

Appendix 1.1: Surveys in Open Wetlands (2015-2016)

Field Work

We determined that limited information has been collected on wetland birds in terms of using standardized methods, particularly in many small and inland (or disconnected) open wetlands that are dominated by herbaceous plants in the LGB&FR AOC. This information gap is largely due to the fact that the Great Lakes Coastal Wetland Monitoring Program (CWMP, 2011-2017, Uzarski et al. 2017; <http://www.greatlakeswetlands.org>) only samples Great Lakes coastal wetlands at least 4 ha in size and that are connected and influenced by a Great Lake (e.g., seiche). Thus, many small, inland, or partially forested wetlands that are still dominated by herbaceous plants within the LGB&FR AOC (e.g., along the Fox River, lower Green Bay) have not been recently surveyed for wetland birds. Thus, Erin Giese and a student assistant, Stephanie Beilke, scouted and identified 13 locations (Figure 1, Appendix 1.1) within the LGB&FR AOC that trained UW-Green Bay students surveyed for wetland birds in the summer of 2015. Two additional points were added along the west shore of the lower Bay and sampled in 2016. Some of these wetland locations were also sampled for anurans ($n = 7$). Once a point count location was established, Giese and a student assistant filled out a Site Description form (one per location), which documents the location's name and geospatial coordinates, safe parking areas, dominant plants, compass bearing (used for repeatability of anuran and wetland bird surveys), property information, and any other helpful notes (Figure 2, Appendix 1.1).

Wetland birds were sampled using the same, widely accepted protocol used for the CWMP, namely a 15-minute, unlimited-distance point count, in which trained observers recorded all birds seen or heard regardless of how far away an individual was calling from the observer (Great Lakes Coastal Wetlands Consortium 2014, pp. 132-136, Uzarski et al. 2017). During the first five minutes of the 15-minute count, an observer listened passively to all birds calling or singing and recorded all species and individuals; during the middle five minutes, a broadcast of bird songs/calls was played to elicit vocalizations from secretive marsh-nesting species (e.g., rails); and finally during the last five minutes, an observer passively listened to all birds vocalizing. All species, number of individuals, and the minute and distance an individual was first detected were recorded on the point count form (Figure 3, Appendix 1.1), though for ten focal species (e.g., rails, bitterns) every minute a focal species vocalized was also recorded. Point count locations were visited twice in the summer (late May through early July 2015; or late May through late June 2016), once in the early morning hours and once in the evening, in order to detect different bird species based on their activity. Visits were separated by at least 15 days. Surveys were conducted during relatively good weather conditions with minimal wind and precipitation. Basic weather information (e.g., cloud cover, wind), air and standing water temperatures, start time, compass bearing, noise level, and geospatial coordinates of point count locations were collected at each survey.

Six UW-Green Bay students (advanced undergraduates or graduates) were trained to conduct wetland bird surveys on 23 and 26 March 2015. Another graduate student was trained to conduct wetland bird surveys on 7 March, 28 March, and 15 April 2016. This student conducted point counts at the two points added in 2016. For safety purposes, surveys were conducted by teams of two students, one conducting the survey itself and the other collecting weather and geospatial information and helping with navigation and operating the broadcast of bird calls. Students who conducted the bird surveys were also required to pass the required, rigorous certification test, as is done for the CWMP (see QAPP section "Personnel, Special Training Requirements, or Certifications").

Data Entry

After the field season, two UW-Green Bay students double entered bird data into a MS Excel spreadsheet created by Giese that employed data validation techniques to minimize data entry error; the two entries were subsequently compared to produce a final, high quality data set (see QAPP "Data Management" for more details on data entry). Accompanying metadata were later added.

