

Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

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

William J. Mitsch, Ph.D.
Wilma H. Schiermeier Olentangy River
Wetland Research Park
The Ohio State University
352 W. Dodridge Street
Columbus, OH 43202 USA
Phone: +1 614 292 9774
FAX: +1 614 292 9773
mitsch.1@osu.edu

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated: **October 5, 2007**

3. Country: **USA**

4. Name of the Ramsar site:

Wilma H. Schiermeier Olentangy River Wetland Research Park

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

7. Map of site: **see attached 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:

The boundary of the wetland research park is defined generally by property boundaries of land owned by The Ohio State University. The wetland site is bounded on the south by Dodridge Road and ARC Industries (property rented from Ohio State University) and on the west by Union Cemetery. The Olentangy River is part of our designated Ramsar site and waters are owned by the State of Ohio. The river shoreline forms the northern and eastern boundaries of the proposed Ramsar site.

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

40° 1.2' N 83° 1.1' W

9. General location:

Columbus (Franklin County), Ohio

The site is in the city limits of Columbus (1.6 million people in metropolitan area).

10. Elevation:

220.8 – 223.8 m above mean sea level

11. Area: 21 ha

12. General overview of the site:

The Wilma H. Schiermeier Olentangy River Wetland Research Park (ORWRP) is a complex of created and natural freshwater riverine wetlands located on the campus of The Ohio State University in Columbus, Ohio, USA. The wetlands include freshwater, tree-dominated wetlands (bottomland hardwood forest), permanent rivers/streams/creeks, seasonal/intermittent freshwater marshes, and permanent freshwater marshes. The site is being nominated because of its unique combination of 1) a biologically diverse assemblage of different wetland and riverine habitats both representative and unique to the region; 2) high-quality university teaching, research, and publishing related specifically to wetland ecology and management; and 3) significant wetland ecotourism and outreach for an urban community where few wetlands remain. As a result of wetland creation, restoration, and sound management, the ORWRP has developed into a diverse set of habitats and vegetated ecosystems comparable to any similar-sized temperate zone wetland. The site has supported almost 160 bird species, diverse fish and invertebrate communities in the river and marshes, and a wide variety of mammals, amphibians and reptiles, all in an urban region of 1.6 million people. Almost 250 scholarly publications are on the ORWRP publication list (many related to wetlands from this site) including recent editions of the textbook “Wetlands” that has trained an entire generation of wetland scientists and managers on the functions and values of wetlands. The ORWRP has also produced more than a dozen university and college professors who now teach and study on wetlands around the world. It has become one of the most popular ecotourism destinations in central Ohio for schools, universities, garden clubs, and retirement groups. This ecotourism is particularly important because 90% of the wetlands in Ohio were drained in the 19th and 20th centuries and there is little memory of the functions and values of wetlands in the American Midwest. One hundred twenty formal tours and 35 university courses use the ORWRP annually. The ORWRP is one of only two wetland research facilities in the USA in the Global Wetland Consortium (GWC).

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. Importance to Biogeographic Region's Representative, Rare, or Unique Wetlands—The Olentangy River Wetland Research Park (ORWRP) contains both representative and unique examples of natural and near-natural wetlands found at the crossroad of three sub-biogeographic regions of the Eastern Deciduous Forest biome of North America: the Mixed Wood Plains, the Central USA Plains, and the Appalachian Forests. The first two regions were glaciated, the last one not. The representative wetland is the restored 5-ha bottomland hardwood forest (type Xf) adjacent to the Olentangy River. The unique wetlands, once typical of river floodplains but now nearly extinct in the USA Midwest, include both the permanent flow-through freshwater marshes/pools (type Tp) and the seasonal/intermittent freshwater marshes (oxbow wetland; type Ts), both of which receive Olentangy River water continuously or during flood pulses respectively.

These wetlands provide important water quality improvement and floodwater storage in addition to unique habitat. The seasonal/intermittent wetland, in particular, provides an extensive mudflat area that is key for wading birds and migrating shore birds. The Olentangy River itself (type M) provides habitat for a diverse community of fish (see Criteria 7 and No. 22 below). Within the large scale Eastern Deciduous Forest, the same descriptions apply for representative and unique wetlands.

The wetlands at the ORWRP provide a major role in the natural control and mitigation of flooding, particularly in its urban area. Flood pulses occur on the river from 6 to 20 times per year, with extensive flooding about two years out of three. The wetlands and floodplain collectively serves as a floodwater retention area during these floods that can be significant. For example, we estimated that 47,000 m³ of floodwater was stored in our marshes and forested wetlands during a July 2007 flood event in central Ohio that otherwise would be floodwater in other urban areas. Our studies over the years show that the bottomland hardwood forest (freshwater, tree-dominated wetlands) floods about 6-10 times per year while the oxbow wetland (seasonal/intermittent freshwater marshes) floods 7-17 times per year.

Criterion 2. Importance to Vulnerable, Endangered, or Critically Endangered Species—The Olentangy River supports several species of birds considered vulnerable and/or endangered in the state of Ohio (designated by Ohio Department of Natural Resources) including the Peregrine Falcon (*Falco peregrinus*), the Osprey (*Pandion haliaetus*), and the Northern Harrier (*Circus cyaneus*). The rare Merlin (*Falco columbarius*) was found along the river at the ORWRP during the winters of 2005-06 and 2006-07. The symbolic bird of the USA, the Bald Eagle (*Haliaeetus leucocephalus*), was seen feeding at the ORWRP in September 2006. Even though the Bald Eagle is no longer listed as endangered in the USA or Ohio, it is locally rare and certainly rare in urban Columbus. The Bald Eagle recovered from only 4 nesting pairs in all of Ohio in 1979 to a record 150 nests in 2006, in part to the restoration of wetlands.

