

Iowa Audubon

REAP
Resources Enhancement and Protection
IOWA DNR

Connecting Owners and Managers of Iowa Important Bird Areas (IBAs) to the Global Network of IBAs

Habitat Management Recommendations for 37 of Iowa's Most Seriously Declining Birds

Part 1: Introduction

Welcome to a new four-part educational initiative focusing on thirty-seven of Iowa's most seriously declining bird species and improved management of the primary habitats essential to the survival of those species. We consider this project to be a major step toward building long-term partnerships, improving on-site management at our state's numerous Important Bird Areas (IBAs), and expanding overall public support for all-bird conservation.

Part 1:

Introduces and explains the entire initiative, and provides selected reference information for more in-depth learning.

Part 2:

Describes a global network of Important Bird Areas (IBAs) which owners and managers of Iowa's IBAs should rightfully feel proud to be a part of. For Iowa's IBAs include many of our state's most notable habitats – currently 92 official IBAs in some 60 counties – but gradually with additional sites being approved for IBA status in even more counties as new field data is obtained.

Part 3:

Summarizes recommended habitat management practices for each of our state's 3 primary habitats types that 37 IBA Criteria Species depend upon: wetlands, woodlands and grasslands.

LINK TO IOWA IBA:

Part 4:

Provides individual species accounts which summarize habitat preferences, feeding habits, breeding biology, concerns and limitations, and habitat management issues, for each of our state's 37 IBA Criteria Species.

Overview of this Educational Tool

It is important to recognize that this initiative by Iowa Audubon provides individuals with the flexibility for accessing the same information in different formats. The information you are now viewing is available on a data CD. It is also found at Iowa Audubon's website

www.iowaaudubon.org/iba

and, as a downloadable PDF file also found on the Iowa Audubon website. This flexibility is possible due to advances in technology since the project was begun. This eco-friendly or "green" methodology of downloading information from the Iowa Audubon web site eliminates the need to use excessive numbers of CDs, CD cases, CD labels, and mailing envelopes – while making the same content even more broadly accessible.

Using this approach, Iowa Audubon will be able to revise and update this document as well as provide additional up-to-date and timely information on their website for years to come.

During the early stages of the planning of this project, it became clear for the need to gather, distill and summarize the wide range of available information – online and in print – into one easily accessible document, concerning Iowa's thirty-seven highest conservation priority birds as well as the recommendations for managing the wetland, woodland and grassland habitats that sustain those species. Producing this document, along with updating the Iowa IBA website (with downloadable PDF file) was viewed as the preferred method for delivering specific details and recommendations to a widely dispersed target audience. The most probable alternative to this approach would have been to hold several multi-day conferences in which many recipients would probably have declined to attend due to the rising travel costs, the inconvenience of overnight travel, and many already overtaxed work schedules.

Delivery of information directly to desktop and laptop computer screens, where individual users can learn at their own pace has become far more commonplace. REAP-CEP leaders recognized this trend and provided the essential funding required to go forward with this project. We hope the built-in flexibility and convenience of a CD, and viewing and/or downloading content from the Iowa IBA website directly to your work space will be used to its maximum effectiveness.

Effective management of our natural resources is a long-term, hands-on process. It has to begin somewhere. In many cases the document you are now reading will be a person's first introduction to Iowa's IBA Program. Therefore, we hope it will be studied carefully, and reviewed frequently, in whatever format that is utilized. Obviously, we wish to have owners and managers of Iowa's IBAs and potential IBAs understand the content of the document, but it is even more important, over the long-term, to also become familiar with and to actively utilize new information that will become available on the Iowa Audubon IBA website.

The project's intent is to highlight progressive habitat management practices for IBAs, potential IBAs, and for all of our state's wetland, woodland and grassland habitats, and to help build overall habitat management capacity. Iowa Audubon hopes to engage, inform and partner with, the key individuals who can make

significant conservation progress at each of these vital habitats.

Any modern computer should be capable of using a data CD, accessing the Iowa IBA website, or downloading a PDF file. Obviously, Internet access is necessary to utilize embedded links found in the document - fortunately, Internet access has become ubiquitous.

REAP-CEP and Iowa Audubon Partnership

Production of this user-friendly and readily accessible document was funded by the Iowa Department of Natural Resources Resource Enhancement And Protection – Conservation Education Program (REAP-CEP). Great appreciation is extended to the staff and citizen leaders of REAP-CEP for funding this initiative, and especially for their patience while the product was being produced and distributed.

An enormous amount of detailed information was willingly shared by a variety of sources, and each is also greatly appreciated. The final products were produced and distributed by the Iowa Important Bird Areas (IBA) Program. The Board of Directors of Iowa Audubon received and administered the REAP-CEP funds. The text for this project was prepared by Ric Zarwell, Iowa Important Bird Areas (IBA) Coordinator, under contract to the Iowa Audubon Board of Directors.

For additional details and updates on Iowa's IBA Program readers may go to the IBA website: www.iowaaudubon.org/iba. Or, to discuss new issues that arise related to Iowa's birds and habitats, you can contact leaders of Iowa Audubon through links on their website.

Target Audience

This project was developed specifically for the landowners and land managers who have responsibility for Iowa's 92 official IBAs located in some 60 counties, and for the 100+ additional sites that have been nominated for IBA status (in approximately 25 other counties). This information will also be useful to any other Iowan with an interest in improving management of wetlands, woodlands, or grasslands in general, or in the thirty-seven rapidly declining species of birds described here.

Follow-up with members of the target audience is a major component of this initiative, as well as for the overall Iowa IBA Program as it continues to grow and mature. We want to open up new methods of sharing and benefiting from bird conservation information, and to continue strengthening that effort far into the future.

Again, this is an early step in a long-term process. Our primary goal is to work in partnership with landowners and land managers to develop or revise habitat management plans for IBAs, and then to assist with preparing grants or securing and organizing the most appropriate technical assistance to effectively implement those IBA conservation plans.