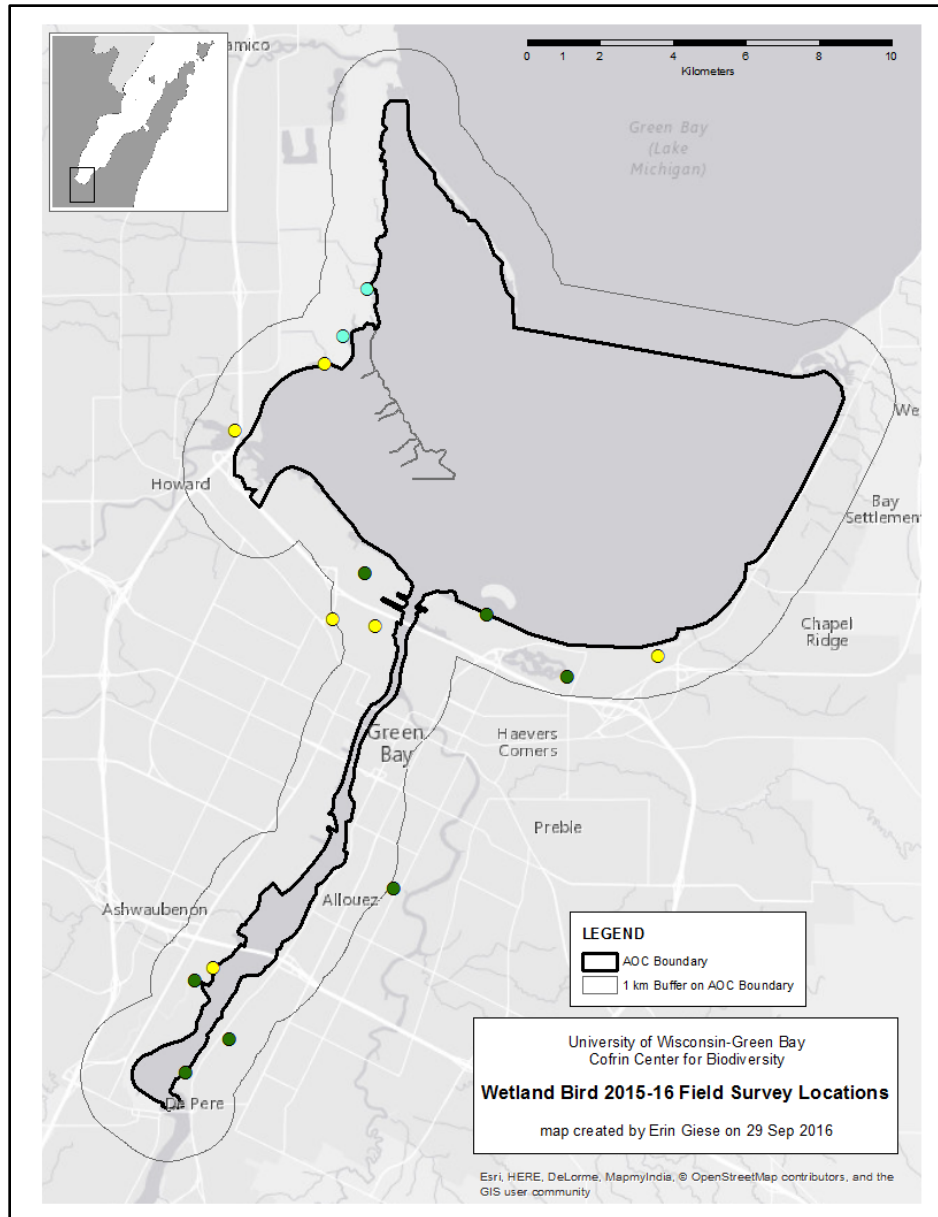


Figure 1. Point count locations (n = 15) positioned in open wetlands primarily dominated by herbaceous plants that were surveyed for wetland birds in the summer of 2015 or 2016. They are located within 1 km of shoreline at Lake Michigan/Green Bay high water level of 177.2 m AMSL in the Lower Green Bay and Fox River Area of Concern in Wisconsin. Points surveyed for both wetland birds and anurans are shown as green dots (n = 7); yellow dots indicate wetland bird-only points surveyed in 2015 (n = 6); light teal dots indicate wetland bird-only points surveyed in 2016 (n = 2). Note that one point in the village of Allouez and one point along the western portion and mouth of the Fox River are located just slightly outside this 1 km buffer (~100-200 m). Basemap sources: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community. Map created in ArcGIS 10.3.1 (Environmental Systems Research Institute 2015).

**Lower Green Bay and Fox River Area of Concern Project
SITE DESCRIPTION**

University of Wisconsin-Green Bay

Site Name	Point Number

Date	Start Visit (depart car)	Arrive at Point	Start Census	Leave Point	End Visit (depart in car)	Observer(s)

Location	Latitude (dd.ddddd)	Longitude (dd.ddddd)	Waypoint #	3D (✓)	Directions / Notes
<i>Car Park</i>					
<i>Survey Point</i>					

Record the bearing here: _____

Site Description (dominant plant species, flowers in bloom, etc.)

Other Notes:

Figure 2. Sample Site Description form filled out for each point count location that documents the location's name and geospatial coordinates, safe parking locations, dominant plants, compass bearing (used for repeatability of anuran and wetland bird surveys), and any other important notes.