Another important conservation value of the ORWRP is the stopover habitat that it provides to migratory birds moving through central Ohio, including an impressive 26+ species of warblers. Migratory birds using the Olentangy Wetland Research Park as stopover

habitat include several species of national and regional conservation concern, such as Acadian Flycatcher (*Empidonax virescens*), Eastern Wood-Pewee (*Contopus virens*), Scarlet Tanager (*Piranga olivacea*), Worm-eating Warbler (*Helmitheros vermivorus*), and Prothonotary Warbler (*Protonotaria citrea*).

Criterion 3. Importance for Maintaining Biodiversity of Biogeographic Region—The ORWRP is important for a number of bird species that are important in this and other ecoregions such as the Northern Forests, Hudson Plain, and Taiga of Canada. It supports a wide range of migratory birds in both the spring and fall including shorebirds such as Lesser and Greater Yellowlegs (*Tringa flavipes*, *Tringa melanoleuca*), Semipalmated Plover (*Charadrius semipalmatus*), Semipalmated, Least, and Solitary Sandpipers (*Calidris pusilla*, *Calidris minutilla*, *Tringa solitaria*). These birds travel to Canada, Siberia, and the Arctic in spring migration and Mexico, Central America, and South America in fall migration. Twenty-six species of warblers are among the passerine birds have been recorded at the ORWRP, most of which migrate to Canada in the spring.

Criterion 4. Important as Refuge during Adverse Conditions—The ORWRP is a refuge for species during adverse conditions or times of otherwise limited resources. The intermittent/seasonal marsh (oxbow wetland; type Ts) is connected to the river during flood pulses, mostly in the winter/spring, and isolated during the drier summer/fall. In the spring, many fish and fish fry are washed into the wetland by the flooding river. These fish grow in size and numbers throughout the spring/summer as the water levels begin to drop because streamflow is low. In late summer and early fall, water levels usually drop to where the wetland has standing water on only 10% or less of its original size. This period allows the wading birds, particularly the Great Blue Heron (*Ardea herodias*) and Great Egret (*Ardea alba*), to feast on the high concentration of fish that once were in 3 ha and now are in 0.3 ha or less. The low water also creates a mudflat-like habitat that is the favorite of many of the shorebirds that then stop by in the autumn. In other words, the hydroperiod (controlled by the natural river pulsing rather than management) is optimum for providing an optimum habitat for fish, herons, egrets, and shorebirds at critical stages in their life cycles.

Criteria 7. Important in Support of Fish—The Olentangy River at the ORWRP has some of the most diverse fish communities of anywhere in central Ohio (see “Fish and Aquatic Life” in Section 22). The lower section of the river in the proposed Ramsar site is immediately downstream of a region known as the “Falls of the Olentangy” (the falls now have a low-head dam). As a result of the oxygen-rich water from the falls and the clean water from the wetlands that returns to the river here, indigenous fish diversity in this location is extraordinary. A listing of the fish species caught by Ohio State University students in one short sampling on August 29, 2007, is illustrative of that diversity. Ninety-three individual fish representing 16 species were caught in only 7 minutes of electrofishing at this location: Smallmouth bass (*Micropterus dolomieu*) (8); Bluntnose minnow (*Pimephales notatus*) (7); Stoneroller (*Campostoma anomalum*) (24); Rock bass (*Ambloplites rupestris*) (8); Gizzard shad (*Dorosoma cepedianum*) (4); spotfin shiner (*Cyprinella spiloptera*) (4); bluegill (*Lepomis macrochirus*) (6); emerald shiner (*Notropis atherinoides atherinoides*) (2); common carp (*Cyprinus carpio*) (1); pumpkinseed sunfish (*Lepomis gibbosus*) (2); green sunfish (*Lepomis cyanellus*) (1); greenside darter (*Etheostoma blennioides*) (8); banded darter (*Etheostoma zonale*) (2) logperch (*Percina caprodes*) (3); largemouth bass (*Micropterus salmoides*) (2); and rainbow darter (*Etheostoma caeruleum*)

(8). The darters are especially important as indicators of good water quality and habitat. Local urban fishers frequently use this site for recreational fishing.

[See support letter from one such fisher, Joe Jordan, and his DVD show preview of his upcoming television show “*Rebirth of a River: The Olentangy River Documentary*.”].

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 Olentangy River Wetland Research Park (ORWRP) is located in the eastern-most edge of the **Central USA Plains portion of Eastern Temperate Forest** Ecological Region (Biome) of North America. The location is actually close to the intersection of three Level II ecoregions in the Eastern Temperate Forest: 8.1 Mixed Wood Plains; 8.2 Central USA Plains; 8.4 Appalachian Forests. The location has the potential for a high diversity of plants, fish and wildlife found in distinctly different ecoregions, from glaciated plains to mountain woodlands.

b) biogeographic regionalisation scheme (include reference citation):

Canada/USA/Mexico Commission for Environmental Cooperation. 2007. Ecological Regions of North America, CEC, Montreal)

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.

