinongy* (muskellunge), *Ameiurus nebulosus* (brown bullhead) and many others (Goodyear et al. 1984). In addition, Humbug Marsh serves as one of the only remaining spawning and nursery areas for forage fishes, which rely on the significant cover of emergent and submergent vegetation for their survival.

15. Biogeography

a) biogeographic region:

Huron-Erie Lakeplain

b) biogeographic regionalisation scheme:

Commission for Environmental Cooperation Ecoregions of North America: Level III

Commission for Environmental Cooperation. 1997. Ecological regions of North America: toward a common perspective. Commission for Environmental Cooperation, Montreal, Quebec, Canada. 71pp. Map (scale 1:12,500,000).

These ecoregions are well documented and have been accepted by numerous agencies in the USA, Canada and Mexico, including the U.S. Environmental Protection Agency (USEPA) and the U.S. Fish and Wildlife Service (USFWS). For the purposes of designating Humbug Marsh as a Ramsar site, we chose to use Level III ecoregions, as this detailed level of analysis is more appropriate for assessing biocriteria than Levels I and II.

16. Physical features of the site:

The Detroit River is a 51 kilometer long waterway connecting Lake St. Clair to Western Lake Erie, dropping about one meter in elevation along the way. At high water, the river reaches 175 meters above sea level and during low water years, it dips to 173.5 meters. Long term water fluctuations depend on water levels throughout the Great Lakes basin and are not artificially regulated. During low water years, areas of emergent marsh expand within Humbug. The upper reach of the Detroit River is a single deep channel, which averages 732 meters in width and has water depths between 10.5 and 15 meters. The lower reach of the river, where Humbug Marsh is located, is a broad, divided channel with many islands and shallower depths averaging 4 meters (USFWS 2005).

Approximately 181,000 hectares of land in Michigan and Ontario drain to the Detroit River, which includes the urban storm water and sewer discharges of two heavily urbanized areas: Detroit, Michigan and Windsor, Ontario (Environment Canada and USEPA 1996). Although areas of the Detroit River have had persistent problems with bacteria, contaminants and sedimentation, water quality consistently improves as combined sewer overflows are managed, storm water treatment structures are constructed, and industrial sediments are properly cleaned up and disposed.

Soils within the lower Detroit River, including Humbug Marsh, consist mainly of poorly drained, level or gently sloping loam from the Blount, Pewamo and Morely series. These soils are quite productive and were

largely drained for farmland during European settlement of the area. The bed of the lower Detroit River is mainly bedrock (U.S. Department of Agriculture, Soil Conservation Service. 1977).

17. Physical features of the catchment area:

Lake St. Clair, along with the Huron, Clinton and Rouge River watersheds, all empty into the Detroit River, which subsequently drains to Lake Erie. The entire catchment is part of the bed of the ancient glacial Lake Maumee, which formed approximately 13,800 BP as melting ice age glaciers receded north. As a result, flat deposits of glacial lake clay dominate the catchment, with deposits of sand dotting the area. The deposits from Lake Maumee range from more than 30 meters thick near the edge of the ancient shoreline, where flat lacustrine bed gives way to rolling glacial moraines, to less than a meter thick along the present shoreline of the Detroit River and Lake Erie (Albert 1995). Because of the flatness of the landscape and the predominance of clay soils, drainage is poor throughout much of the catchment. At one time, hardwood swamp, tallgrass prairie and oak savannah dominated the remaining bed of the ancient lake (Appel et al. 2002). Early settlers, however, quickly discovered that the soils throughout the catchment are extremely rich, and over the course of only 200 years, the majority of the large wetland area was drained for farmland.

The waters of Lake St. Clair and Lake Erie keep the climate moderate in the region, and allow for a growing season that ranges from 150 to 180 days. This area of the Midwestern United States has four distinct seasons with average January temperatures at -5.3 degrees C and average July temperatures at 41.7 degrees C.

18. Hydrological values:

Approximately 80% of the inflow to Lake Erie comes from the Detroit River, which takes water from the entire Upper Great Lakes system and a number of other large watersheds (Environment Canada and USEPA 1996). This water was once treated by thousands of acres of coastal wetlands, but today only a small number of those wetlands are left to perform the important functions of sediment trapping, flood control and shoreline stabilization. Thus, it is essential to maintain and, if possible, enhance the wetlands within Humbug Marsh and the rest of the Lower Detroit River in order to encourage the remaining sediment trapping and pollutant filtering values performed by these wetlands.

19. Wetland Types

a) presence:

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:

1. Type K: Coastal Freshwater Lagoon (Great Lakes coastal marsh)
 2. Type Ts: Seasonal/intermittent freshwater marshes/pools on inorganic soils
 3. Type W: Shrub dominated wetlands
- (See Annex 4: Wetland Boundary Delineation)

20. General ecological features:

The Humbug property consists of three main areas: Humbug Island, the marsh surrounding the island, and a mosaic of upland and wetland habitat on the mainland. Humbug Island is mainly upland with a fringe of emergent wetland. Portions of the upland areas consist of mature hardwood forest. It is one of the most

undisturbed locations in the Detroit River because of its separation from the mainland. Shallow areas surrounding the island make up the main marshlands of the site, and consist of emergent and submergent vegetation depending on yearly water levels. This shallow area extends the entire distance between the island and the mainland, and continues to the east of the island for approximately 400 meters. These shallow shelves are particularly important to the area's ecology because vegetated shoals have been virtually eliminated from the rest of the river. The mainland portion of Humbug Marsh include six wetland areas, which form pockets and fingers that weave through the upland portions of the site. This mosaic of wetlands and uplands significantly contributes to the functions and values of the shallow water shelf, the adjacent river, and Humbug Island (Department of the Army 2000).