LOWER GREEN BAY & FOX RIVER AOC

BIRD MONITORING

Field Data Sheet
2015

broadcast volume at 80dB, checked today

Point ID:
Sample:
Date: / / 2015
Start Time: CDT EDT
Observer:

Weather: Dry Damp/Haze/Fog Drizzle Rain	
% Cloud Cover:	Wind:
Air Temp: °C	Water Temp: °C
Noise:	

Waypt:
Lat:
Lon:

Rec #:

Focal Species record ALL time periods				
AMBI	KIRA	PBGR	COMO	VIRA
AMCO	LEBI	SORA	BLRA	YERA

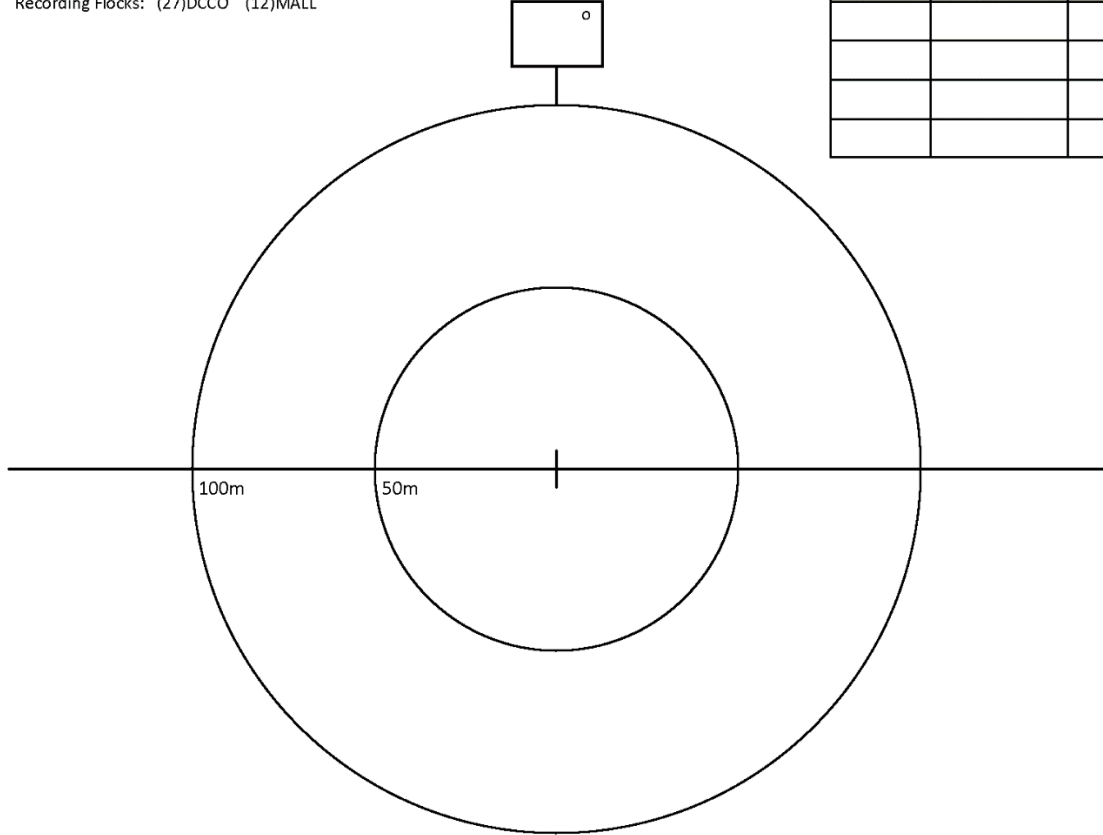
Behavior: NAWA_{singing} NAWA_{calling} -NAWA_{flyover} NAWA_{observed} NAWA_{2 males simultaneous singing} NAWA_H DOWO_{woodpecker drumming}

Time Codes (superscript): 0-1 minutes⁰ 1-2 minutes¹ 2-3 minutes² ... 14-15 minutes¹⁴

Breeding Evidence Codes (subscript): NAWA_{ON}_{occupied nest} NAWA_{CN}_{carrying nest material} NAWA_{NB}_{nest building} NAWA_{DD}_{distraction display} NAWA_{FY}_{feeding young}

Recording Flocks: (27)DCCO (12)MALL

Aerial Foragers (inside & outside 100m)		
species	tally	total



1st data entry (signature): _____

Comments:

2nd data entry (signature): _____

28 May 2015

Figure 3. Sample wetland bird point count data sheet modified from the Great Lakes Coastal Wetland Monitoring Program bird data form (Great Lakes Coastal Wetlands Consortium 2014, p. 136, Uzarski et al. 2017) that was used for summer 2015 field surveys.

