Upper Mississippi / Great Lakes Joint Venture

Summary of Waterfowl and Waterbird Habitat Conservation Strategies

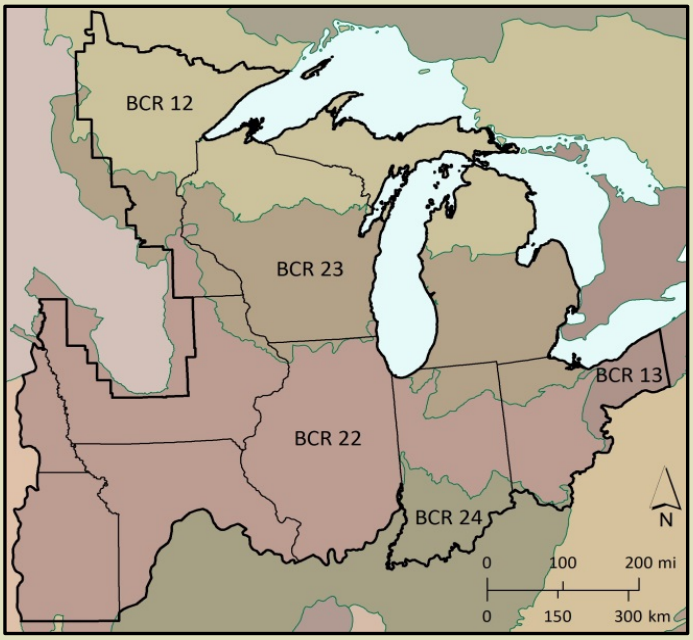
Intended audience: **Wildlife Habitat Biologists and Wetland Bird Professionals** seeking **1)** regional and state-level conservation planning linked to continental initiatives, **2)** species-habitat associations for waterfowl and waterbirds, **3)** science-based wetland bird habitat objectives by state and region, **4)** decision tools (maps) to better target conservation, and **5)** research and monitoring supported by the Joint Venture to fill information gaps, test planning assumptions, and improve wetland bird habitat delivery. Partners developing wetland-conservation grant applications and project proposals will find this information especially useful.

The Joint Venture

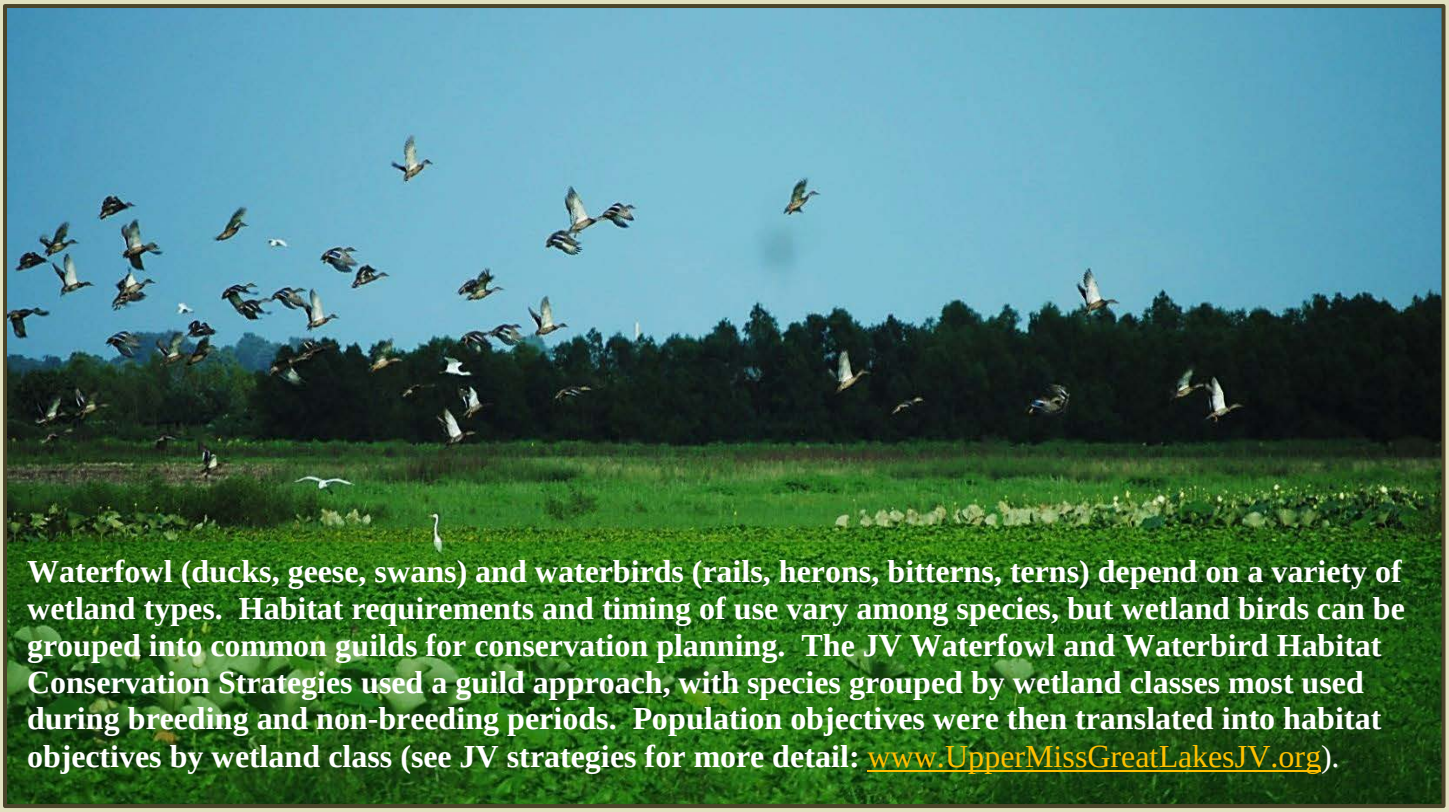
The Upper Mississippi River / Great Lakes Joint Venture (JV) is one of 22 regional bird-habitat partnerships implementing the North American Waterfowl Management Plan and the North American Waterbird Conservation Plan. This document summarizes information found in recently updated JV regional habitat conservation strategies for waterfowl (2017) and waterbirds (2018) based on goals of the overarching continental plans.