Humbug Marsh is part of what is known as the "Lake Huron to Lake Erie Corridor", a region that serves as a transition zone between several biogeographic regions. Here, Eastern Deciduous Forest, Northern Hardwood Forest, and Great Plains Grasslands merge, creating conditions that support a large number of endemic and migrating species. As a whole, the corridor supports at least fourteen different natural community types (Appel et al. 2002). Of these, the Humbug Marsh segment of the corridor supports Great Lakes coastal marsh, shrub swamp, and oak hickory forest. The Detroit River itself is a 51 kilometer long waterway in which water levels vary daily, seasonally and over longer periods of time. Generally, yearly water levels are lowest in the late fall and early winter when evaporation is highest. The water level tends to increase in the early spring as evaporation decreases and melting snow and ice feed the lakes. Longer term variations occur in sync with Great Lakes water levels. The changes in habitat that occur with water level fluctuation serve an important purpose to fish, wildlife and vegetation diversity. Emergent vegetation thrives during low water years, leading to greater soil stability, increased protection of the shoreline from wind and wave action and increased habitat structure. As water levels rise, emergent vegetation is drowned out and replaced with submergent vegetation. However, the root structure of the dead emergent plants remains. The combination of emergent and submergent vegetation results in prime fish spawning, nursery and feeding habitat.

At one time, the Lake Huron to Lake Erie corridor was dominated by vegetated coastal wetlands. As the industrial age progressed, wetland area was quickly reduced. Humbug Marsh represents a large portion of the remaining wetland area in the River, making it imperative that the area be preserved in perpetuity.

21. Noteworthy flora:

Old Growth Oak-Hickory Forest: Most of the mainland adjacent to Humbug Marsh was cleared for logging or development in recent history, as was the majority of forested area in southeast Michigan. However, wooded portions of Humbug Island and a small section of the mainland were not accessible to logging equipment and, thus, continued to persist as high quality old-growth forest. Tree species in this oak-hickory relic are very diverse and include *Quercus bicolor* (swamp white oak), *Q. macrocarpa* (bur oak), *Q. rubra* (red oak), *Q. alba* (white oak), and *Q. shumardii* (shumard oak), which is considered a Special Concern species in Michigan. Hickory species include *Carya ovata* (shagbark hickory), *C. cordiformis* (bitternut hickory), and *C. glabra* (pignut hickory). The understory is also diverse for this urbanized area and includes *Ribes americanum* (wild black currant), *Claytonia virginica* (spring beauty), *Erythronium albidum* (white trout lily), *Floerkea proserpinacoides* (false mermaid), and *Heuchera americana* (alum root), all of which have coefficients of conservatism equal to 6 or greater (Reznicek et al. 2005). These forests are climax communities that provide valuable wildlife habitat and are the last remnants of the environments French explorer Antoine de la Mothe Cadillac would have seen when he canoed the Detroit River in the summer of 1701 (Appel 2002).

***Hibiscus moscheutos* (swamp rose mallow):** This species is becoming rare in Michigan and is known to occur in Humbug Marsh (Reznicek et al. 2005). Because it only occurs in nine counties in the state, it is considered a Special Concern species in Michigan.

***Phragmites australis* (giant reed grass):** This invasive, non-native grass is a substantial problem in southeast Michigan, where it has taken over large tracts of wetland. Several locations within Humbug Marsh have significant populations of *Phragmites*, which may require treatment in the future.

22. Noteworthy fauna:

Because Humbug Marsh is one of the last coastal wetlands on the Detroit River, it is extremely important to waterfowl, other migratory birds, certain insects that depend on wetland, herpetofauna, and fish. Many of these species are regionally rare.

While populations of these particular bird species are considered secure on a national and global level, the State of Michigan has found that local populations are in decline or are threatened with severe decline as developmental pressures continue to disrupt habitat. These birds rely on Humbug Marsh for habitat because it is one of the last natural areas remaining on the Detroit River.

Herpetofauna: Amphibians and reptiles are an important component of the Humbug Marsh system and are recognized as key biological indicators of environmental quality. Seven species of amphibian and reptile were observed during a 2005 survey. Of particular importance was the observation of a juvenile *Elaphe vulpina gloydi* (eastern fox snake), a species protected throughout its range and listed as Threatened in Michigan. This coastal marsh-dependant species is an important member of these ecosystems and is currently a candidate species being considered for Federal protection. Several areas in Humbug Marsh provide valuable hibernacula habitat for this snake. Mifsud (2005) estimates that at least nineteen additional species of herpetofauna may occur within the complex. Historically, Humbug Marsh provided habitat for *Acris crepitans* (Blanchard's cricket frog), now extirpated from the Detroit River corridor. Potential exists for the return of this species, provided wetland restoration is emphasized throughout the region. Future surveys are needed, but data has shown that the type of habitat found within Humbug Marsh has the potential to support several species listed as Special Concern in Michigan as well as a number of "Species of Greatest Conservation Need" identified by the Michigan Department of Natural Resources Wildlife Action Plan.

Fish: Fish surveys have shown that Humbug Marsh provides habitat for the lake sturgeon (*Acipenser fulvescens*), a Michigan Threatened Species. Although the lake sturgeon prefers to spawn in the rocky outcroppings located in the fast moving waters of the Detroit River, it frequently travels into marshy areas like Humbug Marsh for food.

Dragonflies: Humbug Marsh is a haven for dragonflies that are regionally rare. The marsh and its adjacent upland support the largest known population of the Michigan Special Concern Species *Stylurus plagiatus* (russet-tipped clubtail) in Michigan, and perhaps in the Midwest. The Michigan Special Concern *Stylurus notatus* (elusive clubtail) has also been recorded at the site. One of the dragonfly species observed during a recent survey, *Erythrodiplax umbrata* (band-winged dragonlet), represented first recorded specimen from the state (Craves and O'Brien 2007, Craves 2007).

23. Social and cultural values:

a.) Since efforts to permanently protect Humbug Marsh began in 1995, the area has become known for its wide variety of social values. In the spring, fishermen flock to the marsh and the surrounding Detroit River to take advantage of the 30 million migrating walleye that run the river to spawn. Later in the summer, bass and perch fishing begins. The marsh is always inviting for fishermen casting for smaller fish such as bluegill, which spawn there in high numbers. During the fall and early winter, hunters float through the marsh and around Humbug Island as the enormous flocks of waterfowl flee the ice forming on Lakes Erie and St. Clair and congregate in the open water patches of the river and marsh.

Humbug also provides social values that include environmental education for urban youth, wildlife and bird watching opportunities, and a variety of other outdoor recreation benefits described more thoroughly in sections 29-31.

b.) Although the site has not been placed on the National Register of Historic Places, members of the Wyandot of Anderdon Nation believe Humbug Marsh may hold the remains of Wyandot ancestors from thousands of years ago.

