Wisconsin Marshbird Survey
Instructions Booklet

For more information on marshbirds and the survey protocol described herein, please see the following document (available as .pdf upon request):

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-1. Wildlife Research Report #2009-01. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ.

Please direct questions and comments on marshbird monitoring in Wisconsin to:

Ryan Brady, Survey Coordinator, Wisconsin Department of Natural Resources, 715-685-2933, ryan.brady@wisconsin.gov.

INTRODUCTION

The amount of emergent wetland habitat in North America has decreased sharply during the past century and consequently populations of many marsh-dependent birds such as rails, bitterns, and grebes also appear to be declining. Some species, including King Rail, Yellow Rail, American Bittern and others, are of particular concern and have received special status through various federal and state agencies. In addition, marshbirds generally consume a wide variety of aquatic invertebrates and may be susceptible to environmental contaminants. They also are vulnerable to invasions of wetlands by non-native species (e.g. purple loosestrife). Hence, marshbirds may represent "indicator species" for assessing wetland ecosystem quality, and their presence can be used as one measure of the success of wetland restoration efforts.

Due to their secretive nature, difficult-to-access habitats, and low detectability, we currently lack adequate monitoring programs to determine status and estimate population trends of many marshbird species. As a result, numerous agencies and conservation groups have cooperated in the past decade in attempt to fill this gap and inform management and conservation decisions for these species.

In 2008, the Wisconsin Department of Natural Resources (WDNR) and its partners within the Wisconsin Bird Conservation Initiative (WBCI) joined forces with the U.S. Fish and Wildlife Service to pilot the framework for a national marshbird monitoring program. The overarching goals of the program are to:

(1) estimate population trends for all marshbird species,

(2) inform habitat management decisions at multiple scales, and

(3) provide status data for harvested marshbird species such as coots, moorhens, and some rails.

Marshbird surveys have been conducted annually using the standardized protocols described in this booklet at pre-determined, randomly-selected survey points within wetlands

throughout Wisconsin. These surveys continue to date, and results from the pilot study will be used to modify the sampling design, improve program implementation, and provide baseline data for marshbirds in Wisconsin. Meanwhile, other states across the region and country have joined the effort, including Michigan, Ohio, Missouri, Idaho, New York, Florida, Kentucky, and others!

METHODS

Site Selection

Wetland points to be surveyed were randomly selected from the Wisconsin Wetland Inventory, a wetland mapping project by WDNR. Specific wetlands or known marshbird hotspots were not specifically targeted. Points also were not placed into "routes" but rather occur randomly across the landscape. As a result, ***although fewer marshbirds may be detected and fewer points surveyed, these data will most accurately reflect the true status and trends of Wisconsin's marshbird populations***.

Survey points occur in clusters statewide. Most clusters include 5-10 survey points, which is roughly the number of points that can be surveyed in a single outing based on this selection procedure. Adjacent points generally will be no closer than 400 meters apart and some may be several kilometers from their nearest neighbor. Most can be conducted on foot but some will require boat or canoe access. Most surveys are conducted on publicly-accessible lands, but some private lands are included. Survey points will NOT be permanently marked with flagging or posts but maps, GPS units, and GPS coordinates will be provided to each observer. *It is highly recommended that all surveyors visit their survey points prior to actually conducting surveys.*

Each observer will survey ~5-10 predetermined wetland points separated by 400 meters to several kilometers. Points will not be flagged and are found using provided GPS units.

Timing of Surveys

Time of Year

Peak marshbird calling activity occurs during the courtship and egg-laying period in spring and early summer. Thus we will be conducting all surveys in May and June. The survey window will differ slightly for northern versus southern Wisconsin. In northern Wisconsin, separated roughly by a line including Polk, Taylor, and Oconto counties northward, surveys should be conducted between May 15 and June 30. In "southern" Wisconsin, (i.e. St. Croix, Marathon, and Kewaunee counties southward), surveys should be conducted between May 1 and June 15.

Ideally, three (3) surveys should be conducted annually at each survey point. This will help confirm presence/absence of most species with 90% certainty and provide data on calling activity throughout the season. However, if an observer can only conduct two surveys in a season, this is acceptable and the data will still have great value. Each of the 3 replicate surveys should be conducted during a 10-day window, and each 10-day window is separated by 7 days.