The JV region encompasses all or portions of 10 states with unique and important waterfowl and waterbird habitats, particularly related to the Great Lakes and also vast floodplains and interior wetlands. Four of the country's major river systems are in the JV region: lower Missouri, upper and central Mississippi, Illinois, and Ohio rivers. Compared to other JV regions, our geography is critically important to wetland birds during both breeding and non-breeding periods – especially throughout spring and fall migration.

Bird Conservation Regions (BCRs) have distinct bird communities, habitats, and resource management issues and serve well as primary planning units. The JV region is covered mostly by BCRs 22 (Eastern Tallgrass Prairie), 23 (Prairie Hardwood Transition), and the U.S. portion of BCR 12 (Boreal Hardwood Transition). Small portions of BCR 24 (Central Hardwoods) and 13 (Lower Great Lakes / St. Lawrence Plain) also occur within the JV boundary.



Boundaries of the Upper Mississippi River / Great Lakes Joint Venture region (bolded black line) and associated Bird Conservation Regions (BCRs, color discerned).

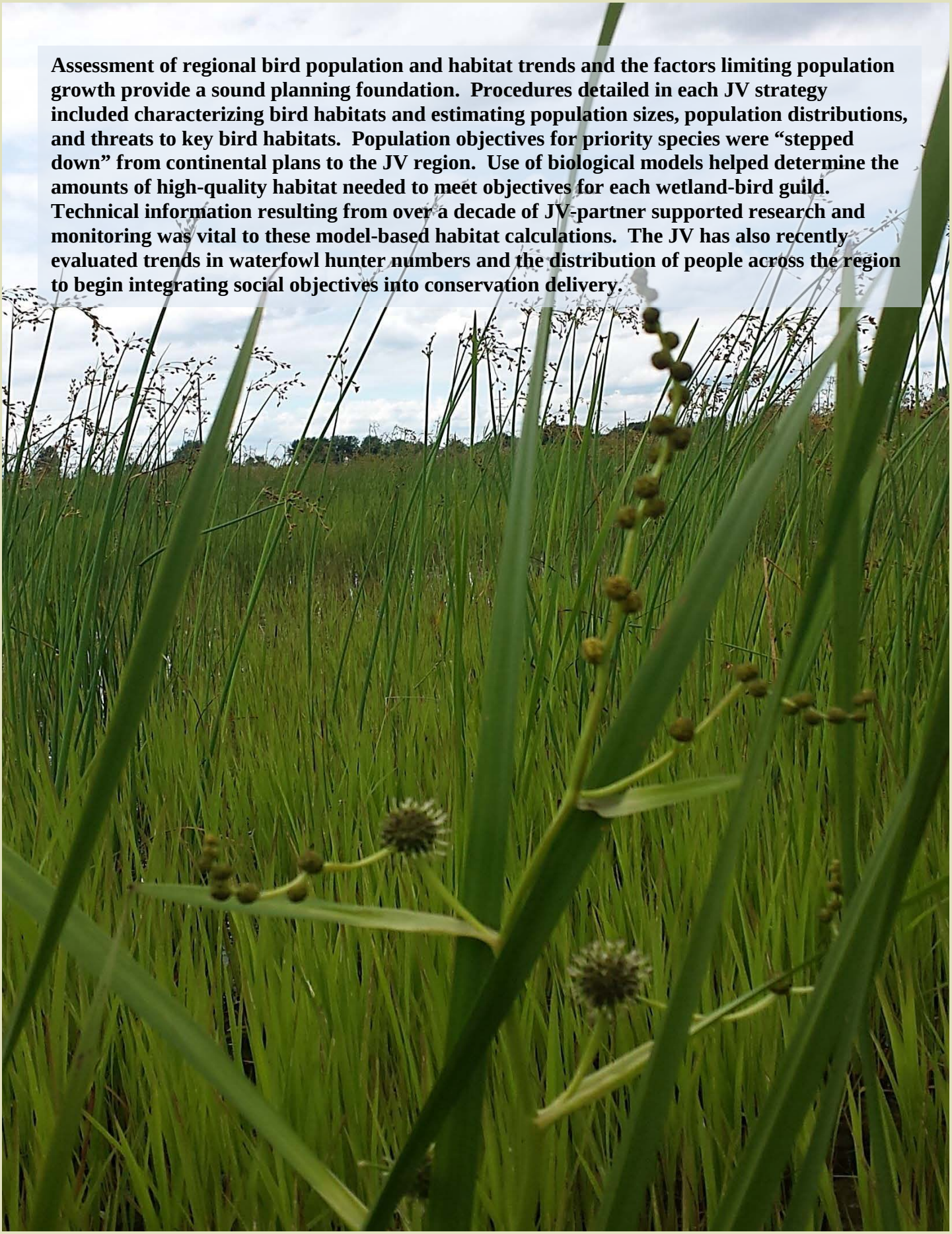


Waterfowl (ducks, geese, swans) and waterbirds (rails, herons, bitterns, terns) depend on a variety of wetland types. Habitat requirements and timing of use vary among species, but wetland birds can be grouped into common guilds for conservation planning. The JV Waterfowl and Waterbird Habitat Conservation Strategies used a guild approach, with species grouped by wetland classes most used during breeding and non-breeding periods. Population objectives were then translated into habitat objectives by wetland class (see JV strategies for more detail: www.UpperMissGreatLakesJV.org).

Need for Strategic Conservation Planning

