

Chapter 2
WATERBIRD PLAN



OHIO BIRD



**CONSERVATION
INITIATIVE**

BACKGROUND

This chapter is based on the Upper Mississippi River and Great Lakes Region Joint Venture (UMRGLRJV) Waterbird Habitat Conservation Strategy (Soulliere et al. 2007):

http://www.uppermissgreatlakesjv.org/docs/zzUMRGLR_JV_WaterbirdHCS.pdf

We have included information from the JV plan that is most applicable to Ohio and summarize Joint Venture (JV) efforts to “step-down” continental waterbird conservation priorities to the JV region and have initiated step-down to a smaller scale, the state of Ohio. This will ultimately provide conservationists guidance in effectively increasing landscape carrying capacity through the protection, restoration, and enhancement of waterbird habitats. We have summarized where, what, when and how much habitat is needed to increase and sustain populations of priority waterbird species at target levels.



Great blue heron, Photo: ODNR Div. of Wildlife

near future will cover species missed in the first draft - secretive marshbirds, loons, and cranes. The UMGLJV regional waterbird conservation plan (Wires et al., in review) summarizes waterbird conservation and management, habitat preferences, population trends, and population estimates.

The term “waterbird” refers to colonial nesting birds (herons, egrets, terns, gulls and cormorants), secretive marshbirds (rails, bitterns and cranes), and loons and grebes that are most often associated with wetland and open-water habitats. These species vary in their social behavior from being mostly solitary and secretive (e.g. King Rail) to semi-colonial (Green Heron), and colonial (e.g. Great Blue Heron). Marshbirds tend to be difficult to observe; they only venture out of extremely dense vegetation while foraging. Colonial waterbirds are on the opposite spectrum; these birds form large colonies while nesting or roosting and are often very conspicuous. Roosts and breeding colonies are usually placed on islands to reduce predation and competition. Colonies are frequently found near important foraging sites.

A national waterbird conservation plan, called the Waterbird Conservation Plan for the Americas (Kushlan et al. 2002), was written to summarize status and threats to North American waterbird species. The first version of this plan only covered colonial and semi-colonial waterbirds but the second version that is due out in the

Ohio provides habitat for many species of waterbirds (see Table 1). The most productive area for waterbirds in Ohio is within the marshes of the Western Lake Erie basin, an area that was once the Great Black Swamp. The islands in Lake Erie shelter nesting colonies of wading birds, gulls and cormorants. Also, many species spend the non-breeding season along the shores of Lake Erie while some species are here only during migration. Although many of Ohio’s wetlands have been drained and converted to agriculture, some of the areas that remain are home to secretive marshbirds and other waterbirds.

Table 1. Seasonal occurrence, relative abundance, and nesting strategy of waterbirds within Ohio listed by Bird Conservation Region (BCR). Data largely taken from the Upper Mississippi Valley / Great Lakes Regional Waterbird Plan (Wires et al., in review) and Soulliere et al. (2007).^a

| Species ^b | Lower Great Lakes / St. Lawrence Plain (BCR 13) | Eastern Tall Grass Prairie (BCR 22) | Central Hardwoods (BCR 24) | Nesting Strategy ^c |
|----------------------------------|---|---|----------------------------------|----------------------------------|
| Red-throated Loon | w, m | m | m | N |
| Common Loon | w, M | M | w, m | N |
| Pied-billed Grebe | B, w | B, w | b, w | N |
| Horned Grebe | w, M | w, M | w, m | N/C |
| Red-necked Grebe | w, m | w, m | - | N/C |
| Eared Grebe | m | m | - | C/N |
| American White Pelican | m | m | m | C |
| Double-crested Cormorant | B | B, w, M | w, m | C |
| American Bittern | <i>b, m</i> | <i>b, m</i> | <i>b, m</i> | N |
| Least Bittern | <i>b, m</i> | <i>b, m</i> | <i>b, m</i> | N/C |
| Great Blue Heron | B, w, m | B, w, m | b, w, m | C |
| Great Egret | b, m | B, m | m | C |
| Snowy Egret | m | b, m | m | C |
| Little Blue Heron | m | b, m | m | C |
| Cattle Egret | m | b, m | m | C |
| Green Heron | <i>B</i> | <i>b</i> | <i>b</i> | N/C |
| Black-crowned Night-Heron | <i>b, w</i> | <i>b, w</i> | <i>b, w</i> | C |
| Yellow-crowned Night-Heron | <i>b, w</i> | <i>b, m</i> | <i>b, m</i> | C |
| Yellow Rail | <i>m</i> | <i>m</i> | <i>m</i> | N |
| Black Rail | <i>m</i> | <i>b, m</i> | <i>m</i> | N |
| King Rail | <i>b, m</i> | <i>b, m</i> | <i>m</i> | N |
| Virginia Rail | b, w | b, m, w | w, m | N |
| Sora | b | b, m | b, m | N |
| Common Moorhen | b, m | b, m | b, m | N |
| American Coot | b, w, m | b, w, m | b, w, m | N |
| Sandhill Crane | b, m | b, m | m | N |
| Whooping Crane | <i>m</i> | <i>m</i> | - | N |
| Parasitic Jaeger | <i>m</i> | <i>m</i> | - | C/N |
| Franklin's Gull | <i>m</i> | <i>m</i> | <i>m</i> | C |
| Bonaparte's Gull | <i>w, m</i> | <i>w, m</i> | <i>w, m</i> | C |
| Ring-billed Gull | b, w, m | b, w, m | w, m | C |
| Herring Gull | b, w, m | b, w, m | w, m | C |
| Great Black-backed Gull | m, w | m, w | - | C |
| Sabine's Gull | <i>m</i> | <i>m</i> | <i>m</i> | C |