The Olentangy River wetland site lies in a floodplain covered by deep deposits of alluvium underlain by glacial material. The site included the river and wetlands on the floodplain. The Devonian bedrock surface beneath the till is gently rolling. The soil nearest to the river is deep, nearly level, and well-drained to very poorly drained. The soil formed in moderately coarse to moderately fine textured recent alluvium. The soil that is a little further from the river is deep, nearly level to moderately steep, and well drained. This soil formed in moderately coarse to moderately fine textured glacial outwash, alluvium, or loess. The finer sediments on the site appear to thin with distance from the river.

The primary soil type at the site is the Ross series (Rs). Ross soils are deep, dark and well-drained. This soil forms on floodplains, commonly on the high part and in alluvium and outwash. The soil ranges from silt loam to silty clay loam to loam. It is friable, mildly alkaline, and interspersed with deep fine roots. The depth to carbonates ranges from 0 to 1.5 m. Permeability is moderate, runoff is very slow, and plant productivity is very high. The next most common soil type found at the wetland site is the Eldean series (Em). It is a gently sloping, deep, well-drained soil that occurs on long narrow stream terraces and broad outwash plains. The soil ranges from silt loam to clay loam to gravelly clay and sandy clay loam to loose gravelly sand. It is friable. It ranges from medium acid at the top to mildly alkaline as depth increases.

Soils in the wetland basins themselves are hydric, with low chromas and high organic carbon content. About 30% of the bottomland hardwood forest soils are hydric and ponding

in those locations is frequent in the flood season. Wetland soil organic matter in the permanent and seasonally flooded marshes has been increasing by about 1% every 3 years since the wetlands were created in the 1990s. Our measurements suggest that carbon sequestration is almost 2000 kg ha⁻¹ yr⁻¹ (Anderson and Mitsch, 2006), a higher rate than many other wetland types and most uplands.

The hydroperiods of the two 1-ha experimental wetlands (permanent freshwater marshes/pools) is artificial and generally maintained by pumps to reflect the river patterns, with high flows during flooding conditions and low flow and water levels during low-flow periods in the river. The seasonal/intermittent freshwater marsh (oxbow) has a natural hydroperiod, flooded naturally by the river frequently in the winter and spring when river flow is substantial and shallow to no standing water (mudflats) with only infrequent flooding during the dry season of summer and early autumn. The shallow mudflats in the fall season are important for many migrating bird species. The restored natural bottomland hardwood forest (freshwater, tree-dominated wetlands) is flooded naturally by the river, has the least amount of river flooding of the wetland types on the site, but was enhanced in overbank flooding from the river through a hydrologic restoration in 2000-01. The north section of the bottomland forest had been disconnected from the river by a constructed levee (up to 2-m high) that was built over 70 years ago and extended along a 250 m stretch of the river. Three breeches were opened in the north section and river water now regularly flows into and out of this section during bank-full river events. The south section of the bottomland was not restricted and periodically flooded by direct surface flow from the river.

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 Olentangy River rises in Crawford County approximately 3.2 km southeast of Galion, in central Ohio, where it turns south and flows through the communities of Delaware, Powell, Worthington, and the campus of The Ohio State University, before joining with the Scioto River in downtown Columbus. The Delaware State Park Reservoir, also known as Delaware Lake, was constructed along the Olentangy River in 1951. The reservoir is located 9 km north of the City of Delaware, and about 40 km north of the ORWRP. The Olentangy River is the primary source of drinking water for much of Delaware County. Thirty-five km of the Olentangy River have been designated a State Scenic River by the Ohio Department of Natural Resources, Division of Natural Areas & Preserves.

The Olentangy River lies in the till plains section of the Central Lowland physiographic province. Till plains are a glacial features formed when a pre-glacial surface is buried under till and a surface of low relief is formed. Till is a glacial material that has been carried along in the ice and deposited directly by the ice in another location. The land surface in this area is flat to gently rolling. The buried valley in which the Olentangy River flows is filled with 30 to 75 m of permeable glacial outwash deposits. These deposits are potential major aquifers. The river is eroding a new channel in a post-glacial valley filled with outwash. Alluvial deposits composed of silt and gravel have been deposited by the present river. Drainage in the central Ohio area was changed during the last glaciation. Waterways of the Teays Stage drainage system that had drained southeast were rerouted to the south by ice encroachment, deposition, and stream piracy. It was later, when the glaciers melted, that the valleys were filled with till, sand, and gravel.

The catchment itself is dominated by agriculture in its upper reaches (corn and soybeans) and by urban and suburban development in its lower reaches, mostly the Columbus metropolitan area. Combined sewer outfalls in the lower Olentangy River basin contribute to episodic pollutions problems in the river. The agricultural landscape leads to runoff high in sediments and nutrients (nitrates and phosphates). The wetlands at the ORWRP have been removing these sediments and nutrients for years and converting them into wetland sediments and organic carbon.

Climate in central Ohio is dominated by a humid continental climate (Köppen climate classification Dfa), characterized by hot, muggy summers and cold, dry winters. The warm summer (Köppen: Dfa) subtype of the humid continental climate has an average temperature in excess of 22°C, rainy summers and cold, often but not always snowy winters. The highest temperature ever recorded in Columbus was 41°C, which occurred twice during the 1930s. The coldest was -30°C, occurring in January 1994.

18. Hydrological values:

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

The wetlands at the ORWRP are riparian ecosystems that provide significant flood storage in urban Columbus during high-flow periods on the Olentangy River. For example, we estimated that 47000 m³ of floodwater was stored during a recent (July 2007) flood event in central Ohio that otherwise would be floodwater in unwanted areas. Our studies over the years show that the bottomland hardwood forest (freshwater, tree-dominated wetlands) floods about 6 - 10 times per year while the oxbow wetland (seasonal/intermittent freshwater marshes) floods 7-17 times per year, mostly in the wet season (December-May).