In southern Wisconsin, the first survey should be conducted between May 1-10, the second survey between May 17-27, and the third from June 3-13. In northern Wisconsin, the first survey should be conducted between May 15-25, the second survey between June 1-11, and the third from June 18-28. Try to maintain 2 weeks between each replicate survey. Follow these guidelines as closely possible but if you must digress slightly, doing so is better than not conducting a survey at all.

Conduct 3 surveys annually, each during a 10-day window, with each window separated by one week and each replicate survey separated by two weeks, if possible.

- Southern Wisconsin Survey Period = May 1 – June 15
- Northern Wisconsin Survey Period = May 15 – June 30

Time of Day

Survey points may be surveyed in either the morning or evening. Morning surveys begin 30 minutes before sunrise (at first light) and should be completed by 3 hours after sunrise (e.g., 0500-0830 h if sunrise at 0530). Evening surveys begin 3 hours before sunset and must be completed by dark (don't forget your headlamp or flashlight!). Marshbirds are typically most vocal in the 2 hours surrounding sunrise and sunset. It is acceptable to conduct replicate surveys at different times of day (i.e. survey #1 in the morning and then surveys #2 and #3 in evening). Look up local sunrise/sunset times at http://aa.usno.navy.mil/data/docs/RS_OneYear.php or other internet resources.

Conduct each survey in the morning 30 minutes before to 3 hours after sunrise OR in the evening 3 hours before to 30 minutes after sunset.

<u>Suitable Weather Conditions</u>

Surveys should only be conducted when wind speed is <20 km/hr (12 mph) and not during periods of sustained rain or heavy fog. Participants should postpone surveys if they believe winds are affecting probability of marsh birds calling or being detected. If wind speed increases to above 20 km/hr during the survey (or sustained rain begins while the survey is already underway), participants should stop the survey and repeat the entire survey route another day (i.e. don't just go back and repeat the remaining points on the route). These constraints will require that you be flexible with your survey schedule and watch the weather forecasts closely.

Conduct surveys only when no steady rain or heavy fog and winds are less than 12 mph.

Primary and Secondary Target Species

Primary target species:

Yellow Rail	American Bittern
Sora	American Coot
Virginia Rail	Common Moorhen
King Rail	Pied-billed Grebe
Least Bittern	Wilson's Snipe*

Secondary target species:

Red-necked Grebe	Swamp Sparrow
Black Tern	Le Conte's Sparrow
Forster's Tern	Yellow-headed Blackbird
Marsh Wren	Sandhill Crane*
Sedge Wren*	

With exceptions of rare birds (use your judgment), these are the only species that should be recorded on data sheets. While it may be tempting to record all species heard at a given survey point, doing so may cause you to overlook some of the target species, which will negatively affect survey results. Many other species you will encounter (e.g. Red-winged Blackbird) are adequately monitored by other surveys. Please do not focus your efforts on detecting or counting these species.

Record only primary and secondary target species on your data sheets. Do not spend time counting Red-winged Blackbirds and other species not listed as targets.

Field Survey Protocol

Surveys at each point consist of two parts, including an initial 5-minute passive listening period followed by successive 1-minute segments of broadcast calls for certain target species. Each 1-minute broadcast segment consists of 30 seconds of pre-recorded vocalizations and 30 seconds of silence. In southern Wisconsin, six species are included in the call-broadcast (Least Bittern, Yellow Rail, Sora, Virginia Rail, King Rail, and American Bittern), while only five species are included for northern Wisconsin (all of the above except King Rail). Thus, each point at southern Wisconsin sites is surveyed for 11 minutes, while each point in northern Wisconsin is surveyed for 10 minutes.

Pre-recorded calls are broadcasted using the provided mp3 player and portable speaker set. It is very important that you NOT use a different setup for these broadcasts, no matter how much louder other setups may seem to be, as this will affect standardization of the survey effort. Additionally, it is very important that you use the provided 10- or 11-minute sequence and not play species clips individually using different audio files.