As more is known about the conservation of seriously declining populations of birds in Iowa and across North America, and these efforts continue to be highlighted as a high priority within our society, a variety of new public and private funding sources and new forms of technical assistance from federal, state and local sources are expected. Consequently, critical long-term all-bird conservation will likely become an essential component of land management at local, state and national levels. The global network of IBAs is developing steadily, and there will be a great deal of habitat conservation projects for all of us to collaborate on in the future.

Additional Sources of Information

Online and printed sources offer an enormous amount of information about birds, natural habitats and bird conservation. Some sources are quite useful, while others definitely are not. Found below is a list containing the primary references that were used to assemble Parts 1, 2 & 3 of this project. The first several resources on the list were used most extensively by the author. Each of these sources is hereby given a very sincere "thank you" for providing helpful data. Everyone is encouraged to use the following references for a wide variety of additional details.

Managing for Iowa's Birds of Greatest Conservation Need

This paper was written by Bruce Ehresman, Wildlife Ecologist, Iowa DNR Wildlife Diversity Program, as a creative component of Animal Ecology 599 at Iowa State University, in the fall of 2005; and was in partial fulfillment of Bruce's M. S. degree from ISU in 2006. No online link is known for this information, but copies should be available at ISU.

State of the World's Birds – 2004

An excellent resource available from Birdlife International: www.birdlife.org

USGS Northern Prairie Wildlife Research Center Biological Resources

A very good source of research data: http://www.npwrc.usgs.gov/resource/type_a.htm

2007 Watchlist prepared jointly by the American Bird Conservancy and Audubon

25% of U.S. birds need help to avoid slipping toward extinction: http://www.abcbirds.org/abcprograms/science/watchlist/photopage.html

Birder's Conservation Handbook: 100 North American Birds at Risk, 2007

- Jeffrey V. Wells

Restoring North America's Birds: Lessons from Landscape Ecology, 2nd Ed. 2002

- Robert A. Askins

Saving Migrant Birds: Developing Strategies for the Future, 2002

- John Faaborg

101 Ways to Help Birds, 2006

- Laura Erickson

LINK TO IOWA IBA:

Securing a Future for Fish and Wildlife: A Conservation Legacy for Iowans

This comprehensive document is known as the Iowa Wildlife Action Plan, Revised 2006, Iowa Department of Natural Resources

Strategies for Bird Conservation

The Partners In Flight Planning Process
http://www.birds.cornell.edu/pifcapemay/

Iowa – Portrait of the Land, 2000

Published by the Iowa Department of Natural Resources

NatureServe

A network that connects science to conservation
Started by The Nature Conservancy: http://www.natureserve.org/

Basics of Bird Conservation in the U.S

http://www.epa.gov/owow/birds/basics.html#sub6

Bird Conservation Initiatives in the U.S

http://www.epa.gov/owow/birds/bird.html

15 pdf files detailing benefits of the USDA Farm Bill 2000-2005

http://www.nrcs.usda.gov/technical/NRI/ceap/fwbenefit.html

PIF Species Assessment Database with scores by Bird Conservation Region (BCR)

http://www.rmbo.org/pif/scores/scores.html

PIF Best Management Practices (with an excellent list of sources)

http://www.partnersinflight.org/pubs/BMPs.htm

A Bird's Eye View by Marlene Ehresman

a helpful booklet published by the Iowa Natural Heritage Foundation:
http://www.inhf.org/neotropbook.htm

The Importance of Migratory Stopovers Chipper Woods Bird Observatory, New Jersey

http://www.wbu.com/chipperwoods/photos/migrstop.htm

LINK TO IOWA IBA:



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Part 2: Bird Populations

Obvious Environmental Indicators with Positive Trends Emerging

There is a growing realization across the planet that genuinely sustainable development depends on conserving the Earth's biodiversity. Biodiversity underpins all of our lives, by providing numerous vital goods and services to people. There are also many strong ethical and aesthetic arguments for why humanity should protect, restore and enhance biodiversity. Given the pervasiveness and fundamental importance of biodiversity, humans know surprisingly little about it. We are sure that it is disappearing fast, yet measuring changes, especially at large scales, has been quite difficult in the past.

For many reasons, birds have a very special place as environmental indicators, not the least of which is their enormous public appeal. Birds are by far the best-known animal group. They can tell us (if we listen) a great deal about the status of all biodiversity, the pressures on it, and solutions that should be put in place. Because birds are highly visible and highly vocal, they have been providing a benchmark against which we can assess our efforts to conserve all of biodiversity in the future. In addition, a network of birders and ornithologists, investigating and providing data at every level – from backyard feeder watchers to global scientific expeditions – are providing a huge amount of bird population data (data of similar quality

and quantity that are largely lacking for other species).

In the past a typical sequence of events that lead to an effective public response (e.g. a new public mindset) was: first a crisis, followed by demands for action by citizen organizations, followed by development of new public policies, and finally, the institutionalization of these new policies to combat the crisis.

This pattern was followed when the slaughter of egrets for feather plumes to adorn women's hats at the end of the 19th Century evoked public outcry and led to the creation of the National Wildlife Refuge System and the National Audubon Society. Once more the same pattern was repeated in reaction to the dust bowl days; the near disappearance of waterfowl in the 1930's (which led to the formation Ducks Unlimited, a major expansion of the national refuge system, and new soil and water conservation programs). And another example: when the abuse of DDT and other biocides in mid-20th Century led to reliance on creative and improved testing of newly developed poisons before they were released to the public; new forms of monitoring water and air contamination; the creation of the Environmental Protection Agency; and other safeguards to public health and the integrity of natural environments.

Consequently, as we're faced with a fourth major crisis – the steady and sometimes quickening pace of population decline in 25% of North American bird species – we should be asking, where are we today in the sequence of events that *should* lead to a major expansion of habitat recovery to benefit these species other forms of declining biodiversity? We believe the answer is that policies are now moving in a good direction, and more positive changes will soon be evident.