The permanently flooded and intermittently flooded flow-through marshes have been well documented as providing water quality improvement, particularly with sediments, nitrate-nitrogen, and soluble reactive phosphorus. Numerous papers listed with our attached publication list have documented retention of sediments, nitrogen, and phosphorus by the ORWRP wetlands.

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.

Xf -- Freshwater, tree-dominated wetlands (bottomland hardwood forest) 6.1 ha

- M -- Permanent rivers/streams/creeks (Olentangy River and swale) 5.0 ha
Ts -- Seasonal/intermittent freshwater marshes (oxbow) 2.8 ha
Tp -- Permanent freshwater marshes/pools (exp. wetlands, stormwater wetland) 2.5 ha
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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.

Freshwater, tree-dominated wetlands (Xf)—These forested wetlands (referred to at our site as bottomland hardwood forest) is an uneven-aged forest; dominant tree species in the north section are boxelder (*Acer negundo* L.), Ohio buckeye (*Aesculus glabra* Willd.), paw paw (*Asimina triloba* L.) and hackberry (*Celtis occidentalis* Willd.) while dominant trees in the south section consisted of *A. negundo*, *A. glabra* and eastern cottonwood (*Populus deltoides*). This forested wetland has several areas that stay ponded well after the river level drops, creating vernal pools that are valuable habitat for amphibians. The forest community provides a vital habitat for a number of bird and mammal species.

Permanent rivers/streams/creeks (M)—The river ecosystem adjacent to the bottomland forest has substantial fish diversity (see description of fish and aquatic life below). The river is classified as a warm-water habitat stream, and its quality in the vicinity of the ORWRP is generally good. Recreational fishing is common in the river itself; fishing is not permitted in the outflow channel of the wetlands because they are on university property and are primarily for teaching and research.

Seasonal/intermittent freshwater marshes (Ts)—This created naturally flooding floodplain wetland has two main areas—the inflow half is dominated by *Typha* while the outflow areas is generally an unvegetated mudflat. As water level decreases in the late summer, *Xanthium strumarium* can colonize the exposed mudflat and become the dominant species on the mudflat until the onset of the first heavy frost. Alternatively, the mudflat remains unvegetated. Only two of the original planted species, *Scirpus americanus* and *Juncus effusus*, make up a significant portion of the wetland productivity. Macrophyte species contributing most to productivity are *Typha* sp., *Eleocharis* sp. and *Scirpus americanus*, which together account for about 70% of the macrophyte productivity in the wetland. The dominant vegetation communities in the created oxbow are *Typha* sp., a woody fringe of *Salix spp.* and *Populus deltoides*, a mixed community of *Eleocharis* sp., *Juncus effusus*, and *Scirpus americanus*, and expanding patches of *Pontederia cordata*. While *Typha* sp. contributes most to the macrophyte productivity, its proportion of the productivity decreases from 83% at the inflow to 0% at the outflow. Of 105 species of plants identified in the created oxbow in 2003 and 2004, 55 were wetland indicator species.

Permanent freshwater marshes/pools (Tp)—Two kidney-shaped deepwater marshes (1-ha each) were constructed on the river floodplain in 1993-94 and have received pumped river water on a continuous basis ever since then. In an experiment that continues to the present day, one wetland was planted with 2500 individual plants representing 12 species, while the second created wetland was not planted. Both wetlands have developed diverse macrophyte communities and are now fringed by volunteer trees about 5 to 13 years old. There are over 100 herbaceous plant species and a dozen tree species in and around each wetlands basin. Water quality data from 14 years of sampling inflows and outflows show consistent patterns of improved water quality. Vegetation community maps and primary productivity are determined annually in both marshes. Vegetation communities include marshes dominated by

Schoenoplectus tabernaemontani, *Typha* spp., *Leersia oryzoides*, and *Sparganium eurycarpum* and young edge forest dominated by *Populus deltoides*, *Salix* spp., and *Acer saccharinum*. Approximately 30% of the marshes are open water dominated by benthic algae. Most indications are that the planted marsh is a little more diverse than the unplanted marsh, but the unplanted marsh has a pattern of higher productivity.

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.*

Noteworthy vegetation at the ORWRP includes the large old (>130 years) wetland trees (e.g., cottonwood (*Populus deltoides*) and sycamore (*Platanus occidentalis*)) in the bottomland hardwood forest (see attached photos).

A list of the vegetation at the ORWRP is attached to this report (Plant Field Guide). Overall, there are 223 plant species in and adjacent to the wetlands at the ORWRP. It is noteworthy that the permanent freshwater marshes/pools (Tp) alone support 154 species of vegetation; one of the two wetlands was planted with 12 wetland species in 1994 while the second marsh was allowed to colonize plants naturally. The seasonal/intermittent marsh (Ts) has been documented to have 122 plant species. The freshwater, tree-dominated wetland (Xf) supports 70 plant species including 18 tree species. A further noteworthy fact related to biodiversity is that there are a total of 99 wetland species in this list (defined as obligate (OBL) or facultative wet (FACW) wetland species in the U.S. National List of Plant Species That Occur in Wetlands: Northeast (Region 1) (U.S. Fish and Wildlife Service, Reed, 1988 as updated). Some of the more noteworthy wetland plants in these wetlands include *Acorus calamus*, three species of *Juncus*, *Lobelia cardinalis*, two species of *Polygonum*, three species of *Potamogeton*, *Sagittaria latifolia*, *Schoenoplectus tabernaemontani*, *Scirpus fluvialtitus*, and *Sparganium eurycarpum*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12, 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.*