Table 1. Continued.

| Species ^b | Lower Great Lakes / St. Lawrence Plain (BCR 13) | Eastern Tall Grass Prairie (BCR 22) | Central Hardwoods (BCR 24) | Nesting Strategy ^c |
|--------------------------|---|---|----------------------------------|----------------------------------|
| Thayer's Gull | w | w | - | C |
| Iceland Gull | w | w | - | C |
| Lesser Black-backed Gull | w | W | - | C |
| Glaucous Gull | w | w | - | C |

| | | | | |
|--------------------|----------|-------------|----------|-----|
| Little Gull | w | w | - | C |
| Caspian Tern | <i>m</i> | m | <i>m</i> | C |
| Common Tern | b | b, <i>m</i> | <i>m</i> | C |
| Forster's Tern | m | <i>m</i> | <i>m</i> | C |
| Least Tern | M | m | m | C/N |
| Black Tern | b | b, <i>m</i> | <i>m</i> | C |

^a Seasonal occurrence and relative abundance categories: B = Breeding, M = Migration, W = Wintering.

B, M, W = high concentrations, Ohio is very important to the species relative to most other regions; B, M, W = common or locally abundant, Ohio is important to the species; b, m, w = uncommon to fairly common, Ohio is within species range but species occurs in low abundance relative to other states; *b, m, w* = status as a breeder, migrant, or wintering birds is known, but abundance relative to other states is not known for the BCR.

^b Bold names are focal species selected for habitat planning and monitoring emphasis (Soulliere et al. 2007); Yellow Rail is considered focal species in the UMRGLRJV, but not for OBCI.

^c Nesting strategy includes colonial (C) and non-colonial (N), or both (C/N); when the degree of coloniality varies, the most typical behavior is listed first.

Population Trends

Using standardized survey protocols for marsh birds, the National Marsh Bird Monitoring Program (NMBMP) has been collecting data in coastal wetlands around the Great Lakes since 1995 (Conway 2004). Data collected by the NMBMP suggest significant basin-wide population declines in some marsh-breeding birds since the start of the program, including Pied-billed Grebe, American Bittern, Least Bittern, Sora, Virginia Rail, Common Moorhen, and Black Tern (Crewe et al. 2005). Species that depend on emergent wetlands appear to be declining, especially in those areas that have a high human populations or agricultural development. However, some species such as Double-crested Cormorant and Ring-billed Gull have increased so much that they are considered nuisances in some areas. Long term (1966-2005) data on population trends for waterbird species that breed within the UMRGLRJV are provided by the North American Breeding Bird Survey (Table 2; Sauer et al. 2006).

PLANNING FRAMEWORK

The UMRGLRJV Waterbird Habitat Conservation Strategy Plan (Soulliere et al. 2007) used the Partners in Flight “five element process” to design landscapes to meet regional bird conservation objectives (Will et al. 2005). The five elements include: 1) landscape characterization and assessment, 2) bird population modeling, 3) conservation opportunities assessment, 4) landscape design and 5) monitoring and evaluation. Soulliere et al. (2007) identified population status and goals for all breeding waterbirds in the JV, but ultimately used a focal species approach for conservation planning with each species representing a different community type.