According to *Iowa – Portrait of the Land*, published by the Iowa Department of Natural Resources in 2000, our state has the most man-manipulated landscape, and the smallest percentage of publicly protected land area of any state in our nation. But this is gradually improving. Statewide there are several positive developments related directly to birds as environmental indicators and recovery of the habitats that they require.

First, Iowa's IBA Program has identified numerous IBAs that need serious attention, and a prioritization process continues with many more sites throughout the state at the nomination stage for IBA status. Second, the Wildlife Diversity Program of the Iowa Department of Natural Resources has partnered closely with the IBA Program, and has provided solid leadership on

According to BirdLife International, in State of the World's Birds (2004), 1 in every 8 species of birds in the world (1,211 species or 12%) face extinction. In the United States, according the 2007 Watchlist prepared jointly by the American Bird Conservancy and Audubon, a full 25% of all species of birds are experiencing severe population declines, and need help to keep them from slipping toward extinction. These trends are truly alarming, and they're starting to be recognized and accepted by society as a whole, and by policy makers.

several important fronts. Among these are: completion of Iowa's Wildlife Action Plan that will likely bring more funding to the state for high priority birds and other biodiversity; identification of a series of Bird Conservation Areas (BCAs) in which BCAs and IBAs are now synonymous; and several successful restoration projects for species that were previously seriously declining.

In addition, many county conservation boards around the state have begun giving increased attention to habitat management for high conservation priority species; and managers of state forests, state parks, state wildlife management areas, federal wildlife refuges, federal reservoirs, and privately owned properties have each given higher priority to management for birds and other biodiversity. A great deal of work remains to be done of course, but these are all positive trends for future habitat recovery and sustained biodiversity.

Context for Recovery of Natural Habitats

Within the Prairie Avifaunal Biome, of which Iowa is part, almost 40% of the land bird species that breed here are on the Partners in Flight (PIF) Continental Watch List as a result of declining trends or high threats. While some nesting species that once were extirpated from the state have returned to nest here, (examples are: Peregrine Falcon, Trumpeter Swan, Greater Prairie-Chicken, and Sandhill Crane), the return of most of these species is largely related to successful (and expensive) individual species restoration efforts. While it is good that the single species approach to recovery has worked in these cases, there now are far too many species declining at too great a rate for single species recovery programs alone to be an adequate solution to the accelerating problem. It appears certain that without a unified partnership focus on use of ecosystem-based habitat protection, restoration, and enhancement approaches to bird population recovery, that the future for many declining bird species looks quite dark and troubling.

Historically, Iowa's landscape supported a rich assortment of wildlife and plants, and early accounts indicate that bird abundance was extraordinary. In the early 1800s, Iowa was covered by a rich mixture of tall-grass prairie, deciduous woodlands, rich wetlands, and closely associated sub-habitats. The dominant land-cover was tallgrass prairie, which comprised approximately 70% of the state. *Today more than 99.9% of the original prairie has been converted to agricultural use and only about 30,000 acres of the original 25 million acres of prairie remain – mostly as very small isolated remnants.*

Records indicate that forests or woodland communities once blanketed some 6.7 million acres and made up about 19% of Iowa's landscape. *Today many of these communities are highly fragmented and/or severely degraded. And two-thirds of these acres have been converted to other landuses. Thus, only about one-third of Iowa's original woodland habitat still remains.*

Wetlands are another important community type and once comprised at least 4 million acres, or 11% of the Iowa landscape. Surface water is extremely important to both aquatic and terrestrial organisms. Historically, prairie potholes and natural lakes dominated north-central and northwest Iowa, while backwaters and oxbows were common along the major rivers in the rest of the state. *Human activity has taken an amazing toll, and today only about 5% of our original wetlands have not been destroyed.*

With such massive changes to its landscape, Iowa's natural communities have been severely reduced and extremely altered. In 1990, 94% of Iowa was

considered farmland, with 70% of the landscape in row-crops (mostly corn and soybeans). Iowa now holds the dubious distinction of having the most dramatically and completely altered landscape of any state in the United States. Clearly the loss of natural habitats has affected many of our wildlife species. While at least 29 vertebrate species, including 12 bird species, already have disappeared as breeding populations from Iowa, many more species now are much rarer than they once were.

Major Threats to Birds and Other Biodiversity

Loss of natural habitats of all types

This has been the single most acute force working against Iowa's bird populations. For many of the 37 endangered, threatened, and high conservation priority bird species addressed here, the number of individuals that once nested in Iowa was certainly hundreds, if not thousands of times greater than the populations that exist today. This is especially true for grassland species such as Greater Prairie Chicken, Northern Harrier, Short-eared Owl, Henslow's Sparrow, Grasshopper Sparrow and Bobolink. Each of these is an IBA Criteria Species, and none are close to being as common in Iowa today as they previously were, or could be. Along with agriculture, and rural homes being carved into and fragmenting natural habitats, continuous urban sprawl – via housing developments, shopping centers, new road and highways, etc. – are important causes of habitat loss in many areas of the state. This can be witnessed most easily within commuting distance of cities and upon the wooded bluffs in northeastern Iowa, where upland forest areas are cleared to make room for houses "with a view.

Habitat fragmentation and loss of connectivity between habitats

These are two closely related and often unrecognized, but still major threats, to Iowa birdlife. Many species of birds require large blocks of habitat for successful nesting and survival. Large blocks of habitat provide a larger "interior" area offering greater protection from predators, more protection from nest parasitic species such as Brown-headed Cowbirds, and more buffer against human disturbance. When native vegetation is cleared for agriculture, rural homes or urban sprawl, habitats that once were contiguous become divided into separate fragments. After intensive clearing, the separate fragments tend to be very small islands isolated from each other by cropland or other blocks of property, which are not viable habitat. As wetlands, woodlands, and grasslands, become smaller and more disconnected, fewer species of birds can successfully use them for nesting, feeding or escape cover.