Appendix 1.2: Surveys in Non-Open Wetland Habitats (2015)

Field Work

We also identified an information gap on using standardized methods to survey birds in a variety of non-open wetland habitats in the LGB&FR AOC, particularly along the Fox River and west shore, in habitats including forested wetlands, upland forests, isolated forests in suburban areas, early successional forests, old fields, restore oak savanna, shrub-dominated habitats, and riparian habitats. Thus, Erin Giese and a student assistant, Stephanie Beilke, scouted and identified 23 locations (Figure 1, Appendix 1.2) within the LGB&FR AOC that trained UW-Green Bay students surveyed for birds in the summer of 2015. Once a point count location was established, Giese and Beilke filled out a Site Description form (one per location), which documents the location's name and geospatial coordinates, safe parking areas, dominant plants, property information, and any other helpful notes (Figure 2, Appendix 1.1).

Birds were sampled following the methods outlined in Knutson et al. (2008), a widely accepted, western Great Lakes region-wide protocol. Trained observers conduct a 10-minute, unlimited-distance point count by recording all birds seen or heard regardless of how far away an individual was calling from the observer. All species, number of individuals, and the minute and distance an individual was first detected were recorded on the point count form (Figure 2, Appendix 1.2). Each point count location was visited one time in late June or early July 2015. Surveys were conducted during relatively good weather conditions with minimal wind and precipitation. Basic weather information (cloud cover, wind, and air temperature), start time, and geospatial coordinates of point count locations were collected at each survey.

Six UW-Green Bay students (advanced undergraduates or graduates) were trained on how to conduct wetland bird surveys on 23 and 26 March 2015 and also met individually with Giese to further discuss these non-open wetland surveys. For safety purposes, surveys were conducted by a team of two students, in which one student conducted the survey itself and the other student collected the basic weather information, helped with navigation, and collected geospatial coordinates of the point count locations. Students who conducted the bird surveys passed the required, rigorous wetland bird certification test, as is done for the CWMP (see QAPP section "Personnel, Special Training Requirements, or Certifications"), and have been doing bird surveys for many years across many different habitat types in the Great Lakes region using protocols similar to Knutson et al.'s (2008).

Data Entry

After the field season, two UW-Green Bay students double entered bird data into a MS Excel spreadsheet created by Giese that employed data validation techniques to minimize data entry error; the two entries were subsequently compared to produce a final, high quality data set (see "Data Management" for more details on data entry). Accompanying metadata were later added.