Table 2. Long term (1966-2005) and short term (1996-2005) population trend estimates (annual % change) for waterbird species that breed within FWS Region 3^a based on the North American Breeding Bird Survey (BBS, Sauer et al. 2006). These data are from entire UMRGLRJV region and are not Ohio specific.

| Species ^b | 1966-2005 | | | 1996-2005 | | |
|----------------------------------|-----------|----------------------|----------------|-----------------|---------|-----|
| | Trend | p-value ^c | n ^d | Trend | p-value | n |
| Pied-billed Grebe | -2.7 | 0.07 | 86 | -6.5 | 0.37 | 31 |
| Double-crested Cormorant | 6.0 | 0.11 | 58 | -11.2 | 0.06 | 33 |
| American Bittern | -5.0 | 0.00 | 116 | 6.7 | 0.28 | 42 |
| Least Bittern | -6.8 | 0.25 | 6 | na ^e | na | na |
| Great Blue Heron | 3.1 | 0.00 | 542 | -1.2 | 0.22 | 438 |
| Great Egret | 9.7 | 0.00 | 61 | 11.4 | 0.05 | 39 |
| Snowy Egret | na | na | na | na | na | na |
| Little Blue Heron | -0.5 | 0.91 | 11 | -1.4 | 0.53 | 7 |
| Cattle Egret | 2.6 | 0.33 | 11 | -8.2 | 0.31 | 8 |
| Green Heron | -0.7 | 0.21 | 399 | 0.1 | 0.93 | 239 |
| Black-crowned Night-Heron | 0.9 | 0.50 | 28 | -7.6 | 0.43 | 8 |
| Yellow-crowned Night-Heron | -5.2 | 0.20 | 3 | na | na | na |
| King Rail | na | na | na | na | na | na |
| Virginia Rail | -3.2 | 0.11 | 19 | 43.3 | 0.12 | 2 |
| Sora | -2.5 | 0.10 | 86 | -3.6 | 0.39 | 32 |
| Common Moorhen | 10.6 | 0.44 | 11 | na | na | na |
| American Coot | -5.5 | 0.00 | 44 | -5.4 | 0.27 | 11 |
| Sandhill Crane | 9.7 | 0.00 | 121 | 5.9 | 0.00 | 115 |
| Ring-billed Gull | 3.8 | 0.16 | 114 | -1.1 | 0.57 | 70 |
| Herring Gull | -5.7 | 0.02 | 49 | 5.0 | 0.73 | 26 |
| Caspian Tern ^f | -14.8 | 0.05 | 6 | na | na | na |
| Common Tern | na | na | na | na | na | na |
| Forster's Tern ^f | 3.8 | 0.22 | 9 | 14.5 | 0.10 | 4 |
| Black Tern | -5.6 | 0.00 | 76 | 3.6 | 0.52 | 25 |

^a FWS Region 3 includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin.

^b Bold names are focal species selected for habitat planning and monitoring emphasis (Soulliere et al. 2007); Yellow Rail is considered focal species in the UMRGLRJV, but not for OBCI.

^c p-values represent confidence in trend direction with values closer to 0.0 reflecting a greater degree of confidence in the trend; for example, values <0.05 reflect >95% confidence in trend direction.

^d n = number of BBS routes used to generate regional trend average; results based on fewer than 20 BBS routes may be unreliable as a regional indicator of population trend.

^e na = inadequate survey data to generate a trend estimate.

^f indicates species that are non-breeders in Ohio.

POPULATION GOALS

Population estimates derived by the UMRGLRJV were used to generate population deficits (population goal – current population estimate = population deficit and habitat conservation objectives) (Table 3). Unlike other national conservation plans the National Waterbird Conservation Plan did not provide national population goals, instead the UMRGLRJV used regional goals provided in the Upper Mississippi Valley / Great Lakes Waterbird Conservation Plan (Wires et al., in review). Species population goals that were not in the UMRGLRJV plan were derived from state atlas data, survey data or expert opinion.