Many bird researchers believe that a minimum of 250 acres of forested land is necessary to maintain most forest-interior bird species, and this concept especially applies to warblers, and thrushes and other species that are IBA Criteria Species. Area-sensitive forest nesting birds are another category, and examples like Cerulean Warbler and Veery, (both IBA Criteria Species) also need large tracts of habitat. The loss of connectivity between required habitats is a stressor for each of these species. Isolated habitats that have even a narrow connecting corridor between them are more likely to be used by birds than habitats that are not linked.

Habitat degradation

Iowa's natural habitats frequently undergo gradual, unnoticed degradation; and this is yet another major threat to Iowa's birdlife. The result is a habitat lacking sufficient biological health, integrity, or quality to sustain the species of birds and other wildlife that once depended on the original habitat.

Invasive non-native species and detrimental grazing are two important forms of degradation that reduce habitat quality for native birds. Another example is invasive garlic mustard, an increasing concern in moist forests and woodlands, where it chokes out native ground cover plants and reduces available habitat for many woodland nesting birds. Another example is leafy spurge which has invaded prairie remnants and pastures in the Loess Hills of western Iowa, where it creates less desirable habitat for nesting grassland birds. A third example is purple loostrife which replaces desirable native plants of wetlands and drastically alters the community structure needed by birds associated with that habitat.

Grazing of woodlands by cattle and other livestock reduces valuable ground cover that would otherwise provide foraging and nesting habitat for birds, and severely degrades woodlands and forests. Overgrazing of grassland pastures eliminates the necessary structure for ground-nesting or low-nesting birds that use those habitats. Over abundance of White-tailed Deer in some parks and areas that are off limits to hunting is also taking a toll on birdlife. As browsers, deer in high populations tend to eliminate shrubbery and low vegetation from forests, leaving much less cover and fewer food resources available for woodland birds that frequent those areas.

Proper habitat management practices can help restore degraded habitats and prevent future degradation. In fact, alleviating habitat degradation is a key component of effective wildlife management programs.

Greatest threats to wild bird populations derive from unsustainable uses of land

If owners and managers of IBAs and other valuable habitats can keep this central fact in mind, we should be able to work together to give back significant parcels of the habitat that has been lost, fragmented or degraded.

There is still time to halt the rapid rate of population declines for the native species of birds recognized for having high conservation priority, and then reversing the trend toward one of a positive population growth. But to do so will take a cooperative effort between owners and managers, partnerships between public agencies and private conservation organizations at every level, plus the business community and citizen-conservationists.

Effective dialogue and cooperation will be a key to the future of Iowa's IBAs and the birds and biodiversity that those essential habitats nurture and sustain. Iowa Audubon's IBA Program stands ready to assist with this effort as explained within the following sections.

Overview of Iowa's IBA Program

Iowa's Important Bird Areas (IBA) Program is a statewide, citizen-led, science-based, and data-driven initiative that is led by a State IBA Technical Committee. This committee, first chaired by Dr. Jim Dinsmore, Iowa's leading ornithologist, is made up of bird researchers, wildlife biologists, experienced birders and others who represent many of Iowa's public conservation agencies and private conservation organizations. The IBA Program wishes to extend this partnership to any agency, organization, corporation, or individual who owns or manages an IBA, or who has an interest in conserving Iowa's wild birds and natural habitats.

The technical committee began its work by choosing 37 species of birds in our state, which were experiencing seriously declining populations (e.g. Iowa's 37 IBA Criteria Species). By IBA procedure, this group had to include endangered species (9), threatened species (2) and additional species of high conservation priority to be selected by the Technical Committee (the

committee chose 26). The Technical Committee then established science-based IBA criteria that local habitats are evaluated against and must meet, before being recognized as an official IBA. When our state's priority bird species are documented as being supported by a specific habitat – particularly during the nesting season – that habitat may gain IBA status by vote of the IBA Technical Committee.

By producing or sustaining Iowa's IBA Criteria Species, a local habitat that meets the IBA criteria is deemed to be one of Iowa's most essential bird habitats, or a State-level IBA. Iowa's IBA criteria can be viewed using the buttons found at this link: http://iowaaudubon.org/IBA/criteria_def.asp.

When criteria with very high thresholds are met, an Iowa IBA may be recognized as a Continental IBA, or even a Global IBA within BirdLife International's worldwide bird conservation program. Some of Iowa's habitats meet these high standards.

In 2002 an IBA Coordinator was hired and technical committee members, professional wildlife biologists, and numerous volunteer recreational birders from across the state began nominating the habitats that they thought were supporting our state's 37 IBA Criteria Species, or were meeting other IBA criteria. An excellent online tool for submitting new observation data facilitated data evaluation and voting on a site-by-site basis by members of the Technical Committee. The process of obtaining new observation data via the only data management system is ongoing, and birders are encouraged to actively participate. Evaluating new observation data that are needed to nominate additional sites, and voting to move previously nominated site to full IBA status is one function of the IBA Technical Committee and is ongoing.

Thanks to the volunteer efforts of numerous individuals across the entire state, Iowa has had excellent success in identifying IBAs. Initially 70 IBAs, well distributed in 55 counties, were officially recognized, but that number has grown to 92 IBAs in about 60 different counties. More than 100 additional habitats, in approximately 25 additional counties were nominated for IBA status, and more are expected in the future.

Gathering and submitting essential bird observation data in this manner is often called birding with a purpose, or citizen-science. This is definitely a valuable and enjoyable activity, and it's growing quickly in popularity. Citizen science is the backbone of the IBA identification process, as well as the IBA monitoring program, and we invite more citizens to actively participate.