24. Land tenure/ownership:

The area to be designated as a Ramsar site, known as Humbug Marsh, has been owned by the USFWS since September 16, 2004. Much of the site is covered by a conservation easement that is held by the Michigan Department of Environmental Quality. This easement was negotiated by the MDEQ in 1991 as part of a wetland fill permit, and is meant to permanently protect much of the wetland area from any alteration (Appendix E). The property adjacent to the designation area, which will eventually contain a visitor center and restored wetlands, was purchased by Wayne County in 2002. The property south of the designation area contains a subdivision with homes owned by multiple property owners and a marina, owned by Humbug Marina, Inc.

25. Current land (including water) use:

a) within the Ramsar site:

The site is used solely for outdoor recreation and education, as described in detail below in parts 29-31.

b) in the surroundings/catchment:

The area surrounding Humbug Marsh is urban, and has been widely developed for both light and heavy industrial, residential, and commercial use. The Detroit River is a drinking water source for over 5 million people, and is also used in industrial processes. Approximately nine kilometers downstream of Humbug Marsh, where the Detroit River empties into Lake Erie, water is used for agricultural purposes as well. (See Annex 5: Watershed Land Use/Land Cover)

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:

As surrounding lands were developed for industrial, commercial and residential uses, Humbug Marsh encountered its share of disturbance. Historic aerial photos indicate that portions of the site were intensively farmed in the early 1950's. Other portions of the site were used for pasture. The marsh area between the mainland and Humbug Island appears to have been diked for the creation of a hunting preserve in the 1960's, then converted back to open water in the 1970's (Department of the Army 2000). Between the 1970's and the 1990's, several developers attempted to impact Humbug Marsh with projects that included a golf course, a residential development and a marina. A conservation easement was placed over portions of the wetland in 1991 (Appendix E), but gaps in the easement would not have prevented development within the upland portions of the site, many of the smaller, inland wetlands, or Humbug Island. Some of the proposed projects received appropriate permits, but for various reasons, were never completed. The entire parcel was finally permanently protected by the USFWS in 2004.

Despite this protection, factors such as invasive species, sedimentation and pollutants still threaten the marsh. Invasive species have been identified as one of the top threats to the integrity of the Great Lakes, and Humbug Marsh has not been immune to their impact. As described above, *Phragmites australis*, an invasive species of marsh grass, has taken over portions of the interior marsh on the mainland, crowding out other native vegetation. A number of invasive fish species have been found in the marsh, including *Morone*

americana (white perch), *Alosa pseudoharengus* (alewife), *Dorosoma cepedianum* (gizzard shad), *Cyprinus carpio* (common carp), *Carassius auratus* (goldfish), *Apollonia melanostomus* (round goby) and *Proterorhinus semilunaris* (tubenose goby). These invasives, along with others such as *Dreissena polymorpha* (zebra mussel) and *Dreissena rostriformis bugensis* (quagga mussel), have impacted the Great Lakes food chain and crowded out native, endangered mussels and fish. Michigan and other Great Lakes States are working towards finding control and management methods for some of these species, and also attempting to increase regulations on common invasive species vectors, such as ballast water discharges and the landscaping industry.

b) in the surrounding area:

Approximately 97% of the Detroit River shoreline has been lost to hard armouring (Manny 2007). Since European settlement, the Detroit area has been converted from wetland, to drained farmland, to major urban center. The urban qualities of the area have led to a number of problems for the Detroit River including poor storm water control measures in some communities, ongoing sedimentation from Canadian farming activities, industrial discharges, high traffic volumes, and wetland fill activities. Because so much of the Detroit River has been so drastically altered, it is imperative that rare natural areas such as Humbug Marsh be protected to the fullest extent possible.

Sediments and other pollutants from nearby tributaries, storm sewer outlets, and industrial discharges have traditionally been a significant problem in the Detroit River. Over the past 30 years, a number of drastic measures have been taken that have reduced these impacts, including separations of storm and sanitary sewers, increased storm water treatment throughout the catchment, stricter regulations on industrial discharges to the river, and significant cleanups of numerous Detroit River toxic hot spots.

27. Conservation measures taken:

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

Humbug Marsh has both a National and International conservation status because it is an important component of the first International Wildlife Refuge in North America. This partnership with Canada was established on December 21, 2001. The Refuge includes numerous properties on the U.S. and Canadian sides of the river, including islands, coastal wetlands, marshes, shoals, and waterfront lands along 77 kilometers of Detroit River and Western Lake Erie shoreline.

In addition, Humbug Marsh is part of an Important Bird Area designated by the National Audubon Society; a Biodiversity Investment Area, designated by the U.S.-Canada State of the Lakes Ecosystem Conference; is recognized as one of 34 Waterfowl Habitat Areas of Major Concern in the North American Waterfowl Management Plan; is declared part of a Regional Shorebird Reserve by the Western Hemispheric Shorebird Reserve Network; and is part of an American Heritage River designated by U.S. Presidential Order.

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

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

The management in Humbug Marsh falls in to two IUCN protected area categories. First, Humbug Marsh can be considered a National Park (category II) because it has been protected to preserve the ecological integrity of the site and provides a foundation for educational and recreational opportunities. Humbug Marsh is also a Natural Monument (category III), since the entire 188 hectares has been preserved and is

managed for conservation of natural features. The fact that the marsh represents some of the last remaining coastal wetland in the Detroit River makes it a unique and rare resource with outstanding value.

Conservation measures have also included an extensive monitoring program (described in section 29), and restoration activities. Invasive plants such as *Phragmites australis* are controlled at the property as funding allows. In the past, purple loosestrife was largely eliminated from the Refuge after the release of *Galerucella spp.*, a beetle that reduces the growth and reproduction of the plant. Large scale restoration is taking place at Wayne County's Refuge Gateway immediately adjacent to and north of Humbug Marsh. Restoration at the Refuge Gateway will include daylighting a stream, re-establishment of several wetland areas, and construction of upland buffers to further protect Humbug Marsh. This site will house the future visitor center for the Refuge.

Fishing and waterfowl hunting in accordance with Federal, state, and local regulations are allowed within the waters of Humbug Marsh. In order to ensure a quality hunting and fishing experience, Refuge managers encourage use of the highest ethical standards in taking wildlife as well as the use of proper gear and safety equipment. Public hunting areas are clearly marked to ensure safety and minimal habitat impact.