The JV Waterfowl and Waterbird strategies used the latest scientific information to address regional- and continental-scale priorities throughout the annual cycle (breeding, migration, and wintering). Habitat conservation often occurs locally, but even small-scale projects benefit migratory birds when those efforts address key habitat limitations. In fact, the cumulative effect of needed conservation initiatives within and among JV regions is essential to sustainable migratory bird populations. Moreover, social considerations are appearing in conservation plans seeking to be more relevant to society and to grow support for bird habitat initiatives. For example, wetland bird habitat restoration in locations that provide society more tangible ecological goods and services (e.g., water filtration, floodwater storage, open space for hunting and birding) should, theoretically, help recruit more conservation supporters. Navigating the many biological, political, and social aspects of modern conservation planning is challenging, and the need to be strategic when dedicating resources and targeting conservation has never been greater.

Contemporary bird-habitat planners support thoughtful, accountable, and adaptive management actions driven by science. The latest conservation planning methods include systematically assessing baseline habitat conditions, gauging management options with tradeoffs in mind, implementing habitat actions considered most appropriate, and evaluating population response to measure success. Using this process, the JV has attempted to estimate what, where, when, and how much habitat is needed to increase and sustain populations of priority bird species at objective levels. In addition, the JV developed a method for integrating social considerations when targeting conservation for wetland birds.