Local IBAs: Key Components in A Global Network of Essential Habitats

Iowa's IBAs are part of *a global network* of the habitats – each essential to the birds with seriously declining populations within any one particular state or a nation. Because a great many birds are long-distance migrants and depend on specific types of habitats along the routes of their annual travels – such as the Neotropical Migrants that nest in Iowa but reside in Latin America for the majority of each year – a whole *network* of nesting sites and stop-over and re-fueling habitats, is essential to their continued existence.

Fortunately, a large partnership of forward-thinking bird conservation organizations working together as BirdLife International initiated the IBA Program in Europe in 1985. The global network of IBAs has been developing steadily ever since. According to the exceptionally informative booklet, *State of the World's Birds – 2004*, published by BirdLife International, in 2004 there were more than 7,500 recognized IBAs receiving priority conservation treatment in more than 170 different nations. Each IBA was identified using a data-driven process and

locally established science-based criteria, similar to that being used in Iowa.

National Audubon is the partner designate for BirdLife International in the United States, and has administered state-level IBA work in our nation since 1995. BirdLife International continues as overall administrator of this critically important global program – thought by many authorities to be the premiere worldwide bird conservation initiative ever developed.

Currently 46 states in the U.S. are expanding and strengthening their individual IBA Programs. Within our state, the Iowa Audubon Board of Directors provides guidance and funding for the statewide IBA Program. And the IBA initiative is the primary activity by which Iowa Audubon achieves its bird, wildlife and habitat mission.

Iowa's IBA Criteria were developed to fit within criteria at continental, western hemisphere and global levels. The fact that the criteria telescopes together, provides a seamless method for prioritizing conservation projects and facilitating coordinated management of IBAs at state, national, hemisphere and global levels. Furthermore, when very high criteria thresholds are met, an Iowa IBA may also be recognized as a Continental IBA, or even a Global IBA, getting even higher conservation priority. And several Iowa IBAs have been recognized as such.

Three Phases of Iowa's IBA Work

Each of the three primary phases of IBA work is a necessary step along the path to effective bird and habitat conservation. For every IBA or potential IBA in Iowa, each of the following 3 phases of conservation work represents an opportunity for collaboration among public agencies, private organizations, businesses and private citizens. IBA staff will pursue grants, secure technical assistance, and organize other forms of support to facilitate each of the following collaborative phases.

Phase I

Identification, recognition and prioritization of habitats within our boarders that support Iowa's 37 IBA Criteria Species, or meet other established IBA criteria. A vote from the state IBA Technical Committee is required before a habitat becomes officially recognized as one of Iowa's IBAs. Strong success has been achieved in this phase. There are now 70 officially recognized IBAs in about 60 counties. And there is considerable potential to recognize additional IBAs in the near future, if appropriate supporting on-site data is submitted to the IBA website. This is the critical first step in the entire process; and site identification and prioritization will continue, even as the other phases receive greater attention.

Phase II

Conducting long-term surveys and monitoring of bird populations and habitat conditions, and organizing education programs at officially recognized IBAs, where such public activities are appropriate. A transition into this phase is currently underway. There are a variety of opportunities for direct involvement in field investigations by bird-oriented professionals and volunteers at nearly all IBAs and sites nominated for IBA status. Partnerships with naturalists and other environmental educators for on-site bird and habitat education programming will be important at a number of IBAs. And these efforts will be important for decades to come.

Phase III

Working closely with property owners and managers to develop and then implement, long-term conservation plans to protect, restore, enhance and manage individual IBAs according to their environmental threats and conservation needs. Initiating and strengthening a variety of public-private

conservation partnerships will be vital to success in Phase III.

A primary concern is halting declines in the key bird populations that qualified a habitat as an IBA initially, and then hopefully increasing the populations of those species. This phase of work will become more and more critical as years pass. The habitat management recommendations that are found in Part 3 of this text are intended to be a new step in this critically important process.

A common thread running through each of these phases of the IBA Program is the great need to expand the quantity and quality of pro-active, grassroots, habitat-focused conservation action. To meet this challenge, a progressive sequence of follow-up and conservation assistance from the IBA partnership is being planned.

Iowa's IBA Progress Report

Well over 200 individuals, consisting of professional bird researchers and biologists, and skilled volunteer birders, have been involved in Iowa's IBA site identification effort since 2002. In the early stages of work, some 230 local habitats, very well distributed in 86 counties, were nominated for IBA recognition.

citizen in Iowa lives relatively close to at least one of these IBAs or potential IBAs; and therefore can easily become involved in any number of positive bird conservation activities.

A secondary but very positive aspect of Iowa's IBA Program is that it delivers on-the-ground implementation of several major continental and national bird conservation plans. These include: the Partners In Flight North American Landbird Conservation Plan, the North American Waterbird Conservation Plan, the North American Waterfowl Management Plan, and the United States Shorebird Conservation Plan. All agencies, organizations, businesses, and individuals who participate with the global network of IBAs, will also be helping to implement portions of these major plans.

The Iowa IBA program is science-based in that it adheres to an established IBA Criteria to maintain program integrity at state, national and global levels. The program is data-driven, as only when observers submit data of appropriate quality and quantity will a site become nominated, or if nominated will that habitat become an official Iowa IBA. The program is citizen-led in that members of the Technical Committee

As this text is being prepared, nearly 92 habitats located in about 60 different counties, have received official IBA status by vote of Iowa's IBA Technical Committee. Another 100+ sites, in approximately 25 additional counties, have been nominated for IBA status, and only require additional data – particularly during the nesting season – in order to be voted to IBA status.

All IBAs and sites nominated for IBA recognition are listed alphabetically by county within the 10 regions of the Iowa state map shown at this link: www.iowaaudubon.org/IBA/sites.asp. Every

and many other interested individuals are providing the leadership behind this initiative.

In addition to excellent input from a large number of Iowa's recreational birders who

have volunteered many hours in the field, the other key aspect of this program is the user-friendly online data management system that can be viewed here: www.iowaaudubon.org/IBA. Developed by Ann Johnson of Norwalk, Iowa, this statewide system is easily one of the most functional and useful in the United States.