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

The *Detroit River International Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment* (2005) has been developed and is being implemented. This plan was created through a public process, and has been officially approved by USFWS. Major focus points in the plan include habitat restoration, management and creation; land conservation; and contamination and pollution reduction. The plan also encourages ongoing development of functional partnerships between governments, conservation groups, landowners, industry and local citizens. The plan outlines how the properties within the Refuge should be used for education and preservation of hunting and fishing opportunities. It also calls for a resolution of conflict between water recreation, shoreline development, and the needs of fish and wildlife. The Plan seeks to harmonize human uses of the protected Refuge areas for recreation and education with the needs of fish and wildlife communities that depend on them. A copy of the plan is available at http://www.fws.gov/midwest/planning/detroitriver/finalCCP/DetroitRiver_finalCCP.pdf.

28. Conservation measures proposed but not yet implemented:

Remediation and restoration activities continue to take place in the areas surrounding Humbug Marsh, which will ultimately contribute to the health of this wetland. Several areas within the Refuge, but separated from Humbug Marsh, are known to be contaminated and efforts are underway to study and remediate these sites. In the future, the USFWS plans to continue building partnerships with local municipalities, non-profit groups and Canadian agencies to ensure ongoing conservation and improvement of Humbug Marsh and the rest of the Refuge.

29. Current scientific research and facilities:

Humbug Marsh and the rest of the Refuge play an important part in the Detroit River-Western Lake Erie Indicator Project, which aims to compile and interpret long-term data bases for ecosystem indicators in the area. This project includes many partners, and has been an enormously successful way to communicate the ecological status and trends of this area to policy makers and the public. In addition, a number of monitoring activities are conducted on an ongoing basis throughout the Refuge.

Humbug Marsh has an annual Christmas Bird Count and has also been a site for the Bird Watcher's Digest's Big Sit Event. The Michigan Department of Natural Resources surveys fish in the marsh every three to five years. Independent biologists from the University of Michigan-Dearborn routinely monitor the site for birds and dragonflies.

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

Many public events have taken place in Humbug Marsh over the past several years. In 2007, a viewing platform and informational kiosk were constructed to enhance visitors' views of wildlife. Bird watching scopes have been placed on the platform. On October 31, 2008 a ribbon cutting ceremony was held to unveil the new outdoor classroom, which was constructed with monetary aid from numerous partners and construction assistance by the U.S. Navy Seabees. The classroom includes a covered presentation and demonstration shelter and nature trails. These resources are already being used by area schools to teach children who live in primarily urban areas about ecology, wildlife, plants, and the importance of conservation.

The Refuge has initiated a capital campaign with Wayne County for the construction of a visitor center on property immediately adjacent to Humbug Marsh. This visitor center will dramatically increase the ability of the refuge to educate the public on the ecological value of the Detroit River. The center will be a "platinum level" Leadership in Energy and Environmental Design Certified building. The Center has been specifically designed to integrate concepts of sustainability with overall education about the resources preserved by the Refuge. The Great Lakes School Ship will dock at the Center, and will make use of Humbug Marsh and other Refuge properties as a living laboratory for children. The Visitor Center will connect directly to interpretive nature trails in the mainland portion of Humbug Marsh, which lead to learning stations, observation decks, and the outdoor classroom. The center will provide the potential is to educate thousands of children on an annual basis. In addition, a fishing pier will be constructed to provide an area for shore fishing. The fishing pier will provide a world class walleye fishing experience to families who do not have access to a boat. Finally, a kayak landing will be constructed at the Refuge Gateway to offer exceptional kayaking through the Refuge and along the Detroit Heritage River Water Trail.

31. Current recreation and tourism:

Throughout the year, Humbug Marsh attracts visitors from all over southeast Michigan, northwest Ohio and southern Ontario. The Marsh is part of the world class walleye fishery of the Detroit River and, as such, fishermen routinely use the site. Several international fishing tournaments routinely fish off Humbug Marsh. In late winter and early spring the site is especially popular with fishermen because the warm water released from upstream power plants melts the river ice early and is inviting to migrating fish. Each day of waterfowl season, hunters are attracted to the area to take advantage of the thousands of ducks and geese moving past Humbug Island and through the marsh. Throughout the year, volunteers visit Humbug Marsh to participate in various monitoring activities such as the Christmas Bird Count and the Detroit River Indicator Project. Humbug Marsh is also the northern tip of a Blueway that begins in the lower Huron River near Lake Erie. This Blueway is becoming more and more popular with paddlers, and has prompted the Refuge and its partners to sponsor an annual fall paddle that includes a float past Humbug Island and through the marsh. Finally, the nature trails within Humbug Marsh are part of a large Greenway system that is planned to extend from Lake St. Clair to Lake Erie, up several major river tributaries, and across the Detroit River to Canada. These initiatives are helping to send the message that the Detroit River, once the heart of the Rust Belt, is an ecological jewel that all can enjoy.

32. Jurisdiction:

Territorial Jurisdiction is held by the following agencies:

U.S. Army Corps of Engineers
Detroit District
477 Michigan Ave # 600
Detroit, MI 48226

Michigan Department of Environmental Quality
Land and Water Management Division and Water Bureau
525 W. Allegan
Lansing, Michigan 48933

City of Trenton
2674 West Jefferson Avenue
Trenton, Michigan 48183

City of Gibraltar
29450 Munro St
Gibraltar, Michigan 48173-9724

Jurisdictional authority is held by:

U.S. Fish and Wildlife Service
Detroit River International Wildlife Refuge
Large Lakes Research Station
9311 Groh Road
Grosse Ile, MI 48138, USA

33. Management authority:

John Hartig, U.S. Fish and Wildlife Service
Detroit River International Wildlife Refuge
Large Lakes Research Station
9311 Groh Road
Grosse Ile, MI 48138, USA
Phone: 734-692-7608 Fax: 734-692-7603
Email: John_Hartig@fws.gov

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Appendix A: Fish Species observed in or near Humber Marsh

From: Michigan DNR, unpublished Data 2006

* indicates non-native species

Family Petromyzontidae (Lampreys)

Species:

Icthyomyzon unicuspis silver lamprey

Family Acipenseridae

Species:

Acipenser fulvescens lake sturgeon

Family Lepisosteidae (Gars)

Species:

Lepisosteus osseus longnose gar

Family Amiidae (Bowfins)

Species:

Amia calva bowfin

Family Clupeidae (Herrings)

Species:

* *Alosa pseudoharengus* alewife
* *Dorosoma cepedianum* gizzard shad

Family Esocidae (Pikes)

Species:

Esox lucius northern pike
Esox masquinongy muskellunge

Family Salmonidae (Trout)

Species:

Oncorhynchus mykiss rainbow trout

Family Cyprinidae (Minnows)

Species:

* *Carassius auratus* goldfish
* *Cyprinus carpio* common carp
Cyprinella spiloptera spotfin shiner
Luxilus chrysocephalus striped shiner
Luxilus cornutus common shiner
Nocomis biguttatus honeyhead chub
Nocomis micropogon river chub
Notemigonus crysoleucas golden shiner
Notropis atherinoides emerald shiner
Notropis heterodon blackchin shiner
Notropis hudsonius spottail shiner

<i>Notropis stramineus</i>	sand shiner
<i>Notropis volucellus</i>	mimic shiner
<i>Pimephales notatus</i>	bluntnose minnow
<i>Pimephales promelas</i>	fathead minnow

Family Sciaenidae (Drums)

Species:

<i>Aplodinotus grunniens</i>	freshwater drum
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Family Castostomidae (Suckers)

Species:

<i>Carpiodes cyprinus</i>	quillback
<i>Catostomus commersoni</i>	white sucker
<i>Hypentelium nigricans</i>	northern hog sucker
<i>Ictiobus cyprinellus</i>	bigmouth buffalo
<i>Ictiobus niger</i>	black buffalo
<i>Minytrema melanops</i>	spotted sucker
<i>Moxostoma anisurum</i>	silver redhorse
<i>Moxostoma erythrurum</i>	golden redhorse
<i>Moxostoma macrolopidotum</i>	shorthead redhorse

Family Ictaluridae (Catfishes)

Species:

<i>Ameiurus melas</i>	black bullhead
<i>Ameiurus natalis</i>	yellow bullhead
<i>Ameiurus nebulosus</i>	brown bullhead
<i>Ictalurus punctatus</i>	channel catfish
<i>Noturus gyrinus</i>	tadpole madtom

Family Cyprinodontidae (Killifishes)

Species:

<i>Fundulus diaphanus</i>	banded killifish
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Family Atherinidae (Siversides)

Species:

<i>Labidesthes sicculus</i>	brook silverside
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Family Serranidae (Striped Basses)

Species:

* <i>Morone americana</i>	white perch
<i>Morone chrysops</i>	white bass

Family Centrarcidae (Sunfishes)

Species:

<i>Ambloplites rupestris</i>	rock bass
<i>Lepomis cyanellus</i>	green sunfish
<i>Lepomis gibbosus</i>	pumpkinseed
<i>Lepomis humilis</i>	orangespotted sunfish

<i>Lepomis macrochirus</i>	bluegill
<i>Lepomis megalotis</i>	longear sunfish
<i>Micropterus dolomieu</i>	smallmouth bass
<i>Micropterus salmoides</i>	largemouth bass
<i>Pomoxis annularis</i>	white crappie
<i>Pomoxis nigromaculatus</i>	black crappie

Family Percidae (Perches)

Species:

<i>Etheostoma nigrum</i>	johnny darter
<i>Perca flavescens</i>	yellow perch
<i>Percina caprodes</i>	logperch
<i>Stizostedion vitreum</i>	walleye

Family Gobiidae (Gobies)

Species:

* <i>Apollonia melanostomus</i>	round goby
* <i>Proterorhinus semilunaris</i>	tubenose goby

**Appendix B: Plant Species with a Coefficient of Conservatism of 5 or Higher
Observed in the Humbug Marsh Wetland/Upland Complex**

From: Reznicek, et. al 2005

Genus/Species	Common Name	Coefficient of Conservatism	Wetness Designation	Physiognomic Classification
<i>Agastache nepetoides</i>	yellow giant hyssop	5	FACU	Nt P-Forb
<i>Arisaema triphyllum</i>	Jack in the pulpit	5	FACW-	Nt P-Forb
<i>Boehmeria cylindrica</i>	false nettle	5	OBL	Nt P-Forb
<i>Carex gracilescens</i>	sedge	5	UPL	Nt P-Sedge
<i>Carex hirtifolia</i>	sedge	5	UPL	Nt P-Sedge
<i>Carya cordiformis</i>	bitternut hickory	5	FAC	Nt Tree
<i>Carya glabra</i>	pignut hickory	5	FACU	Nt Tree
<i>Carya ovata</i>	shagbark hickory	5	FACU	Nt Tree
<i>Celtis occidentalis</i>	hackberry	5	FAC-	Nt Tree
<i>Dentaria laciniata</i>	cut leaved tooth wort	5	FACU	Nt P-Forb
<i>Fraxinus americana</i>	white ash	5	FACU	Nt Tree
<i>Juglans nigra</i>	black walnut	5	FACU	Nt Tree
<i>Leersia virginica</i>	white grass	5	FACW	Nt P-Grass
<i>Parthenocissus quinquefolia</i>	Virginia creeper	5	FAC-	Nt W-Vine
<i>Quercus alba</i>	white oak	5	FACU	Nt Tree
<i>Quercus macrocarpa</i>	but oak	5	FAC-	Nt Tree
<i>Quercus rubra</i>	red oak	5	FACU	Nt Tree
<i>Ranunculus hispidus</i>	swamp buttercup	5	FAC	Nt P-Forb
<i>Ranunculus recurvatus</i>	hooked crowfoot	5	FACW	Nt A-Forb
<i>Rosa setigera</i>	prairie rose	5	FACU+	Nt Shrub
<i>Triosteum aurantiacum</i>	horse gentian	5	UPL	Nt P-Forb
<i>Triosteum perfoliatum</i>	horse gentian rough leaved	5	UPL	Nt P-Forb
<i>Cornus drummondii</i>	dogwood	6	FAC	Nt Shrub
<i>Geum vernum</i>	spring avens	6	FAC-	Nt P-Forb
<i>Geum virginianum</i>	pale avens	6	FACU-	Nt P-Forb
<i>Quercus velutina</i>	black oak	6	UPL	Nt Tree
<i>Ribes americanum</i>	wild black currant	6	FACW	Nt Shrub
<i>Erythronium albidum</i>	white trout lily	7	UPL	Nt P-Forb
<i>Floerkea proserpinacoides</i>	false mermaid	7	FAC+	Nt A-Forb
<i>Hibiscus moscheutos</i>	swamp rose mallow common blue eyed	7	OBL	Nt P-Forb
<i>Sisyrinchium albidum</i>	grass	7	FACU	Nt P-Forb
<i>Carex laxiculmis</i>	sedge	8	UPL	Nt P-Sedge
<i>Heuchera americana</i>	alum root	8	FACU-	Nt P-Forb
<i>Quercus bicolor</i>	swamp white oak	8	FACW+	Nt Tree