The broadcast player should be placed upright on the ground or on the bow of the boat. If the ground is wet, place the speaker on an object as close to the ground as possible. Point the speaker toward the center of the wetland and do NOT change/rotate the speaker's position during the call-broadcast survey. Speakers should be pointed in the same direction for all replicate surveys. In situations, where the "center" of the wetland is not obvious, observers should record the general compass direction (N, NW, SE, WSW, etc.) in which they pointed the speaker. Observers should stand 2 m to one side of the speaker (standing too close can reduce your ability to hear responses).

All surveys should be conducted by a single observer. If more than one individual is present, only the primary observer should contribute to data collection. If additional observers wish to conduct simultaneous surveys, they should record data on separate data sheets as if conducting entirely <u>independent</u> surveys. All surveys are unlimited-radius point counts, i.e. record all target birds detected at a survey point regardless of their distance from that point.

All surveys are single-observer, unlimited-radius point counts. In southern Wisconsin, each point is surveyed for 11 minutes, including a 5-minute passive listening period followed by 1-minute call-broadcast segments for each of 6 target species. In northern Wisconsin, each survey lasts only 10 minutes, including 5 passive minutes and then call-broadcast for only 5 species. Place the broadcast speakers on or near the ground and point toward the center of the wetland to be surveyed.

For primary target species, each individual bird detected during the survey period will be entered on a separate line on the field data form. Observers should record when each individual is detected, i.e. during any of the initial 1-min passive segments and/or during any of the 1-min call-broadcast periods. Observers do not record the number of times a bird responded during each segment. Simply record if the individual was detected during each of the 1-minute segments of the survey. Recording all the segments during which an individual bird is detected is extremely important so that we can determine whether call-broadcast is effective at eliciting additional responses for each of the primary species. These data will help us determine whether or not to use call-broadcast of all primary species during surveys in future years. Moreover, recording whether each individual responds during each 1-min sub-segment allows us to estimate detection probability using capture-recapture models. Estimates of detection probability are essential for regional/national monitoring efforts so that we can determine how well the count data index true population size/trends. Hence, observers must make a decision as to whether each vocalization heard at a survey point is a new individual for that point or an individual that vocalized previously during the current survey from that survey point.

Some areas or some survey points within a survey area will have so many marsh birds calling that observers will find it impossible to record each sub-segment during which each individual bird is detected. For example, an observer may see/hear >20 American Coots at one survey point. In these situations, simply write down an estimate of the total number of individuals detected for that particular species during the entire survey period on one line of the data sheet (e.g., write "23 AMCO" on one line of the data sheet).

All target species are recorded on a line-by-line basis on the data sheet (i.e. one individual bird per row). If species are too abundant to track individually (e.g. American Coots on some occasions), then simply writing the species name and a total number is acceptable.

Observers should also estimate the distance from each individual bird to the survey point. Estimate distance to each bird when the bird is first detected (birds will approach the call-broadcast so observers need to record the distance to the bird when the bird was first detected). Recording distance to each individual will allow us to use distance sampling to estimate density for each species in each survey area. Estimating the distance to some individual birds will involve some uncertainty, so observers are encouraged to practice their estimating skills using objects of known distance. The provided GPS units are good tools for measuring distances to stationary objects.

For secondary species, each individual bird detected during the survey period should be entered on a separate line on the data sheet. Then, rather than estimate an exact distance for each individual (as you will for primary species) you should place each bird into one of three distance bins, i..e. <50 meters, 50-100 m, >100 m, based on when you FIRST detected the bird. This will simplify the distance estimation but maintain adequate value of the data. Lastly, you should mark the FIRST (and only the first) minute in which you detected that individual. Unlike with primary species, you do NOT need to mark every minute in which you detect the secondary species (just the first minute of detection!). This may seem complex at first but you'll find with practice that it's rather straightforward.

For secondary species, (1) record each individual bird on a separate line, (2) mark only the FIRST minute of detection for each bird, and (3) record a distance category (<50 meters, 50-100 m, >100 m) for each individual detected.

FILLING OUT THE DATA SHEET

Bird Data

Date: Indicate the date of the survey. Use separate data sheets for different dates.
Site # and Name: Write the number and name associated with your survey site. These should be provided with your maps and/or other survey materials.
Observer: Provide the name of the individual conducting the survey.
Survey replication #: Indicate if this is the first, second, or third survey of the year for this site.
Temperature: Use a thermometer or local weather station to determine temperature at the start and end of your survey outing.
Wind speed: Categorize wind speed based on the Beaufort scale below.