Assessment of regional bird population and habitat trends and the factors limiting population growth provide a sound planning foundation. Procedures detailed in each JV strategy included characterizing bird habitats and estimating population sizes, population distributions, and threats to key bird habitats. Population objectives for priority species were "stepped down" from continental plans to the JV region. Use of biological models helped determine the amounts of high-quality habitat needed to meet objectives for each wetland-bird guild. Technical information resulting from over a decade of JV-partner supported research and monitoring was vital to these model-based habitat calculations. The JV has also recently evaluated trends in waterfowl hunter numbers and the distribution of people across the region to begin integrating social objectives into conservation delivery.

Planning required establishment of species-habitat associations for wetland-bird guilds occurring in the JV region during breeding and non-breeding (migration and winter) periods. *Primary* and *Secondary* land-cover classes, based on National Wetland Inventory (NWI) and National Land Cover Data (NLCD), comprise the spatial data used in habitat modeling for each bird guild (top rows in table below). *Note:* The most common habitat associations were used for planning even though individual species regularly use multiple wetland types (see JV Waterfowl and Waterbird strategies for more detail: www.UpperMissGreatLakesJV.org).

Primary→ (NWI) ***Secondary***→ (NLCD and NWI)	**Emergent** **Aquatic bed or Unconsolidated**	**Emergent** **Aquatic bed and Grassland/herbaceous**	**Forested** **Aquatic bed/Emergent or Scrub-shrub and Deciduous forest**	**Aquatic bed** **Emergent and Unconsolidated**	**Unconsolidated bottom/shore** **Aquatic bed or Emergent, plus islands**
Breeding Waterfowl					
	Mallard Gadwall Green-winged Teal	**Blue-winged Teal** Northern Shoveler Canada Goose	**Wood Duck** Common Goldeneye Hooded Merganser	**Ring-necked Duck** American Black Duck Redhead Trumpeter Swan	Common Merganser Red-breasted Merganser
Non-breeding Waterfowl					
	Northern Pintail **Green-winged Teal** Mallard Blue-winged Teal Northern Shoveler		**Wood Duck** American Black Duck	**Gadwall** **Canvasback** American Wigeon Redhead Ring-necked Duck Ruddy Duck Snow/Ross' Goose Canada/Cackling Goose Trumpeter Swan Tundra Swan	**Lesser Scaup** Greater Scaup Surf Scoter White-winged Scoter Black Scoter Long-tailed Duck Bufflehead Common Goldeneye Hooded Merganser Common Merganser Red-breasted Merganser
Breeding Waterbirds					
	American Bittern Least Bittern Common Gallinule American Coot	**King Rail** **Sora** **Yellow Rail** Black Rail Virginia Rail Sandhill Crane Whooping Crane	**Black-crowned Night-Heron** Great Blue Heron Great Egret Snowy Egret Little Blue Heron Cattle Egret Green Heron Yellow-crowned Night-Heron	**Black Tern** Pied-billed Grebe Red-necked Grebe Forster's Tern	**Common Tern** **Common Loon** Double-crested Cormorant American White Pelican Ring-billed Gull Herring Gull Great Black-backed Gull Caspian Tern Least Tern
Non-breeding Waterbirds					
	American Bittern Least Bittern	**Sora** **Sandhill Crane** Cattle Egret Yellow Rail Black Rail King Rail Virginia Rail	**Great Blue Heron** Black-crowned Night-Heron Great Egret Snowy Egret Little Blue Heron Green Heron Yellow-crowned Night-Heron	**American Coot** **Pied-billed Grebe** Red-necked Grebe Common Gallinule Forster's Tern Black Tern	**Common Tern** **Common Loon** Double-crested Cormorant American White Pelican Ring-billed Gull Herring Gull Great Black-backed Gull Caspian Tern Least Tern

Focal species (**in bold**) received greater planning emphasis, especially for objective setting, habitat descriptions, and monitoring.

Conservation Delivery

JV strategies established explicit regional objectives for wetland-bird populations and their habitats. Limited population and ecological information for some species posed a planning challenge. However, objectives for habitat restoration (to increase populations) and habitat retention (to maintain populations at objective levels) were generated using the best scientific information and technical tools available. Recommendations for *focal species* monitoring were also provided to measure conservation success and to assure continuous improvement in habitat delivery.