Quercus shumardii

shumard oak

8

FACW-

Nt Tree

Appendix C: Birds Observed in Humbug Marsh

From: Appel 2007, Craves and Fowler 2003 and Craves 2006

* indicates non-native species

Family Anatidae (ducks, swans and geese)

Species:

<i>Aix sponsa</i>	Wood Duck
<i>Anas acuta</i>	Northern Pintail
<i>Anas americana</i>	American Wigeon
<i>Anas platyrhynchos</i>	Mallard
<i>Anas rubripes</i>	American Black Duck
<i>Anas strepera</i>	Gadwall
<i>Aythya affinis</i>	Lesser Scaup
<i>Aythya americana</i>	Redhead
<i>Aythya collaris</i>	Ring-necked Duck
<i>Aythya valisineria</i>	Canvasback
<i>Branta canadensis</i>	Canada Goose
<i>Bucephala clangula</i>	Common Goldeneye
<i>Bucephala albeola</i>	Bufflehead
<i>Cygnus olor</i> *	Mute Swan
<i>Cygnus columbianus</i>	Tundra Swan
<i>Lophodytes cucullatus</i>	Hooded Merganser
<i>Mergus merganser</i>	Common Merganser

Family Phasianidae (pheasants, quails and partridges)

Species:

<i>Phasianus colchicus</i> *	Ring-necked Pheasant
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Family Gaviidae (loons)

Species:

<i>Gavia immer</i>	Common Loon
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Family Podicipedidae (grebes)

Species:

<i>Podilymbus podiceps</i>	Pied-billed Grebe
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Family Phalacrocoracidae (cormorants)

Species:

<i>Phalacrocorax auritus</i>	Double-crested Cormorant
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Family Ardeidae (herons and bitterns)

Species:

<i>Ardea herodias</i>	Great Blue Heron
<i>Butorides virescens</i>	Green Heron
<i>Casmerodius albus</i>	Great Egret
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron

Family Cathartidae (New World vultures)
Species:

<i>Cathartes aura</i>	Turkey Vulture
Family Accipitridae (hawks and eagles)	
Species:	
<i>Accipiter cooperii</i>	Cooper's Hawk
<i>Accipiter gentiles</i>	Northern Goshawk
<i>Accipiter striatus</i>	Sharp-shinned Hawk
<i>Buteo jamaicensis</i>	Red-tailed Hawk
<i>Buteo lagopus</i>	Rough-legged Hawk
<i>Buteo lineatus</i>	Red-shouldered Hawk
<i>Buteo platypterus</i>	Broad-winged Hawk
<i>Circus cyaneus</i>	Northern Harrier
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Pandion haliaetus</i>	Osprey
Family Falconidae (Falcons)	
Species:	
<i>Falco sparverius</i>	American Kestrel
Family Rallidae (Rails)	
Species:	
<i>Fulica americana</i>	American Coot
Family Charadriidae (plovers)	
Species:	
<i>Charadrius vociferus</i>	Killdeer
Family Scolopacidae	
Species:	
<i>Actitis macularius</i>	Spotted Sandpiper
<i>Scolopax minor</i>	American Woodcock
Family Laridae (gulls and terns)	
<i>Larus argentatus</i>	Herring Gull
<i>Larus delawarensis</i>	Ring-billed Gull
<i>Larus marinus</i>	Great Black-backed Gull
<i>Larus philadelphia</i>	Bonaparte's Gull
<i>Sterna caspia</i>	Caspian Tern
<i>Sterna forsteri</i>	Forster's Tern
<i>Sterna hirundo</i>	Common Tern
Family Columbidae (doves and pigeons)	
Species:	
<i>Columba livia</i>	Rock Pigeon
<i>Zenaida macroura</i>	Mourning Dove
Family Cuculidae (cuckoos)	

Species:	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo
Family Strigidae (owls)		
Species:	<i>Aegolius acadicus</i>	Northern Saw-whet Owl
	<i>Bubo virginianus</i>	Great Horned Owl
Family Apodidae (swifts)		
Species:	<i>Chaetura pelagica</i>	Chimney Swift
Family Trochilidae (hummingbirds)		
Species:	<i>Archilochus colubris</i>	Ruby-throated Hummingbird
Family Alcedinidae (kingfishers)		
Species:	<i>Ceryle alcyon</i>	Belted Kingfisher
Family Picidae (woodpeckers)		
Species:	<i>Colaptes auratus</i>	Northern Flicker
	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker
	<i>Molothrus ater</i>	Brown-headed Cowbird
	<i>Picoides pubescens</i>	Downy Woodpecker
	<i>Picoides villosus</i>	Hairy Woodpecker
	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker
Family Tyrannidae (flycatchers)		
Species:	<i>Contopus cooperi</i>	Olive-sided Flycatcher
	<i>Contopus virens</i>	Eastern Wood-Pewee
	<i>Empidonax alnorum</i>	Alder Flycatcher
	<i>Empidonax minimus</i>	Least Flycatcher
	<i>Empidonax traillii</i>	Willow Flycatcher
	<i>Myiarchus crinitus</i>	Great Crested Flycatcher
	<i>Sayornis phoebe</i>	Eastern Phoebe
	<i>Tyrannus tyrannus</i>	Eastern Kingbird
Family Vireonidae (vireos)		
Species:	<i>Vireo flavifrons</i>	Yellow-throated Vireo
	<i>Vireo gilvus</i>	Warbling Vireo
	<i>Vireo olivaceus</i>	Red-eyed Vireo
	<i>Vireo solitarius</i>	Blue-headed Vireo

Family Corvidae (crows)

Species:

<i>Corvus brachyrhynchos</i>	American Crow
<i>Cyanocitta cristata</i>	Blue Jay

Family Alaudidae (larks)

Species:

<i>Eremophila alpestris</i>	Horned Lark
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Family Hirundinidae (swallows)

Species:

<i>Hirundo rustica</i>	Barn Swallow
<i>Riparia riparia</i>	Bank Swallow
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow
<i>Trachycineta bicolor</i>	Tree Swallow

Family Paridae (chickadees and titmice)

Species:

<i>Baeolophus bicolor</i>	Tufted Titmouse
<i>Parus atricapillus</i>	Black-capped Chickadee

Family Sittidae (nuthatches)

Species:

<i>Sitta canadensis</i>	Red-breasted Nuthatch
<i>Sitta carolinensis</i>	White-breasted Nuthatch

Family Certhiidae (treecreepers)

Species:

<i>Certhia americana</i>	Brown Creeper
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Family Troglodytidae (wrens)

Species:

<i>Thyrothorus ludovicianus</i>	Carolina Wren
<i>Troglodytes aedon</i>	House Wren
<i>Troglodytes troglodytes</i>	Winter Wren

Family Regulidae (kinglets)

Species:

<i>Regulus calendula</i>	Ruby-crowned Kinglet
<i>Regulus satrapa</i>	Golden-crowned Kinglet

Family Sylviidae (Old World warblers)

Species:

<i>Poliioptila caerulea</i>	Blue-gray Gnatcatcher
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Family Turdidae (thrushes)

Species:

<i>Catharus guttatus</i>	Hermit Thrush
<i>Catharus minimus</i>	Swainson's Thrush

<i>Catharus minimus</i>	Veery
<i>Hylocichla mustelina</i>	Wood Thrush
<i>Turdus migratorius</i>	American Robin

Family Mimidae (mockingbirds and thrashers)

Species:

<i>Dumetella carolinensis</i>	Gray Catbird
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Family Sturnidae (starlings)

Species:

<i>Sturnus vulgaris</i>	European Starling
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Family Bombycillidae (waxwings)

Species:

<i>Bombycilla cedrorum</i>	Cedar Waxwing
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Family Parulidae (New World warblers)

Species:

<i>Dendroica caerulescens</i>	Black-throated Blue Warbler
<i>Dendroica castanea</i>	Bay-breasted Warbler
<i>Dendroica cerulean</i>	Cerulean Warbler
<i>Dendroica coronata</i>	Yellow-rumped Warbler
<i>Dendroica fusca</i>	Blackburnian Warbler
<i>Dendroica magnolia</i>	Magnolia Warbler
<i>Dendroica palmarum</i>	Palm Warbler
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler
<i>Dendroica petechia</i>	Yellow Warbler
<i>Dendroica striata</i>	Blackpoll Warbler
<i>Dendroica tigrina</i>	Cape May Warbler
<i>Dendroica virens</i>	Black-throated Green Warbler
<i>Geothlypis trichas</i>	Common Yellowthroat
<i>Icteria virens</i>	Yellow-breasted Chat
<i>Mniotilta varia</i>	Black-and-white Warbler
<i>Oporornis philadelphia</i>	Mourning Warbler
<i>Parula americana</i>	Northern Parula
<i>Seiurus aurocapillus</i>	Ovenbird
<i>Seiurus noveboracensis</i>	Northern Waterthrush
<i>Setophaga ruticilla</i>	American Redstart
<i>Vermivora celata</i>	Orange-crowned Warbler
<i>Vermivora chrysoptera</i>	Golden-winged Warbler
<i>Vermivora peregrina</i>	Tennessee Warbler
<i>Vermivora pinus</i>	Blue-winged Warbler
<i>Vermivora ruficapilla</i>	Nashville Warbler
<i>Wilsonia citrina</i>	Wilson's Warbler

Family Thraupidae (tanagers)

Species:

Piranga olivacea

Scarlet Tanager

Family Emberizidae (sparrows)

Species:

Junco hyemalis

Dark-eyed Junco

Melospiza georgiana

Swamp Sparrow

Melospiza lincolni

Lincoln's Sparrow

Melospiza melodia

Song Sparrow

Passerculus sandwichensis

Savannah Sparrow

Passerella iliaca

Fox Sparrow

Pipilo erythrophthalmus

Eastern Towhee

Spizella arborea

American Tree Sparrow

Spizella passerina

Chipping Sparrow

Spizella pusilla

Field Sparrow

Zonotrichia albicollis

White-throated Sparrow

Zonotrichia leucophrys

White-crowned Sparrow

Family Cardinalidae (cardinals)

Species:

Cardinalis cardinalis

Northern Cardinal

Passerina cyanea

Indigo Bunting

Family Icteridae (blackbirds)

Species:

Agelaius phoeniceus

Red-winged Blackbird

Dolichonyx oryzivorus

Bobolink

Euphagus carolinus

Rusty Blackbird

Icterus galbula

Baltimore Oriole

Icterus spurius

Orchard Oriole

Molothrus ater

Brown-headed Cowbird

Quiscalus quiscula

Common Grackle

Sturnella magna

Eastern Meadowlark

Family Fringillidae (finches)

Species:

Pheucticus ludovicianus

Rose-breasted Grosbeak

Carduelis tristis

American Goldfinch

Carpodacus purpureus

Purple Finch

Carduelis pinus

Pine Siskin

Carduelis flammea

Common Redpoll

Carpodacus mexicanus

House Finch

Family Passeridae (Old World sparrows)

Species:

*Passer domesticus**

House Sparrow

Appendix D: Odonata and Lepidoptera species Observed in Humbug Marsh

From: Craves 2007 and Craves 2008

ORDER ODONATA

Family Calopterygidae (broad-winged damselflies)

Species:

<i>Calopteryx maculata</i>	Ebony Jewelwing
<i>Hetaerina titia</i>	Smoky Rubyspot

Family Lestidae (Spreadwings)

Species:

<i>Lestes dryas</i>	Emerald Spreadwing
<i>Lestes [disjunctus] disjunctus</i>	Northern Spreadwing
<i>Lestes [disjunctus] australis</i>	Southern Spreadwing
<i>Lestes rectangularis</i>	Slender Spreadwing

Family Coenagriidae (red and blue damselflies)

Species:

<i>Argia apicalis</i>	Blue-fronted Dancer
<i>Enallagma carunculatum</i>	Tule Bluet
<i>Enallagma civile</i> ,	Familiar Bluet
<i>Enallagma exsulans</i>	Stream Bluet
<i>Enallagma geminatum</i>	Skimming Bluet
<i>Enallagma signatum</i>	Orange Bluet
<i>Enallagma vesperum</i>	Vesper Bluet
<i>Ischnura posita</i>	Fragile Forktail
<i>Ischnura verticalis</i>	Eastern Forktail
<i>Nehalennia iren</i>	Sedge Sprite