Beaufort #	Wind Speed in km/hr (mph)	Indicators of Wind Speed
0	< 2 (< 1)	Smoke rises vertically
1	2 to 5 (1 to 3)	Wind direction shown by smoke drift
2	6 to 12 (4 to 7)	Wind felt on face, leaves rustle
3	13 to 19 (8 to 12)	Leaves, small twigs in constant motion
4	20 to 29 (13 to 18)	Raises dust/loose paper, small branches move
5	30 to 38 (19 to 24)	Small trees in leaf sway

Cloud cover: Estimate % of sky covered by clouds (0% = clear, 100% = overcast).
Precipitation: Indicate as light rain, rain, heavy rain, light snow, heavy snow, fog, or none.

Point #: List the survey point number as given on your GPS unit (e.g., "0-1620N").
Start time: Write the start time for the survey point using military time notation (to avoid confusion between AM and PM surveys).
Background noise: Indicate the level of background noise using the codes given on the bottom of the data sheet.
Species: Write the full name of the species or use the codes given below.

Primary species	Code	Secondary species	Code
Yellow Rail	YERA	Red-necked Grebe	RNGR
Sora	SORA	Black Tern	BLTE
Virginia Rail	VIRA	Forster's Tern	FOTE
King Rail	KIRA	Marsh Wren	MAWR
Least Bittern	LEBI	Sedge Wren	SEWR
American Bittern	AMBI	Swamp Sparrow	SWSP
American Coot	AMCO	Le Conte's Sparrow	LCSP
Common Moorhen	COMO	Yellow-headed Blackbird	YHBL
Pied-billed Grebe	PBGR	Sandhill Crane	SACR
Wilson's Snipe	WISN		

Responded during: Put a "1" in each column (i.e. minute segment) in which that individual is detected based on vocalizations and put an "S" in each column in which the individual is seen (including flyovers). If the individual is both heard and seen, put a "1S" in that column. Thus if a single Virginia Rail calls during minute 2 and then again in response to its species' call-broadcast during minute 9, then for that row a "1" should be recorded only for columns "Pass 1-2" and "VIRA 8-9". If a new individual of the same species or a different species is also detected, start a new row for this new individual and use the same recording method.

Call types: For primary species only, record the call type(s) detected to the best of your abilities. This can help us learn more about breeding chronology, observer bias, detection probability, and more. See the descriptions below.

- Least Bittern: *coo-coo* (male advertisement/territorial), *kak-kak-kak* (when feeding young), *ank* or *ert* (given when flushed)
- Yellow Rail: *click-click* (in series, primary call), *wheese* (female call), *descending cackle* (pair maintenance), *squeak* (given by retreating bird)
- Sora: *whinny* (territorial defense and mate contact), *per-weep* (advertisement), *keep* (contact call)
- Virginia Rail: *grunt* (pair contact, territorial call), *tick-it* (male advertisement call), *kicker* (female advertisement call), *kiu* (sharp call, contact among individuals)
- King Rail: *kek-burr* (territorial), *grunt* (territorial), *kek-kek-kek* (mating call)
- American Bittern: *pump-er-lunk* (territorial/advertising), *chu-peep* (given during copulation ceremony), *kok-kok-kok* (given when flushed)
- Common Moorhen: *wipeout* (territorial/advertising), *giddy-up* (territorial/advertising), *beep* (communication between pairs), *squawk, yelp, cluck*
- American Coot: *burr-up* (territorial/advertising), *hic-up* (territorial/advertising), *cackle* (communication between pairs), *honk* (social interactions), various other calls
- Pied-billed Grebe: *owhoop* (primary territorial call), *hyena* (pair formation/territorial), *quaa-aaa-aaa* (wavering, guttural copulation call), *kwah* (alarm call), *ek-ek-ek* (rapid, staccato greeting call)
- Wilson's Snipe: *tuk-tuk-tuk* (harsh call usually given from ground), winnowing *hu-hu-hu* (hollow sound given during flight display), rasping *scaipe* (given when flushed)

Distance: For primary species, estimate the exact distance to the bird when it was FIRST detected, to the nearest five meters. If the bird is any distance more than 200 meters from the survey point, simply write ">200" in this column. For secondary species, place each bird into one of three distance bins: <50 meters, 50-100 m, >100 m.