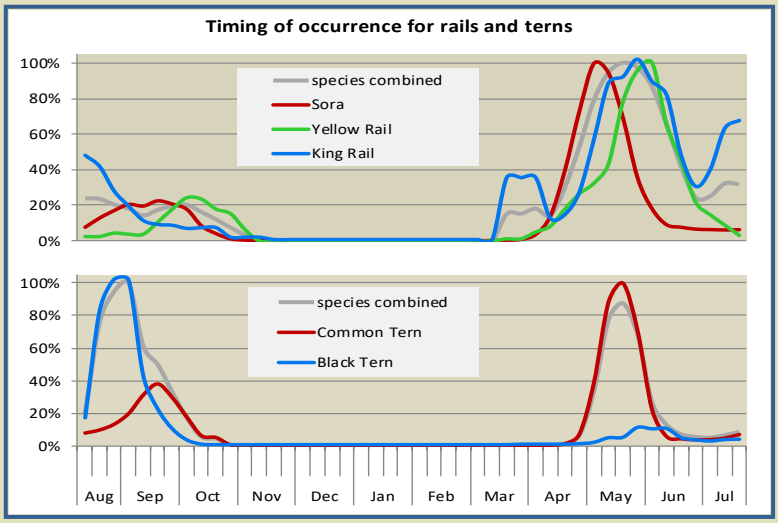
Habitat objectives for waterfowl and waterbirds were joined among the four primary habitat categories used for planning and then distributed across BCRs, States, and State x BCR sub-regions based on current bird distribution and predicted return on conservation investment. *Note:* General habitat categories were used for planning, but most species depend on complexes of multiple wetland types plus upland cover, such as an *Emergent* and *Aquatic Bed* wetland mosaic surrounded by grassland for Mallard and Sora (see JV strategies for more detail: www.UpperMissGreatLakesJV.org).

Wetland Restoration (for population growth) – Habitat restoration is necessary to increase landscape carrying capacity for species currently below their population objectives. Waterfowl population and habitat objectives were typically greater than waterbird objectives, thus amounts of wetland restoration required to achieve waterfowl population objectives usually surpassed the amount needed for waterbirds. Greatest restoration need was for *Emergent* (emergent with aquatic bed) wetlands during the breeding period. Second in area need was the *Unconsolidated* habitat category, where restoring water clarity of degraded lakes, flowages, and impoundments and reducing excess disturbance can increase food availability to diving ducks during migration and winter.

Estimated additional area (**in acres**) of high-quality habitat needed by wetland category to increase landscape carrying capacity for species below JV population objective levels. Habitat restoration needs were generally greater for waterfowl, except where breeding waterbirds dependent on *Aquatic Bed* wetlands had higher habitat restoration requirements (shaded cells = waterbird habitat restoration needs greater than waterfowl).

		Emergent		Forested		Aquatic Bed		Unconsolidated (open water and shore)	
State and BCR		Breeding	Nonbreeding	Breeding	Nonbreeding	Breeding	Nonbreeding	Breeding	Nonbreeding
Iowa	**22**	17,344	5,196	5,350	1,240	993	12,469	--	27,831
	23	10,940	430	1,819	103	82	1,031	--	2,302
Illinois	**22**	24,473	7,333	7,549	1,750	1,402	17,595	--	39,272
	23	5,116	201	851	48	38	482	--	1,076
Indiana	**22**	8,606	2,579	2,654	615	493	6,187	--	13,810
	23	21,757	855	3,618	204	163	2,051	--	4,577
	24	3,410	2,104	2,082	502	402	5,049	--	11,270
Kansas	**22**	13,059	3,913	4,028	934	748	9,389	--	20,955
Michigan	**12**	7,404	--	754	--	873	--	--	--
	23	109,948	4,319	18,285	1,031	825	10,363	--	23,131
Minnesota	**12**	7,946	--	810	--	937	--	--	--
	22	1,534	460	473	110	88	1,103	--	2,462
	23	39,401	1,548	6,553	369	296	3,714	--	8,289
Missouri	**22**	16,393	4,912	5,056	1,172	939	11,785	--	26,305
Nebraska	**22**	4,385	1,314	1,353	314	251	3,153	--	7,037
Ohio	**13**	13,044	1,290	1,041	308	247	3,095	--	6,908
	22	7,846	2,351	2,420	561	449	5,641	--	12,590
	23	19,386	762	3,224	182	146	1,827	--	4,078
Wisconsin	**12**	4,435	--	452	--	523	--	--	--
	23	147,050	5,776	24,456	1,378	1,104	13,860	--	30,936
Total		483,479	45,340	92,828	10,820	11,000	108,795	--	242,830