Birds and Waterfowl

Over 150 species of birds have been documented at the Olentangy River Wetland Research Park in the last 15 years. The site provides breeding and stopover habitat to many species of waterfowl, shorebirds and rails, including the King Rail (*Rallus elegans*), which is one of the highest priority and most severely declining rails in North America. While the shrubby and forested habitats that are part of or adjacent to the ORWRP support a variety of breeding birds, the most important conservation value of the site is the stopover habitat that it provides to migratory birds moving through central Ohio, including an impressive 26+ species of warblers. Migratory birds using the Olentangy Wetland Research Park as stopover habitat include several species of national and regional conservation concern, such as Acadian Flycatcher (*Empidonax virens*), Eastern Wood-Pewee (*Contopus virens*), Scarlet Tanager (*Piranga olivacea*), Worm-eating Warbler (*Helmitheros vermivorus*), and Prothonotary Warbler (*Protonotaria citrea*). The Prothonotary Warbler was observed nesting at the wetland site in 2005.

Wading birds and rails include the Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Green Heron (*Butorides virescens*), Black-crowned Night-Heron (*Nycticorax nycticorax*), Least Bittern (*Ixobrychus exilis*), and Virginia and King Rails (*Rallus limicola*, *Rallus elegans*). Shorebirds include the Wilson's Snipe (*Gallinago delicata*), Dunlin (*Calidris alpina*), Killdeer (*Charadrius vociferous*), Least Sandpiper (*Calidris minutilla*), Greater Yellowlegs (*Tringa melanoleuca*), Lesser Yellowlegs (*Tringa flavipes*), and Solitary and Spotted Sandpiper (*Tringa solitaria*, *Actitis macularia*). Waterfowl frequent the site year-round or during migration including Canada Goose (*Branta canadensis*), Mallard (*Anas platyrhynchos*), Black Duck (*Anas rubripes*), American Wigeon (*Anas americana*), Lesser Scaup (*Aythya affinis*), Blue-winged Teal (*Anas discors*), Northern Shoveler (*Anas clypeata*), Hooded Merganser (*Lophodytes cucullatus*), and Wood Duck (*Aix sponsa*). Several of the ducks breed at the ORWRP.

The wetland site is frequently both a breeding and feeding habitat for a great variety of raptors including the American Kestrel (*Falco sparverius*), Red-tailed Hawk (*Buteo jamaicensis*), Cooper's Hawk (*Accipiter cooperii*), Northern Harrier (*Circus cyaneus*), Sharp-shinned Hawk (*Accipiter striatus*), Osprey (*Pandion haliaetus*), and at least 4 species of owls: Short-eared Owl (*Asio flammeus*), Barred Owl (*Strix varia*), Eastern Screech-Owl (*Otus asio*), and Great Horned Owl (*Bubo virginianus*). A Bald Eagle (*Haliaeetus leucocephalus*) was sighted at the wetland in 2006, probably one of the first incursions of this bird to the middle of this large urban area ever. The rare Merlin (*Falco columbarius*) was seen at the ORWRP recently, causing many visits by birdwatchers from throughout Ohio.

Fish and Aquatic Life

The Olentangy River that passes through the ORWRP has some of the best recreational fishing for Smallmouth Bass (*Micropterus dolomieu*) in the Midwestern USA. Smallmouth Bass prefers cooler water temperatures than its cousin the Largemouth Bass, is found in both still and moving water, is relatively intolerant of pollution, and is a good indicator of good water quality. Its diet includes crayfish, insects, and smaller fish all of which are abundant in this wetland/river complex. Fish in the river also include *Micropterus salmoides* (Largemouth Bass), *Ambloplites rupestris* (Rock Bass), *Pomoxis nigromaculatus* and *P. annularis* (Black and White Crappie), *Lepomis megalotis* (Longear Sunfish), *Lepomis macrochirus* (Bluegill), *Lepomis cyanellus* (Green Sunfish), *Campostoma anomalum* (Stoneroller), *Dorosoma cepedianum* (Gizzard Shad), *Cyprinella spiloptera* (Spotfin Shiner), *Notropis atherinoides atherinoides* (Emerald Shiner), *Lepomis gibbosus* (Pumpkinseed Sunfish), *Etheostoma blennioides* (Greenside Darter), *Etheostoma zonale* (Banded Darter), *Percina caprodes* (Logperch), *Etheostoma caeruleum* (Rainbow Darter), and *Ictalurus punctatus* (Channel Catfish). Some of recently improved fish productivity and diversity in the Olentangy River is undoubtedly due to the creation in the mid-1990s of over 5 ha of flow-through wetlands at the ORWRP; these wetlands have been documented to improve water quality.

Fish documented in the permanently flooded marshes themselves at the ORWRP include *Lepomis cyanellus* (Green Sunfish), *Lepomis macrochirus* (Bluegill), *Pimephales promelas* and *P. notatus* (Fathead and Bluntnose Minnow), *Luxilus cornutus* (Common Shiner), *Cyprinus carpio* (Common Carp), *Micropterus salmoides* (Largemouth Bass), and *Micropterus dolomieu* (Smallmouth Bass).

Annual surveys of benthic invertebrates have been conducted in two of the marshes at the ORWRP and show generally increasing diversity since the wetlands were created in the mid-1990s. As many as 41 taxa of benthic invertebrates have been seen in these annual studies and 54 taxa have been observed overall in the wetlands. The diversity includes at least 3 families of Odonata and 4 families of Ephemeroptera.