Table 3. Population estimates, goals, and deficits by Bird Conservation Region for waterbirds that breed in the UMRGLRJV, including BCRs within Ohio.

| Species | BCR | Ohio estimate | UMRGLRJV estimate | UMRGLRJV goal | UMRGLRJV deficit |
|-----------------------------------|-----|---------------|-------------------|---------------|------------------|
| Pied-billed Grebe | 13 | 56 | 56 | 84 | 28 |
| | 22 | 154 | 1,194 | 1,791 | 597 |
| | 24 | na | 72 | 108 | 36 |
| | 28 | 4 | 4 | na | na |
| Double-crested Cormorant | 13 | na | 7,844 | | |
| | 22 | na | 8,296 | | |
| American Bittern | 13 | 10 | 10 | na | na |
| | 22 | 12 | 112 | 224 | 112 |
| | 24 | 0 | 14 | 28 | 14 |
| Least Bittern | 13 | 35 | 35 | 53 | 18 |
| | 22 | 100 | 1,230 | 1,845 | 615 |
| | 24 | na | 55 | 83 | 28 |
| | 28 | 35 | 35 | 53 | 18 |
| Green Heron | 22 | na | 55,500 | | |
| | 24 | na | 10,336 | | |
| Great Blue Heron | 22 | na | 86,660 | | |
| | 24 | na | 9,442 | | |
| Great Egret | 22 | na | 12,475 | | |
| | 24 | na | 879 | | |
| Snowy Egret | 22 | na | 300 | | |
| | 24 | na | 190 | | |
| Little Blue Heron | 22 | na | 1,450 | | |
| | 24 | na | 559 | | |
| Cattle Egret | 22 | na | 2,040 | | |
| | 24 | na | 4,402 | | |
| Black-crowned Night- Heron | 13 | na | 654 | 981 | 327 |
| | 22 | na | 3,100 | 4,650 | 1,550 |
| | 24 | na | 333 | 500 | 167 |

Table 3. Continued.

| Species | BCR | Ohio estimate | UMRGLRJV estimate | UMRGLRJV goal | UMRGLRJV deficit |
|-----------------------------|-----|---------------|-------------------|---------------|------------------|
| Yellow-crowned Night- Heron | 22 | na | 600 | 900 | 300 |
| | 24 | na | 656 | 984 | 328 |
| Black Rail | 13 | 0 | 0 | na | na |
| | 22 | 2 | 36 | 54 | 18 |
| | 24 | 0 | 8 | 12 | 4 |
| | 28 | 0 | 0 | na | na |
| King Rail | 13 | 0 | 4 | 6 | 2 |
| | 22 | 30 | 230 | 460 | 230 |
| | 24 | na | 21 | 42 | 21 |
| Virginia Rail | 13 | | 160 | | |
| | 22 | | 572 | | |
| | 24 | na | 16 | | |
| | 28 | | 12 | | |
| Sora | 13 | | 1,117 | 1,676 | 559 |
| | 22 | | 3,950 | 5,925 | 1,975 |
| | 24 | na | 19 | | |
| Common Moorhen | 13 | 400 | 400 | | |
| | 22 | 230 | 1,860 | | |
| | 24 | na | 80 | | |
| | 28 | 30 | 30 | | |
| American Coot | 13 | 25 | 25 | | |
| | 22 | 400 | 1,545 | | |
| | 24 | na | 110 | | |
| | 28 | 5 | 5 | | |
| Sandhill Crane | 22 | | 300 | | |
| Ring-billed Gull | 13 | | 117,232 | | |
| | 22 | | 112,762 | | |
| Herring Gull | 13 | | 4,428 | | |
| | 22 | | 7,192 | | |
| Common Tern | 13 | | 1,426 | 2,139 | 713 |
| | 22 | | 240 | 360 | 120 |
| Black Tern | 13 | | 465 | 698 | 233 |
| | 22 | | 100 | 150 | 50 |

^aPopulation goals and deficits are included only for species identified as “high” conservation status in continental and regional conservation plans (Soulliere et al. 2007).

^bBold names are focal species selected for habitat planning and monitoring emphasis (Soulliere et al. 2007); Yellow Rail is considered focal species in the UMRGLRJV, but not for OBCI.