Everyone who is interested in conserving Iowa's most seriously declining birdlife is invited to join the inventory and monitoring process at an IBA or a site that might become an IBA. To begin, go to this link: http://www.iowabirds.org/birds/Iowa-Checklist.asp. Read the user-friendly directions and download a field checklist to aid in gathering the proper on-site bird observation data. Then, working at a computer, transfer the data from the checklist to the IBA website. You are also invited to use any information that the website contains for conservation or recreation purposes.

The prioritization process inherent within the IBA Program will help direct funds and staff that are in limited supply to those habitats having the greatest need for habitat protection and other conservation actions. Importantly, Iowa's IBAs will soon become significant factors in local land-use planning decisions, watershed protection protects, and landscape preservation initiatives; and will help local citizens get "more bang for their buck" from present and future conservation projects and initiatives.

Two components of Iowa's IBA Program are vital to progress in bird and habitat conservation. First, *citizens and communities can be effectively engaged in all aspects of the program*. Second, *each IBA becomes part of a network of critical IBA habitats across North America, the western hemisphere, and the entire planet.*

The IBA Program ties Iowa's heartland communities directly to a whole world of bird conservation action and natural habitats protection, restoration and enhancement.

More input is always needed and welcomed as the entire IBA process continues.

Five Goals of the IBA Program Education Initiative

ONE: Provide summarized resource information that will assist the owners and the local managers of Iowa's IBAs and sites nominated for IBA status, in improving management of these essential habitats that support 37 bird species of high conservation priority.

TWO: Provide assistance initially via CD, and then on the Iowa IBA website, which will be updated on a regular basis. And to promote effective use of these educational tools by the individuals who are directly or indirectly involved in managing Iowa's IBAs and sites nominated for IBAs status.

THREE: Facilitate statewide person-to-person sharing of the most effective wetland, woodland and grassland management practices that evolve over time from this initiative; and to ensure that the IBA website is revised and updated as necessary for maximum public understanding and support for these management techniques.

FOUR: Use effective outreach services related to these educational tools, including one-on-one follow-up, to achieve the primary long-term goal of the Iowa IBA Program: on-site development or revision of habitat management plans *in partnership with* landowners and land managers; and preparing grants or organizing and securing appropriate forms of technical assistance to effectively implement those plans.

FIVE: Help the IBA Program of Iowa Audubon become recognized statewide as the primary provider of educational tools addressing our state's high conservation priority birds and recommendations for

management of the habitats that each of those species depend upon.

Three Goals for the Target Audience

ONE: Increase understanding of how severely some bird populations are declining; how serious the problems of habitat loss, fragmentation, and degradation are; and how the *global network of IBAs* connects Iowa and Iowans to positive bird conservation activities on an international scale.

TWO: Gain commitments from those who are responsible for Iowa's IBAs – for using positive habitat management recommendations to ensure that each of Iowa's IBAs reaches its full ecological potential and supports an appropriate suite of bird species and other biodiversity.

THREE: Maximize effective participation by the owners and managers of Iowa's IBAs, as well as by volunteer Stewardship Teams and others, in Phases I, II and III of the IBA Program.



Iowa Audubon

REAP
Resources Enhancement and Protection
IOWA DNR

Connecting Owners and Managers of Iowa Important Bird Areas (IBAs) to the Global Network of IBAs

Habitat Management Recommendations for 37 of Iowa's Most Seriously Declining Birds

Part 3: Habitat Management Recommendations

Part 3 addresses each of the three primary habitat types that are most in need of improved management for Iowa's declining birdlife: Wetlands, Woodlands and Grasslands. For each of these habitat types we provide an overview of management, followed by a summary of recommended management practices that will aid in population recovery for Iowa's 37 IBA Criteria Species, plus other birds, and countless forms of biodiversity.

Providing this information is only one step in what we hope will be a long and productive partnership between owners and managers of our state's expanding IBA Program and the leaders of Iowa Audubon.

Among a number of references, the primary source used for this section was *Managing for Iowa's Birds of Greatest Conservation Need* by Bruce Ehresman, Iowa DNR Wildlife Diversity Program Biologist. Bruce is a storehouse of valuable information on the status, distribution and habitat management practices for Iowa's diverse populations of non-game wildlife. He is headquartered at the DNR Wildlife Research Station near Boone. Bruce is a very dedicated biologist, and deserves great thanks for the assistance he provided for this CD.

LINK TO IOWA IBA:

Section 1: Wetland Management for Birds

It cannot be over emphasized, that wetlands are among the most biologically diverse and productive natural communities anywhere, and this point is even more important in Iowa.

Approximately 95 percent of the wetlands found in our state prior to settlement have been drained and destroyed. This overall loss to the state, and to the nation, has clearly been a major factor in the decline of 6 of Iowa's IBA Criteria Species: King Rail, American Bittern, Least Bittern, Black-crowned Night-Heron, Common Moorhen, Forster's Tern and Black Tern; as well as many other species of plants and animals.

The ideal management strategy to assist with recovery of wetland birds is to maintain or recreate wetland complexes and large wetlands or lakes. Many wetland bird species are attracted to a variety of wetland types based on the particular kind of food and cover provided. The size of a wetland and its water depth also help determine which species will frequent it. Because of the variation in water levels over seasons or years, a complex of several wetlands in an area is more likely to have at least some wetlands with water levels and plant structure favorable to a particular species of bird.

In general, the more diverse a wetland complex is, the greater variety of birds it should attract and support. Multiple wetlands in close proximity, connected by grass and shrubby corridors, usually result in excellent abundance and diversity of wetland birds. Healthy wetlands are dynamic and diverse, and when coupled with upland cover of appropriate quantity and quality, will provide habitat for nesting, brood rearing, and migration stopover areas, for many species of birds.

To meet the diverse needs of wetland birds, landowners and managers are encouraged to protect existing wetlands and restore former wetlands whenever feasible, as described by the primary concepts shown below.