Reptiles and Amphibians

The Olentangy River Wetlands Research Park provides a matrix of wetland pools and riverine systems with varying microtopography and seasonal hydrology that allow a diversity of reptiles and amphibians including *Thamnophis sirtalis sirtalis* (Eastern Garter Snake), *Storeria dekayi* (Brown Snake), *Nerodia sipedon sipedon* (Northern Water Snake), *Chrysemys picta marginata* (Midland Painted Turtle), *Chelydra serpentina* (Snapping Turtle), *Trionyx spiniferus* (Spiny Soft Shelled Turtle), *Graptemys geographica* (Common Map Turtle), *Bufo americanus* (American Toad), *Rana catesbeiana* (North American Bullfrog), *Rana clamitans* (Green Frog), *Rana palustris* (Pickerel Frog) and *Rana pipiens* (Leopard Frog). *Rana catesbeiana* populations have fluctuated in response to presence and absence of predatory fish and wetland hydroperiods. The extensive bottomland hardwood forest at the ORWRP and several other wetland ponds provided a habitat suitable for early amphibian breeders such as *Pseudacris crucifer* (Spring Peeper) with vernal pool habitat in the spring. Both adult and larval amphibians provide a source of food for predatory bass and sunfish, water and terrestrial snakes, and many species of both resident and migratory birds. Reptile and amphibian species have maintained stable populations at the ORWRP and appear to be well-adapted to the ebb and flow and different hydroperiods of this dynamic ecosystem.

Mammals

A wide variety of mammals have been recorded at the Olentangy River Wetland Research Park including *Didelphis virginiana* (Virginia Opossum), *Sorex cinereus* (Masked Shrew), *Blarina brevicauda* (Northern Short-tailed Shrew), *Scalopus aquaticus* (Eastern Mole), *Sylvilagus floridanus* (Eastern Cottontail), *Tamias striatus* (Eastern Chipmunk), *Marmota monax* (Groundhog or Woodchuck), *Sciurus carolinensis* (Gray Squirrel), *Peromyscus leucopus* (White-footed Mouse), *Microtus pennsylvanicus* (Meadow Vole), *Ondatra zibethicus* (Muskrat), *Procyon lotor* (Raccoon), *Mustela vison* (Mink), *Odocoileus virginianus* (White-tailed Deer), *Castor canadensis* (Beaver), and *Vulpes vulpes* (Red Fox). Beaver and Muskrats are frequently active in the deepwater marshes and their riparian edges, burrowing tunnels, cutting saplings, and building lodges in the winter for predator protection. There is also a healthy bat community (4-6 species) that seasonally flies the wetlands and bottomland forest, consuming emerging insects.

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:

Prior to the creation of the marshes at the wetland site, it was used for agricultural research by The Ohio State University, perhaps for as long as 50-100 years. The University

abandoned the fields in the 1980s, claiming that the site flooded too frequently. Most of the site is floodplain.

There have been some prehistoric artifacts found on the floodplain that indicate Native American cultures that probably lived or hunted near the river. Artifacts include arrow heads and primitive tools. There are also signs of a mill, with a raceway still in place, on the southeastern corner of the site in the bottomland hardwood forest adjacent to the “falls.”

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?

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:

The entire site, including the intermittently flooded tree-dominated wetland (Xf), the seasonal freshwater marsh (Ts), and the permanently flooded marshes (Tp) is owned and maintained by The Ohio State University. Thus it is State of Ohio property. Approximately two-thirds of the site (Xf and Ts wetlands) are formally protected as well “in perpetuity” by a mitigation agreement with the U.S. Army Corps of Engineers that led to their restoration or creation. The intermittently flooded forest (Xf) is also protected by a conservation easement with the Franklin Soil and Water Conservation District. The river itself (M) is property of the state and protected by state and Federal rules regarding water quality and other protection.

b) in the surrounding area:

Most of the land south of the wetland is owned by The Ohio State University. Land to the north, east, and west are held by various private commercial and residential owners.

25. Current land (including water) use:

a) within the Ramsar site:

No person lives within the proposed Ramsar location. The site is used for wetland and teaching research so visits by students and scientists is frequent. The designated use of the wetland research park is primarily for university teaching, research and service. The last includes coordinating a substantial program in wetland ecotourism with over 120 public tours

per year. A City of Columbus bikepath passes through the site, allowing tens of thousands of people annually to walk or ride through the wetland site, enjoying its natural beauty.

b) in the surroundings/catchment:

urban (housing/commercial) in the immediate vicinity of the wetland.

The catchment is urban near the ORWRP with high-density housing and commercial establishments. and rural, with agriculture and low-density housing in its upper reaches. Water is taken from the Olentangy River for drinking water by some small towns north of Columbus. The City of Columbus does not take drinking water from the Olentangy River. There are very few if any river withdrawals from the river for commercial or industrial purposes. The University used river water for power plant cooling downstream but no longer does.

There are two low-lift dams on the Olentangy River in the vicinity of the ORWRP, one at the northwest corner of the proposed Ramsar site, and one at the southeast corner of the site. Recent studies by consultants hired by the City of Columbus concluded that these dams will probably not be removed in the near future because 2-m diameter sewer line passes under these dams and under the city bikepath through the ORWRP. This pipe has no affect on the wetlands and, in fact, the bikepath was located on top of it to minimize wetland disruption when the bikepath was constructed in 1998.