Wetland Retention (for sustaining populations) – Waterfowl and waterbirds can use the same wetlands, but high-quality habitats for individual species have unique characteristics. Habitat retention objectives developed by the JV reflect the estimated minimum area of habitat needed for both bird groups. Waterfowl populations are more abundant than waterbird populations and their habitat retention needs were greater for most wetland categories. One primary exception to this tenet was an extensive area need for the *Unconsolidated* (open water) category during the breeding period, driven largely by requirements of Common Loon. In addition, migration timing for some waterbirds, such as rails and terns, may vary from most waterfowl species. Thus, timing of occurrence is an important management consideration for these species of high conservation concern. The JV Waterbird and Waterfowl strategies provide detailed information regarding high quality habitats and occurrence timing for all priority species used for planning (see www.UpperMissGreatLakesJV.org).



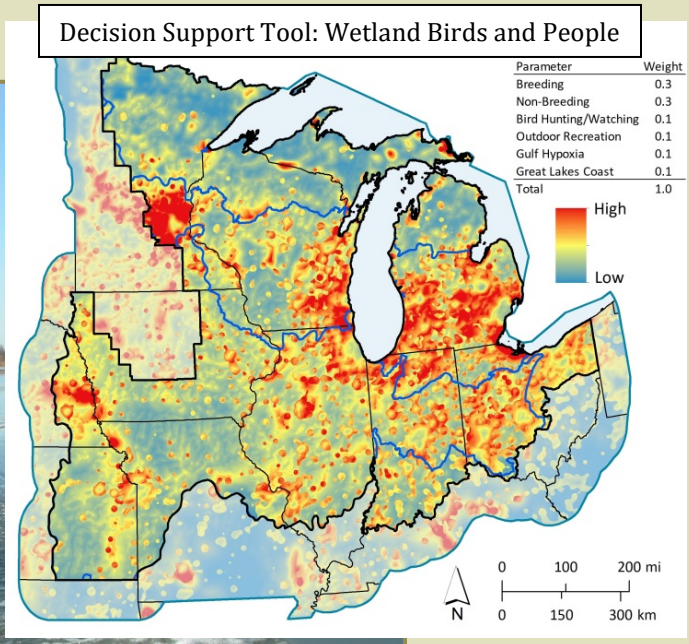
Estimated area (**in acres**) of high-quality habitat needed by wetland type to meet waterfowl and waterbird population objectives. Waterfowl habitat retention needs were typically greater for all wetland types across the JV region with the exception of *Unconsolidated*, where breeding waterbirds had larger habitat area requirements (shaded cells = waterbird habitat retention needs greater than waterfowl).

		Emergent		Forested		Aquatic Bed		Unconsolidated (open water and shore)	
State and BCR		Breeding	Nonbreeding	Breeding	Nonbreeding	Breeding	Nonbreeding	Breeding	Nonbreeding
Iowa	**22**	54,671	16,651	16,715	58,429	1,024	36,540	--	199,157
	23	34,485	1,377	5,685	4,832	9,050	3,022	3,390	16,470
Illinois	**22**	77,146	23,495	23,586	82,448	1,445	51,561	--	281,028
	23	16,127	644	2,658	2,260	4,232	1,413	1,585	7,702
Indiana	**22**	27,128	8,262	8,294	28,993	508	18,131	--	98,823
	23	68,584	2,738	11,306	9,610	17,998	6,010	6,741	32,755
	24	4,342	6,743	6,504	23,661	402	14,797	--	80,650
Kansas	**22**	41,165	12,537	12,585	43,994	771	27,513	--	149,955
Michigan	**12**	203,344	14,642	41,075	51,381	252,982	32,132	423,988	175,135
	23	346,581	13,839	57,133	48,562	90,950	30,369	34,067	165,523
Minnesota	**12**	218,225	15,714	44,081	55,142	271,496	34,484	455,017	187,952
	22	4,837	1,473	1,479	5,169	91	3,233	--	17,619
	23	124,201	4,959	20,474	17,402	32,593	10,883	12,208	59,317
Missouri	**22**	51,674	15,738	15,798	55,226	968	34,537	--	188,239
Nebraska	**22**	13,824	4,210	4,226	14,774	259	9,239	--	50,358
Ohio	**13**	41,119	4,133	3,252	14,503	39,000	9,069	2,490	49,432
	22	24,733	7,532	7,562	26,433	463	16,530	--	90,096
	23	61,110	2,440	10,074	8,562	16,036	5,355	6,007	29,185
Wisconsin	**12**	121,792	8,770	24,602	30,775	151,522	19,246	253,945	104,896
	23	463,537	18,508	76,412	64,949	121,641	40,617	45,562	221,380
Total		1,998,623	184,405	393,500	647,105	1,013,430	404,680	1,245,000	2,205,673