Avoid fragmentation or further destruction of remaining wetland habitat. The number one priority is to protect and manage the largest wetland complexes that remain. For many wetland birds, a complex of 50-350 acres should be maintained to provide habitats at various stages of plant succession. Large, shallow wetlands, with dense growth of emergent vegetation are preferred habitat for bitterns, rails, and cranes. Black Terns prefer large marshes which have roughly equal proportions of well-interspersed emergent vegetation and open water. The key to helping most of Iowa's water birds is to provide a large landscape full of a variety of wetland types to fulfill the needs of these birds as well as other wetland dependent wildlife. To avoid further fragmentation, wetlands should not be divided with roads, trails, or buildings, regardless of the wetland size.

Recreate wetland complexes where they once existed. Restoring wetlands to basins that have previously been drained is also a high priority. A worthy goal is to restore a large area that previously was covered with wetlands and to restore it in such a manner that it resembles the wetland area that existed before Euro-American settlement. To achieve this goal, restore as many wetland basins as possible to create a complex of wetland areas that vary in size, vegetative cover, and water depth. Since many wetland birds are area sensitive, make an effort to restore basins that are, at least, 25 acres in size and wetland complexes ranging from 50-350 acres. Some area sensitive species, like the Black Tern, will nest on wetlands as small as 15 acres in size, but that usually happens only when the area is part of a larger wetland complex. When recreating wetland

complexes, restore or create corridors of grass and/or shrubs that connect two or more wetlands. These corridors are important for travel, especially for females that are nurturing flightless young.

Recommended Wetland Management Practices

The following sections delve into more specific wetland management situations and practices.

Conserve naturally self-maintaining wetland systems whenever possible. Because active wetland management is often expensive and time consuming, we recommend attempting to maintain wetland complexes in their natural state. This "hands-off approach" to water level management works best with very large wetland complexes made up of a multitude of water basins. Using this system of management, the quality of the habitat will likely vary from year to year (depending on weather conditions), and some species may benefit more than others. But understanding that birds use multiple wetlands at different times according to natural cycles is critical to successful wetland complex management.

Manipulate water levels as needed. Water level management is one of the most important tools available to a wetland manager. It can be used to control the varied conditions needed to benefit a host of wetland birds during different times of the year. Installing a water control structure allows the manager to manipulate water levels within a wetland basin. By adding water to a basin or drawing it down, wetland plant height, density, and distribution can be directly affected. As much as possible, artificial water level fluctuations should duplicate natural wetland dewatering and flooding cycles. It is very important that wetland managers are knowledgeable about the effects of water level manipulation. Incorrect manipulation of water levels can be harmful to wildlife or result in the invasion of undesirable plants. The level at which the water is maintained and the timing of those water level changes will determine which bird species benefit or may possibly be harmed. Maintaining stable water levels during nesting season decreases the probability of nest destruction due to rapidly rising water levels and decreases the probability of nest depredation.

Management for IBA Criteria Species that depend upon wetlands (King Rail, American Bittern, Least Bittern, Black-crowned Night-Heron, Common Moorhen, Forster's Tern, and Black Tern) can be compatible with waterfowl management, but careful rotation of different water level manipulations within complexes of wetlands is needed to accommodate all groups. Spring wetland drawdowns should occur before April 15 to avoid disrupting nest initiation by rails. Gradual dewatering provides a maximum edge between moist soil and marsh. This edge habitat is a preferred area for foraging rails. Wetland management also should strive to maximize coverage by emergent perennial vegetation that serves as nesting habitat. Habitat for the IBA Criteria Species mentioned above and for other waterbirds within a wetland complex, can be provided each year using rotational management; simultaneously flooding and drawing down different impoundments in any given year. Since shorebirds are the most threatened *suite of birds* in the larger waterbird group, they deserve special management attention. Shallow water habitats should be provided for shorebirds during their spring and fall migration periods.

Plant buffers strips around wetlands and manage uplands for nesting cover. We recommend using a diverse prairie seeding mix that includes seed from wetland plants to create a buffer of upland vegetation 100 feet in width or more, around the wetland. This will protect the water basin from

sediment and pesticide runoff, and it will provide nesting habitat for wetland birds, like American Bittern, and King Rail and several species of waterfowl. The wider the upland buffer, the more bird species can use it, including many grassland species like Northern Harrier and Short-eared Owl (both IBA Criteria Species). Shrubs also can be maintained within the grasses or allowed to grow at wetland edges. Willow thickets along wetlands are important habitat for several species. Taller woody vegetation beside wetlands often provides nesting sites for Black-crowned Night Herons, and clumps of shrubs near wetlands also are attractive nest sites for Bell's Vireo – both IBA Criteria Species. Along with prairie marsh seedings, plant and maintain buffers along streams and rivers, and on lake front properties. This will help provide a protective fringe for the wetland vegetation at the edge of lakes and streams. Within the wetland community, encourage the growth of smartweed, wild millet, sedges, bulrush, cattails, and other valuable plants, which produce food and cover for wetland birds and a variety of other wildlife.

Use farming implements and burning for wetland management. Besides using water-level control measures, disking, mowing, and prescribed burning are other useful tools to incorporate into wetland management. Disking in late summer to reduce ground cover, followed by shallow flooding can produce excellent habitat for migrating shorebirds. Prescribed burning in late winter or early spring (before April 1) will aid in the regeneration of warm season grasses and forbs, cattails, sedges, and other wetland vegetation, and it will minimize impacts to frogs and turtles. Managers also can use large muskrat populations to control dense cattail stands. Removal of vegetation by muskrats can benefit Black Terns and Forster's Terns (both IBA Criteria Species) by improving the interspersion of vegetation cover and open water. Muskrat lodges, muskrat feeding platforms, and floating dead vegetation created by feeding muskrats can increase the availability of nesting sites for terns, waterfowl (including Trumpeter Swans), and other species that nest over water.