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:

Water pollution caused by urban combined sewer overflow and from upstream agricultural activity continues to cause some degradation of water quality in the Olentangy River. Despite that, the water quality in the immediate vicinity and downstream of the wetlands appears to be good as shown by fish diversity and productivity there (see #22 above).

There are currently plans for an "Olentangy River Restoration Project" to restore the river further downstream from the ORWRP by removing a dam at 5th Avenue, south of the main part of The Ohio State University campus (see attached map). This will have a positive effect on water quality and ecology of the river and will enhance, even more, the river quality in the vicinity of the Ramsar site. It will also make the river continuous without dams from the ORWRP to downtown Columbus and will serve as a better biological conduit between the ORWRP and a riparian wetland park being constructed/restored on the Scioto River by the City of Columbus and the Audubon Society called "Grange Insurance Audubon Center" (see Map) and the larger Metro Park referred to as Whittier Park. It is conceivable that entire Olentangy/Scioto River junction, will one day be added to our proposed Ramsar site.

b) in the surrounding area:

Rivers and streams throughout this part of Midwestern USA, including the Olentangy River, are impaired with high concentrations of nutrients and sediments from intensive agriculture. There are also two wastewater treatment plants north of Columbus on the Olentangy River, but both have strict requirements for treatment to minimize their effects on the river. Combined sewer overflow (CSO) continues to be the worst water quality impact on the lower Olentangy River. When there are high intensity rain storms, runoff that combines sewage

and runoff often enter the river. The City of Columbus is undertaking a multi-million project to control this overflow. The 5th Avenue Dam removal is part of that water quality improvement strategy.

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.

Water quality of the Olentangy River is protected by the Federal Clean Water Act and by state regulations. The Ohio State University owns and manages 16.5 ha of the site (all of the site except the river itself). The entire wetland site is further protected by the fact that the University has raised \$1.8 million in endowments specifically for upkeep and maintenance of the wetlands and its teaching/research structures. Language in those endowments requires that the interest on the endowment be spent for maintenance of the wetlands and its infrastructure. Approximately 8 ha are also protected by the U.S. Army Corps of Engineers because they are wetlands created or restored as mitigation wetlands under the Clean Water Act. Those wetland areas are protected in perpetuity. The 5-ha forested wetland is also protected by a conservation easement administered by Franklin County.

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

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

There is a specific published management plan for the wetlands that deals mostly with its use for research, teaching, and service. This management plan is published on the web site <http://swamp.osu.edu> and is appended to this RIS.

d) Describe any other current management practices:

Water flow to the Permanent freshwater marshes/pools (Tp) is usually maintained, except in special conditions, to match river flow. When river flow is high, high flows are maintained through the wetlands; when river flow is low, low amounts of water is added to the wetlands. All other wetlands have flooding caused naturally by the river.

28. Conservation measures proposed but not yet implemented:

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

29. Current scientific research and facilities:

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

Wetland research at the ORWRP is coordinated at the new Heffner Wetland Research and Education Building completed on the site in 2003. The 1,000 m² research building has three analytical/biological laboratories, computer resources, a conference room, and offices that accommodates about 20 individuals (faculty, staff and students). The Heffner Wetland Building was designed specifically for wetland research, one of only two such buildings in the world on university campuses.

Wetland research at the ORWRP has been supported by the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the U.S. Department of Energy, the U.S. Department of Agriculture, United Nations Environmental Programme, and the Fulbright Foundation, among others. In addition to research specifically at this site, research and consultation has been provided to managers of the Florida Everglades, the Louisiana Delta, the Laurentian Great Lakes, the Delaware Estuary (New Jersey), The Mississippi River Basin, Ballona Wetland (Los Angeles), Cuyahoga River and Darby Creek in Ohio, The Yangtze River Delta (China), Okavango Delta (Botswana), EARTH University and Palo Verde wetlands (Costa Rica), and the Mesopotamian Marshlands (Iraq). Research has been instrumental in recommending ecological solutions to the Gulf of Mexico dead zone (eutrophication due to too much nitrogen from Midwestern agriculture) and other national and international wetland degradations.

The ORWRP has 125 peer-reviewed papers, 5 books, and 37 technical reports, and 64 theses/dissertations on wetlands and related subjects since the research park was established in 1992 (see attached list). Many of the papers and books are on the ecology or the ORWRP itself. The books include the last 2 editions of the standard wetland textbook “Wetlands” (3rd ed. And 4th ed.; Mitsch and Gosselink, 2000, 2007, John Wiley & Sons).

Monitoring at the wetlands themselves at the ORWRP is comprehensive. There is a monitoring system in place for hydrology, water quality, vegetation succession, fish, and invertebrates. Graduate and undergraduate students have carried out daily dawn-dusk monitoring of the site since 1994 and nutrient water quality samples have been collected from the wetlands on a weekly basis since 1995. Several water quality and water level recorders automatically send data by radio signal to the YSI Data Control Center in the Heffner Wetland Building for display in the lobby and archive in computers. Periodic studies are done on wetland soil development, methane generation, carbon sequestration, groundwater hydrology, and many other wetland processes. All data from the sites are stored in file servers in the Heffner Building.

The ORWRP also published an annual report that includes all biological, biogeochemical, and hydrologic studies done at the site for the 14-year period 1992-2005. Since 2006, the reports have been shorter but include reprints of all published work for that year. The 2006 report is appended to this RIS.