Direction: Mark a slash on the oval to indicate in what direction you heard the individual bird. This column is for your personal use to more easily keep track of individuals when several of a single species are detected at a survey point.

Comments: Provide comments as desired. Some examples of information to include here are: (1) total number of individuals for species that couldn't be tracked individually, (2) whether the listed individual was detected at an earlier point (e.g., an American Bittern detected at the current point also was heard at a previous point), and (3) detections of target marshbirds before or after the survey period at a point or while walking between points.

Note: The number of lines filled out on the data sheet will differ among survey points and will correspond to the total number of individual target marshbirds detected at each point. If no marshbirds are detected at a survey point, record the point number, starting time, and background noise and then write "No birds" in the comment column. This will help you keep track of what survey point you are on and which ones you have completed.

Habitat Data

Record habitat data for each survey point on the provided data sheet. This information will assist analyses, describe species-habitat relationships, inform habitat management/conservation decisions, and perhaps explain observed changes in marshbird populations. Assess habitat at each point after conducting the 10- or 11-minute survey. Record habitat information on all visits if possible as habitat may change throughout the survey season. All habitat data should pertain to the area defined within a 100-m radius circle from each survey point (but remember to count birds at unlimited distances).

Date of Habitat Assessment: Record the date in which you collected the habitat data.
Point #: Record the survey point number (e.g., 0-1160N)
% wetland: Record percent of area within 100-m radius circle that is actually wetland
% cover of major wetland habitats: Record % of area within 100-m radius circle in each of the five wetland categories. Do not assess upland components.
Most dominant herbaceous plant type and %: Record the most dominant emergent wetland vegetation and what % of the 100-m radius circle this type covers (e.g., 60% cattail).
Second dominant herbaceous plant type and %: As above but for the second most dominant wetland plant type (e.g., 20% sedges). The two dominants do not have to add up to 100%.
Comments: Record any pertinent notes about the habitat at a survey point (e.g., water levels, recent management actions, general description, etc.).

Equipment Provided to Observers

1) Instructions booklet
2) Data sheets
3) Volunteer effort form*
4) Survey site map
5) GPS receiver
6) Mp3 player with audio files
7) Portable speaker system
8) Extra batteries

*Each volunteer should keep track of the miles traveled and hours spent on all activities related to the Wisconsin Marshbird Survey. Record the type of activity (scouting, surveying, etc.) in the "Purpose of effort" column. This form should be returned with data sheets at the end of the season.

Other Equipment to Bring into the Field

1) Waterproof footwear – depending on the weather and survey point location, knee-high rubber boots or hip waders may be needed
2) Rain pants and/or rain gear – for dew-laden mornings or when rain threatens
3) Flashlight/headlamp – for getting into or out of survey area in the dark
4) Thermometer – to record the temperature at the start/end of your survey
5) Watch/clock – to record start times and stay within designated survey times

6) Clipboard with pencils (if using pen, make sure it is waterproof)
7) Snacks and water
8) Bug spray and/or head net
9) Binoculars
10) Float cushion (?) – to place broadcast equipment on if surveying in standing water

Upon Completion of the Third or Final Survey

Return your data sheets and volunteer effort form to: Ryan Brady, Wisconsin Department of Natural Resources, 2501 Golf Course Road, Ashland, WI 54806.

Contact Ryan Brady at 715.685.2933, or ryan.brady@wisconsin.gov, for direction on what to do with your GPS unit, mp3 player, and/or portable speakers. In most cases, I will have you keep your equipment if you are confident you will participate again next year. However, I have limited GPS units and if you borrowed one from WBCI I may need it for other survey work.

THANK YOU

And last but not least, we cannot thank you enough for your participation in the Wisconsin Marshbird Survey. Without your volunteer efforts, surveys such as this simply would not be possible. This study marks an important and groundbreaking effort that will help pave the way for the future of marshbird monitoring, management, and conservation in Wisconsin and beyond. Thank you for your patience and for being part of this grand experiment!