Targeting Conservation

In addition to *Focal Species Accounts*, where strategies provide comprehensive habitat recommendations for priority species, the JV also developed a process for integrating biological and social objectives when targeting wetland bird conservation. Several priorities were identified in this process: providing high quality breeding and non-breeding bird habitats, expanding outdoor recreation (hunting and birding), and increasing ecological goods and services that address large-scale environmental issues. These objectives were weighted by importance to JV stakeholders (via JV Management Board) and a *Decision Support Tool* was developed, resulting in maps that prioritize landscapes for habitat delivery (see JV Waterfowl and Waterbird strategies for more detail: www.UpperMissGreatLakesJV.org). The Waterfowl and Waterbird decision support maps were similar, and for this summary they were combined (below right), reflecting priority areas to achieve conservation objectives for both wetland bird groups and people.

Decision Support Tool: Wetland Birds and People



Monitoring and Research

Habitat objectives and conservation targeting (for birds and people) have evolved considerably during the past decade because of JV-supported research and monitoring. The new JV Waterfowl and Waterbird strategies both include explicitly stated planning assumptions and key uncertainties that require additional evaluation. Growing our knowledge regarding biological parameters and social values will result in more effective conservation planning and more efficient habitat delivery.

Monitoring initiatives undertaken by the JV:

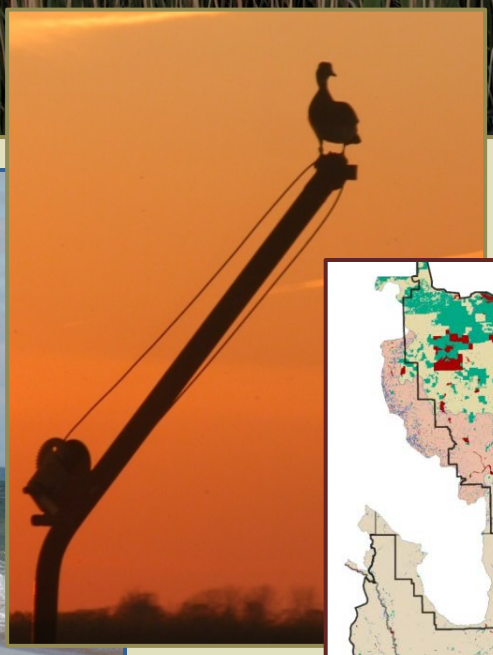
- **Completed State × BCR assessments to quantify available cover types important to birds; determined amount and location of land currently under protection, primary modes of cover type conversion, and conservation implications.**
- **Assessed spatial and temporal patterns in distribution, abundance, and habitat use by priority breeding bird species. Habitat characteristics such as wetland types and abundance, grassland / forest abundance, and landscape composition were correlated to recruitment and survival for some species.**
- **Collaborated in development of the Integrated Waterbird Management and Monitoring program for assessing migrating and wintering wetland birds and their habitats. This is a large-scale effort to help wildlife managers provide birds the right habitats, in the right places, at the right times.**
- **Used new eBird monitoring data to establish abundance chronology during migration and winter, information essential to estimating species-specific use days and food energy needs during the non-breeding period.**

Research supported by the JV:

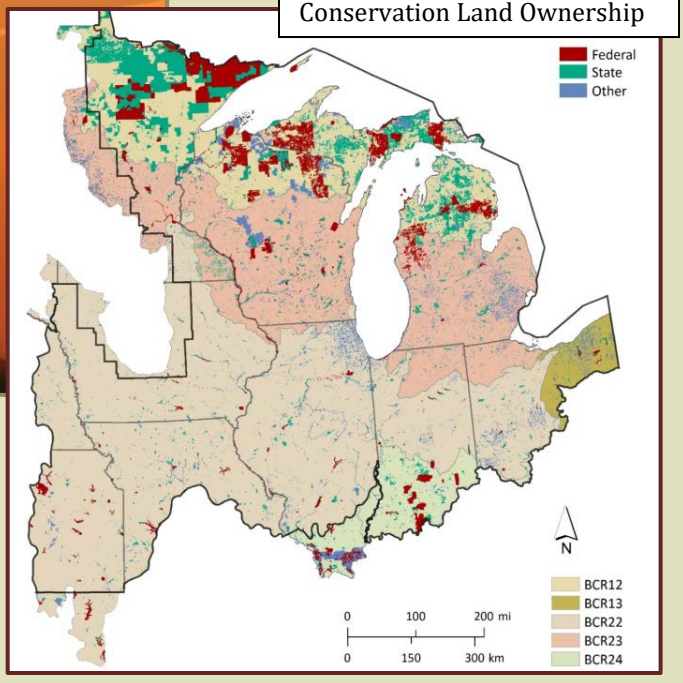
- **Used satellite telemetry on several species to improve understanding of habitat use, stopover duration during migration, and reproduction and mortality rates during breeding and non-breeding periods.**
- **Evaluated food energy requirements, factors related to forage availability, energy values of various foods, and general feeding ecology (including risk avoidance strategies) during the non-breeding period for dabbling ducks.**
- **Assessed wetland/upland parameters influencing species occurrence and factors potentially limiting breeding occurrence and productivity.**
- **Improved understanding of population dynamics for some species, and evaluated abundance and habitat trends across the region for others.**
- **Examined the relationship between habitat conservation actions and population responses, and assessed potential tradeoffs between species for a given action. Ongoing research is focusing on the long-term influence of wetland restoration, enhancement, and management on waterfowl and marsh bird occurrence.**
- **Improved understanding of migration corridors, movement chronology, stopover duration, human disturbance, and impacts from developed landscapes for migrating and wintering wetland birds.**

Summary of procedures common to revised JV Waterfowl and Waterbird strategies:

- **Evaluated habitat delivery (2007–2014) and refined definitions for habitat retention, restoration, enhancement, operational management, and operational maintenance.**
- **Incorporated new knowledge from research and monitoring projects and verified early planning assumptions, and added a list of related publications and professional reports.**
- **Expanded emphasis and detailed steps following a strategic conservation framework: biological planning, conservation design, conservation delivery, and outcome-based evaluation.**
- **Improved linkage between JV conservation planning and the latest North American Waterfowl Management Plan (2012), particularly addressing human dimensions.**
- **Completed a thorough land-cover evaluation, including recent cover-type trends and ownership assessment.**
- **Used new data sources: eBird, U.S. Census, and Landscape Conservation Cooperative focus areas.**
- **Created an adjustable decision support tool with weighted biological and social parameters and associated conservation delivery maps.**
- **Emphasized program integration and efficiency, including principles key to successful business management and strategic conservation.**



Conservation Land Ownership



JV Management Board Membership:

American Bird Conservancy
Ducks Unlimited
Illinois Department of Natural Resources
Indiana Department of Natural Resources
Iowa Department of Natural Resources
Michigan Department of Natural Resources
Minnesota Department of Natural Resources
Missouri Department of Conservation
National Audubon Society
National Park Service
Nebraska Game and Parks Commission
Ohio Department of Natural Resources
Pheasants Forever
The Nature Conservancy
USDA Natural Resources Conservation Service
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
Wisconsin Department of Natural Resources

Call to action: **The Joint Venture Waterfowl and Waterbird Habitat Conservation Strategies explain in detail what, where, when, and how much habitat should be restored and retained to meet the needs of priority wetland birds. Please join in implementing these strategies to assure more efficient and effective conservation for waterfowl, waterbirds, and people.**

Photo by Dale Humburg

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