FOCAL SPECIES, HABITAT GOALS, AND OBJECTIVES

Focal Species



Yellow rail, Photo: ODNR Div. of Wildlife

The UMRGLRJV chose five focal species (Black-crowned Night-Heron, Yellow Rail, King Rail, Common Tern, and Black Tern) as the basis for their biological models and habitat objectives. The focal species are found in manageable numbers, breed in the JV and have enough data to allow for proper management. These focal species are representatives of the major habitat types found in Ohio and the JV which include: seasonal herbaceous wetland and meadows, shallow semi-permanent marshes, deep-water marshes and open water,

herbaceous seasonal and hemi marsh with forest, island/shorelines with little or no vegetation (Table 4). A summary of information of UMRGLRJV waterbird focal species that occur within Ohio is given in Appendix C; for more information on waterbird focal species see Appendix A in Soulliere et al. (2007).

Table 4. General community preferences for breeding waterbird species (guilds) occurring in the Upper Mississippi River and Great Lakes Joint Venture (JV) region. Names in bold text are JV focal species, some of which occur in multiple community types.

| | | | | |
|---|--|---|--|--|
| Seasonal herbaceous wetlands and wet meadows (incl. mudflats) | Shallow semi-permanent marshes (emergent vegetation and open water mosaics – hemi marsh) | Deep-water marshes (submerged and emergent vegetation) and open water, islands with herbaceous or brush | Herbaceous seasonal and hemi-marsh wetlands with associated forest or forested/brushy islands (including river riparian areas) | Islands or shoreline with little or no vegetation surrounded by extensive open water |
| King Rail | Black Tern | Black Tern | Black-crowned Night-Heron | Common Tern |
| Yellow Rail | King Rail | Common Loon | Great Blue Heron | Double-cr. Cormorant |
| Black rail | Forster’s Tern | American Coot | Green Heron | American White Pelican |
| Virginia Rail | Herring Gull | Red-necked grebe | Little Blue Heron | Caspian Tern |
| Sora | Little Gull | Eared Grebe | Yellow-crowned Night-Heron | Ring-billed Gull |
| American Bittern | | Western grebe | Great Egret | Herring Gull |
| Least Bittern | | Pied-billed Grebe | Cattle Egret | Great Black-backed Gull |
| Sandhill Crane | | Common Moorhen | Snowy Egret | Least Tern |
| | | | | Little Gull |

Habitat Goals

Habitat goals and objectives are based on desired population numbers for the JV focal species. The focal species approach to derive habitat goals assumes that protecting and enhancing for

focal species will also enhance populations for other waterbird species. Specific data used to generate habitat goals and objectives are described in Appendix A in Soulliere et al. (2007). Habitat objectives derived by the UMRGLRJV will be refined as more information about focal species becomes available.

Restoration and Enhancement Objectives

The UMRGLRJV restoration and enhancement goals were based on focal species population deficits and habitat models. The term “restoration” implies converting a human altered landscape to a community type that would benefit the focal or target species. With any restoration or enhancement work, landscape context and capabilities are always important considerations including: current cover, hydrology, and historical vegetation.

The goals set for Ohio include 300 ha each of shallow semi-permanent marsh, deep water marsh, and herbaceous wetlands with brushy islands (See Table 5). All the restoration and enhancement objectives are within BCR 13 and 22, which occur around Lake Erie. Targeting areas along Lake Erie and within Western Lake Erie basin will enhance habitat for migratory, wintering and breeding waterbirds.

Protection Objectives

Similar to enhancement objectives, protection objectives were based on habitat needs of the waterbird focal species in the JV. While some habitat may already be protected by state and federal land holdings, there is a need to increase conservation land in Ohio. The JV suggests protecting 1,600 ha of shallow semi-permanent/hemi marshes and herbaceous wetlands, and 300 ha of deep water marsh (see Table 6). Most of the protection falls within BCR 22, which encompasses the Western Lake Erie Basin.

MONITORING NEEDS

Monitoring is an important step to reach any conservation goal. Monitoring helps involved agencies and partners detect changes in populations, evaluate habitat productivity, and help distinguish if management decisions are working. The following monitoring needs were described by the UMRGLRJV and reflect national monitoring goals as well:

- Standard methodologies -- Large-scale monitoring programs must use techniques that allow population and habitat data collected in different locations and across multiple geographic or temporal scales to be compared and combined. OBCI recommends using standardized survey protocols for marsh birds and specifically the protocol of the National Marsh Bird Monitoring Program (NMBMP). The monitoring goal of the NAWCP is to be able to detect >50% change over 10 years or 3 generations.
- Filling information gaps -- With a data repository and standard methodologies in place, partners will be able to identify gaps in current population survey efforts and coordinate an

integrated network of statistically valid, long-term, waterbird population monitoring programs throughout the region and the continent.