Family Aeshnidae (hawker dragonflies)

Species:

<i>Aeshna constricta</i> ,	Lance-tipped Darner
<i>Aeshna umbrosa</i>	Shadow Darner
<i>Anax junius</i>	Common Green Darner
<i>Anax longipes</i>	Comet Darner
<i>Epiaeschna heros</i>	Swamp Darner

Family Gomphidae (Clubtails)

Species:

<i>Arigomphus villosipes</i>	Unicorn Clubtail
<i>Gomphus vastus</i>	Cobra Clubtail
<i>Stylurus notatus</i>	Elusive Clubtail
<i>Stylurus plagiatus</i>	Russet-tipped Clubtail

Family Macromiidae (skimmers)

Species:

<i>Macromia taeniola</i>	Royal River
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Family Corduliidae (emerald dragonflies)

Species:

<i>Epitheca cynosura</i>	Common Baskettail
<i>Epitheca princeps</i>	Prince Baskettail

Family Libelluliidae (skimmers)

Species:

<i>Celithemis elisa</i>	Calico Pennant
<i>Celithemis eponina</i>	Halloween Pennant
<i>Erythrodiplax umbrata</i>	Band-winged Dragonlet
<i>Erythemis simplicicollis</i>	Common Pondhawk
<i>Leucorrhinia intacta</i>	Dot-tailed Whiteface
<i>Libellula luctuosa</i>	Widow Skimmer
<i>Libellula lydia</i>	Common Whitetail
<i>Libellula pulchella</i>	Twelve-spotted Skimmer
<i>Libellula semifasciata</i>	Painted Skimmer
<i>Libellula vibrans</i>	Great Blue Skimmer
<i>Pachydiplax longipennis</i>	Blue Dasher
<i>Pantala flavescens</i>	Wandering Glider
<i>Pantala hymenaea</i>	Spot-winged Glider
<i>Perithemis tenera</i>	Eastern Amberwing
<i>Sympetrum obtrusum</i>	White-faced Meadowhawk
<i>Sympetrum rubicundulum</i>	Ruby Meadowhawk
<i>Sympetrum vicinum</i>	Autumn Meadowhawk
<i>Tramea carolina</i>	Carolina Saddlebags
<i>Tramea lacerate</i>	Black Saddlebags

ORDER LEPIDOPTERA

Family Papilionidae (Swallowtail Butterflies)

Species:

<i>Papilio polyxenes</i>	Black Swallowtail
<i>Papilio cresphontes</i>	Giant Swallowtail
<i>Papilio glaucus</i>	Eastern Tiger Swallowtail

Family Pieridae (Whites and Sulphurs)

Species:

<i>Pieris rapae</i>	Cabbage White
<i>Colias philodice</i>	Clouded Sulphur
<i>Colias eurytheme</i>	Orange Sulphur

Family Lycaenidae (Coppers, Blues, Hairstreaks and Harvesters)

Species:

<i>Lycaena [Hyllolycaena] hyllus</i>	Bronze Copper
<i>Satyrrium calanus</i>	Banded Hairstreak
<i>Satyrrium favonius ontario</i>	“Northern” Oak Hairstreak
<i>Satyrrium liparops</i>	Striped Hairstreak

<i>Strymon melius</i>	Gray Hairstreak
<i>Celastrina lucia</i>	Eastern Spring Azure
<i>Celastrina neglecta</i>	Summer Azure
<i>Cupido [Everes] comyntas</i>	Eastern Tailed Blue

Family Nymphalidae (Brush-footed Butterflies)

Species:

<i>Cercyonis pegala</i>	Common Wood-Nymph
<i>Enodia anthedon</i>	Northern Pearly-eye
<i>Megisto cymela</i>	Little Wood Satyr
<i>Libytheana bachmanii</i>	American Snout
<i>Danaus plexippus</i>	Monarch
<i>Euphydryas phaeton</i>	Baltimore Checkerspot
<i>Junonia coenia</i>	Common Buckeye
<i>Nymphalis antiopa</i>	Mourning Cloak
<i>Phyciodes tharos</i>	Pearl Crescent
<i>Polygonia comma</i>	Comma
<i>Polygonia interrogationis</i>	Question Mark
<i>Vanessa atalanta</i>	Red Admiral
<i>Vanessa cardui</i>	Painted Lady
<i>Vanessa virginiensis</i>	American Lady
<i>Limenitis archippus</i>	Viceroy
<i>Limenitis arthemis</i>	Red-spotted Purple

Family Hesperiidae (Skippers)

Species:

<i>Ancyloxypha numitor</i>	Least Skipper
<i>Hylephila phyleus</i>	Fiery Skipper
<i>Poanes hobomok</i>	Hobomok Skipper
<i>Polites mystic</i>	Long Dash
<i>Polites peckius</i>	Peck's Skipper
<i>Pompeius verna</i>	Little Glassywing
<i>Thymelicus lineola</i>	European Skipper
<i>Wallengrenia egeremet</i>	Northern Broken-Dash
<i>Epargyreus clarus</i>	Silver-spotted Skipper

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(Grantee)
STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LAND AND WATER MANAGEMENT DIVISION

Steven G. Sadewasser Lawrence N. Witte
* Steven G. Sadewasser Lawrence N. Witte
Its Chief

Orin Kennedy
* Orin Kennedy

STATE OF MICHIGAN }

}ss

COUNTY OF INGHAM }

The foregoing instrument was acknowledged before me this 16th day of July
19 96, by Lawrence N. Witte, State of Michigan, on
behalf of the Michigan Department of Natural Resources.

Katharine McGarry
Notary Public Katharine McGarry
My Commission Expires January 28, 1999
Notary Public Eaton County acting in Ingham
County, Michigan

*Type/Print Witness' Name

Drafted by:

FRANK J. KELLEY
Attorney General
Gary L. Hicks
Assistant Attorney General
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Lansing, Michigan 48909

After Recording, Return to:

Wetland Management Program
Land and Water Management Division
Michigan Department of Environmental Quality
P.O. Box 30458
Lansing, Michigan 48909

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EXHIBIT B