All annual reports from the ORWRP are archived in The Ohio State University Library system in perpetuity in their system known as Knowledge Bank <https://kb.osu.edu/dspace/handle/1811/59>. The Knowledge Bank is a digital repository that collects, stores, shares, and preserves important academic assets at the university such as publications, reports, theses, working papers, photographs, and learning objects on a permanent basis.

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.

Thirty to forty university courses and 700 students from 8 Ohio State University colleges and other local colleges use the ORWRP as a “living laboratory” annually. Subjects taught

include wetland ecology, water quality, ecological engineering, anthropology, landscape architecture, chemistry, geography, wildlife ecology, hydrology, wildlife management, ornithology, and forestry. In addition, about 40 participants from around the USA take three-day to five-day short courses in wetland creation and restoration and wetland delineation annually at the ORWRP.

Several other Ohio colleges and universities—Shawnee State, Wright State, Central State, Kenyon College, Ashland University, Capital University, and Columbus State Community College—are part of an Ohio Center for Wetland and River Restoration (OCWRR; http://swamp.osu.edu/consortia/index_ohio.html) centered at the ORWRP and they frequently are involved in use the site for wetland education.

Sixty-four students have completed dissertations, master's theses, or honors undergraduate theses at the Olentangy River Wetland Research Park. <http://swamp.osu.edu/Research/index.html#THESES%20AND%20DISSERTATIONS>

While most of the students are from The Ohio State University, the ORWRP has hosted visiting scientists and students from England, Wales, Denmark, India, China, and Korea. In addition, several dozen post-doctoral researchers and visiting students have carried out research at the ORWRP in that time. Many of the ORWRP alumni are still involved in research and teaching in wetland ecology elsewhere including Texas A&M University, Auburn University, Oklahoma University, George Mason University, Ohio State University, Kenyon College, and Denison University (USA), Yonsei University (Korea), and Erciyes University (Turkey).

A series of seminars by distinguished wetland and water resource scientists was instituted at the ORWRP in 1995. Called "Moonlight on the Marsh" (MOM) seminars, these presentations are usually held outdoors at the Sandefur Wetland Pavilion and are attended by both researchers and the public. There have been 39 MOM distinguished lectures at the ORWRP since 1995.

31. Current recreation and tourism:

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

Formal tours at and presentations of the ORWRP continue to be one of the most popular ecotourism activities in Columbus. <http://swamp.osu.edu/tours/index.html> The ORWRP conducts well over 100 tours and/or public presentations every year to almost 2500 participants. Since 1994, the ORWRP has led over 1400 wetland tours and presentations to over 25,000 individuals. Groups receiving tours ranged from museum children tours, grade school science classes, local garden clubs, university alumni groups, and international visitors from China, Taiwan, Korea, Japan, Thailand, Philippines, Nepal, Australia, New Zealand, Canada, Brazil, Peru, Costa Rica, Israel, Botswana, Kenya, Nigeria, Iceland, Spain, Denmark, England, Scotland, Wales, Germany and Russia.

A Columbus city bike path was constructed in 1998 through the wetland complex. We estimate that 30,000 individuals thus bike, jog, or walk through the wetland annually. To bring their attention to the wetland, we have constructed a bikepath shelter, which will have ecotourism signage to bring attention to the wetland park and its ecology. The bikepath shelter will also have solar collectors on its roof to assist with the displays as well as to inform visitors about the importance of renewable energy. We would put a notice of the

Ramsar designation at the bikepath shelter as well as in the Heffner wetland research building after it is announced.

Another type of outreach is to the wetland scientific community. Many of the most distinguished wetland scientists in the USA, and several from the world have visited the ORWRP wetlands; several have been lecturers at the Moonlight on the Marsh distinguished lecture series. While these visitors do not have to be convinced of the importance of wetlands, many have been inspired by the ORWRP to create a wetland research or local wetland ecotourism sites in their local regions. Scientists who have visited the ORWRP include Curt Richardson (Duke), John Teal (Woods Hole Oceanographic Institute), Wolfgang Junk (Max Planck Institute, Germany), John Day (Louisiana State University), Rob Brooks (Penn State University), H.T. Odum (Univ. of Florida), Eugene Odum (Univ. of Georgia), Ralph Tiner (U.S. Fish & Wildlife Service), Robin Lewis (Lewis Environmental, Tampa, FL), Jianjian Lu (East China Normal University), Ramesh Reddy (University of Florida), and Azzam Alwash (Nature Iraq).

32. Jurisdiction:

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

The ORWRP is part of the School of Environment and Natural Resources, College of Food, Agricultural, and Environmental Science, The Ohio State University

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.

Wilma H. Schiermeier Olentangy River Wetland Research Park
School of Environment and Natural Resources
College of Food, Agricultural, and Environmental Sciences
The Ohio State University
352 W. Dodridge Street
Columbus, OH 43202 USA

Director: William J. Mitsch, Ph.D. (+1 614 292-9774; mitsch.1@osu.edu)
Assistant Director, Li Zhang, Ph.D. (+1 614 292-1098; zhang.326@osu.edu)

34. Bibliographical references:

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

See attached publication list

WEB SITE

<http://swamp.osu.edu/>

ATTACHED MATERIAL

1. Letters of Support
2. Photos
3. Publication list, 1992 – present
4. Maps of proposed Ramsar site
5. Plant Field Guide for the ORWRP

6. 2006 Annual Report for the ORWRP
 7. Policies and Procedures Manual
 8. Reprints of selected scientific papers
 9. Preview of “Rebirth of a River: The Olentangy River Documentary”
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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