Table 6. Waterbird habitat protection objectives by state and Bird Conservation Region (BCR) to meet breeding and migration population goals for the Upper Mississippi River and Great Lakes Joint Venture region. Objectives are presented in hectares (1 ha = 2.47 acres), except for the unvegetated islands. Distribution of protection effort based on BCR population estimates (Table 3) combined with waterbird distribution maps and habitat models (Appendix A).

| State | BCR | Seasonal wetlands and wet meadows | Shallow semi-permanent marshes, hemi-marsh | Deep water marshes and open water | Herbaceous wetlands with brushy islands | Unvegetated islands with open water ^a |
|------------|-------|-----------------------------------|--|-----------------------------------|---|--|
| Ohio | 13 | 0 | 100 | 200 | 200 | 1 |
| | 22 | 0 | 700 | 100 | 600 | 2 |
| | 28 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 800 | 300 | 800 | 3 |
| All States | 12 | 11,300 | 200 | 1,600 | 1,000 | 17 |
| | 13 | 0 | 100 | 200 | 200 | 1 |
| | 22 | 0 | 4700 | 200 | 1400 | 4 |
| | 23 | 1,400 | 1,900 | 7,000 | 1,400 | 4 |
| | 24 | 0 | 400 | 0 | 0 | 0 |
| | 28 | 0 | 0 | 0 | 0 | 0 |
| | Total | 12,700 | 7,300 | 9,000 | 4,000 | 26 |

^aLargely represents existing Common Tern nest colonies

RESEARCH NEEDS

Research needs were identified by the UMRGLRJV Waterbird Conservation Strategy (Soulliere et al. 2007). OBCI can in the future make this list more specific to Ohio. OBCI partners can contribute to a variety of these UMRGLJV research needs, including:

- Accurate distribution, abundance, and population trend data for all species to refine population goals and habitat conservation objectives, plus provide a means to measure management performance over time.
- Habitat requirements of waterbird groups, particularly the secretive marshbirds, during breeding and migration periods.
- An understanding of breeding and winter areas for waterbirds that use the region primarily for migration, and a better understanding of potential limiting factors in the life cycles of individual species.
- Identification of critical migration staging areas, migration corridors, and migration timing for species of greatest concern to refine migration habitat conservation planning.
- Understanding trends and effects of invasive species (e.g., *Phragmites australis*) on breeding and migrant waterbirds to guide wetland management and enhancement.
- Updated land-cover inventories (i.e., updated National Wetland Inventory and National Land Cover Data) to enhance waterbird conservation planning.

LITERATURE CITED

- Conway, C. J. 2004. Standardized North American marsh bird monitoring protocols. Wildlife Research Report No. 2004-7, USGS Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona.
- Crewe, T. L. S. T. A. Timmermans, and K. E. Jones. 2005. The marsh monitoring program annual report, 1995-2003: annual indices and trends in bird abundance and amphibian occurrence in the Great Lakes basin. Produced for Environment Canada - Ontario Region by Bird Studies Canada.
- Kushlan, J. A., M. J. Steinkamp, K. C. Parsons, J. Capp, M. A. Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J. E. Saliva, B. Sydeman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird conservation for the Americas: the North American Waterbird Conservation Plan, version 1. Waterbird Conservation for the Americas, Washington, DC.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2006. The North American breeding bird survey, results and analysis 1966-2005. Version 2004.2. U.S. Geological Survey, 37 Patuxent Wildlife Research Center, Laurel, MD.
Website: www.mbr-pwrc.usgs.gov/bbs/bbs.html
- Soulliere, G. J., B. A. Potter, D. J. Holm, D. A. Granfors, M. J. Monfils, S. J. Lewis, and W. E. Thogmartin. 2007. Upper Mississippi River and Great Lakes Region Joint Venture Waterbird Habitat Conservation Strategy. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.
- Will, T. C., J. M. Ruth, K. V. Rosenberg, D. Krueper, D. Hahn, J. Fitzgerald, R. Dettmers, C. J. Beardmore. 2005. The five elements process: designing optimal landscapes to meet bird conservation objectives. Partners in Flight Technical Series No. 1.
- Wires, L. R., S. J. Lewis, G. J. Soulliere, S. Matteson, C. Weseloh, and R. Russell (in review). Upper Mississippi Valley / Great Lakes Waterbird Conservation Plan. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.