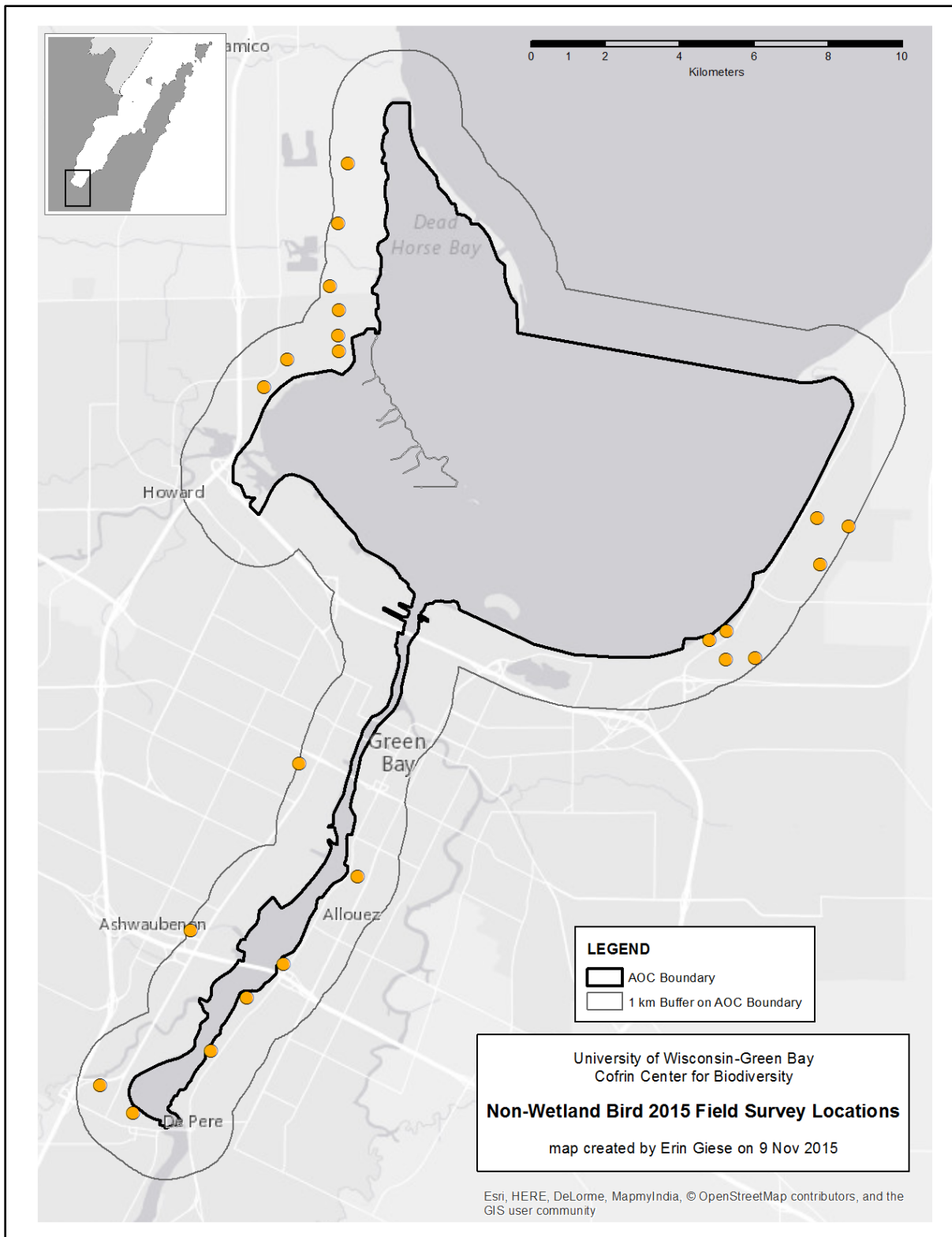


Figure 1. Point count locations (n = 23) positioned in a variety of habitats (e.g., forested wetlands, old fields, upland forest, isolated forests in suburban areas) that were surveyed for birds in the summer of 2015. They are located within 1 km of shoreline at Lake Michigan/Green Bay high water level of 177.2 m AMSL in the Lower Green Bay and Fox River Area of Concern in Wisconsin. Basemap sources: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community. Map created in ArcGIS 10.3.1 (Environmental Systems Research Institute 2015).

Lower Green Bay and Fox River Area of Concern Bird Survey

Point ID			Waypoint ID			Observer		
		20		4		-8		
Month	Day	Year	Time	Latitude	Longitude	Temp. (C)	Wind	Sky

0 = none 0 = < 10% clouds
 1 = 1 - 3 mph 1 = partly cloudy
 2 = 4 - 7 mph 2 = mostly cloudy
 3 = 8 - 12 mph 3 = overcast
 4 = > 12 mph 4 = raining

#	Species Code	Detection Code	Distance	Minute	#	Comments (M or F, etc.)
1				0		
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Audio Recorder

Distance = distance when individual first detected

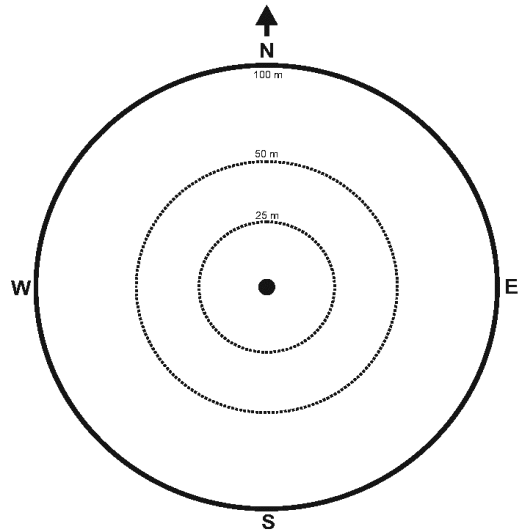
Minute = minute (0-9) when individual first detected # = estimated number of individuals

Detection Code

A = Audio (heard)
 V = Visual (seen)
 B = Both
 F = Fly over

Distance

0 = 0 - 25 m
 1 = 25 - 50 m
 2 = 50 - 100 m
 3 = > 100 m



Notes:

1st data enterer/date _____

2nd data enterer/date _____

Figure 2. Sample bird point count data sheet used for the summer 2015 bird surveys (in non-open wetland habitats) that was modified from bird data forms used at the University of Wisconsin-Green Bay's Cofrin Center for Biodiversity and that is based on the Knutson et al. (2008) protocol.