Remove and control invasive plants. When not controlled, invasive non-native species, such as purple loosestrife and Eurasian watermilfoil, will out-compete and then replace native wetland vegetation. If these invasive plants are detected when they first enter a wetland, they often can be controlled using biological methods (introducing beetles/weevils that eat them). Purple loosestrife also can be eradicated if all plants are removed for several years so that no new seed is produced – or it can be controlled through the careful use of prescribed herbicides.

Minimize disturbance to wetlands. Multiple recreational uses of wetland areas can sometimes pose problems for declining bird species such as the IBA Criteria Species. Many wetland birds are especially sensitive to disturbance during the nesting season. Disturbance by people or free-roaming pets can cause nest abandonment and reduce hatching success and fledgling survival. For these reasons, we recommend limiting disturbance, as much as possible, during nesting season and during times when migrants (especially shorebirds), are present.

Utilize wetland conservation or restoration programs. Wetland habitat can be protected through land purchases, land easements, and continuation of such USDA Farm Bill Programs as the Wetland Reserve Program and Conservation Reserve Program. Wetland restoration programs, like the Prairie Pothole Joint Venture Program, have reaped enormous benefits for wetland birds through restoration of many thousands of acres of wetlands back to Iowa's native landscape.

Public-private partnerships are essential to providing the funding and technical assistance needed to further wetland protection and restoration efforts now underway, and to initiate new recovery projects at IBAs.

Section 2: Woodland Management for Birds

Most of Iowa's wooded landscapes have not been accurately categorized as forest or woodland. Consequently, the terms forest and woodland are being used interchangeably within this text.

The loss of woodland habitat in Iowa has been extreme, but not quite as severe as the loss of wetlands or grasslands. While prior to settlement woodland may have covered some 6.7 million acres, by the 1970s that had been reduced to approximately 1.5 million acres. Today, no known original old growth forest remains in the state! Currently, the state's forest cover is about 2.5 million acres, with the increase in recent decades mainly thought to be due to some wooded pastures being allowed to follow a path of natural succession to woodland.

We are left with about 1/3 of Iowa's original woodland habitat, with 2/3 having been lost through conversion to cropland, urban areas and various transportation systems. Approximately 92% of today's woodland habitat is privately owned; and for 150 years or longer, the most valuable trees have been selected for cutting. It is difficult to find a stand of timber which has not been grazed by cattle. All of these factors taken together, have left Iowa with woodlands that are greatly reduced in size, severely degraded, highly fragmented, and lacking in the diversity that they once provided.

Of the 37 IBA Criteria Species highlighted here, 15 are primarily woodland species. These are: the endangered Red-shouldered Hawk; the threatened Long-eared Owl; and the following high conservation priority species: Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's widow, Pileated Woodpecker, Bewick's Wren, Veery, Wood Thrush, Cerulean Warbler, Worm-eating Warbler, Kentucky Warbler, and Hooded Warbler.

Obviously, good woodland management will not only support populations of the species listed in the previous paragraph, when within their range, but it will also enhance habitat for many other species of birds and other wildlife. A good example of this is the Cerulean Warbler, an IBA Criteria Species which has experienced severe population declines in the past 20-30 years and is a candidate for Federal listing as threatened or endangered. This species requires mature, un-fragmented forests from several hundred to several thousand acres in size to sustain viable populations. Fortunately, managing upland forests for Cerulean Warblers is quite likely to benefit a whole host of other woodland species (several of which are area sensitive) including Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's widow, Pileated Woodpecker, Wood Thrush, Worm-eating Warbler, Kentucky Warbler and Hooded Warbler. Proper management of riparian forests benefits Red-shouldered Hawk, Long-eared Owl, Veery, and Prothonotary Warbler.

Each of the species listed in the paragraph above is an IBA Criteria Species – indicating that a great deal can be achieved if wise forest management practices are followed. Even though each of these species may have different habitat requirements, by managing large forested landscapes – whether upland or riparian – a wide range of habitat conditions will be provided that are necessary to support a variety of birds as well as a rich diversity of vegetation and other animals.

General guidelines for woodland management. Effective management for populations of IBA Criteria Species, as well as for other birds, basically means

appropriate management of woodland tracts large enough that successional stages can occur. Tracts of timber of at least 250 acres in size are recommended to meet this criteria, and forested blocks of 1,000 acres or larger may be needed to support and sustain species which are highly sensitive to woodland fragmentation. Some forest management practices may need modification to achieve the conditions that are required by interior forest species, but such modifications should not drastically alter ongoing forest management practices if they are intended to be sustainable.

Whenever possible in highly diverse forests or riparian woodlands, landowners and land managers are encouraged to avoid clear-cutting over large areas in favor of selective harvesting. Selecting individual trees for harvest mimics natural tree fall, and is the preferred harvest method. Cutting small patches (of 5 acres or less) should be used only in moderation. If a patch cut is done it should be used in a pattern that minimizes creation of new edge between forest and other habitats. Maintaining core areas of maximum size will lessen the negative effects of logging on forest interior species. Mature forest tracts should be retained, or managed for, as the core of management units whenever possible.

A balanced combination of even-aged management practices and selective cutting methods (both planned for sustained yields), should provide habitat for most forest birds. While sustaining large tracts of mature trees is critical for healthy populations of interior and area-sensitive nesting species, creating a patchwork or mosaic of early and mid-successional woodlands will also provide habitats that are utilized by a wide variety of woodland species during all seasons of the year.

Leaving dead snag trees standing is encouraged to provide habitat for woodpeckers and other cavity nesting birds. If a system of rotational cutting and replanting is followed, even-aged stands should ideally be increased to at least 100-150 years. Cuttings should be planned so that stands of the oldest trees are next to stands of other older trees, and the younger stages are adjacent to other young stands.

All patches of woodland are important for birds regardless of their size. The same small and/or isolated stands of timber that may not be valuable as nesting sites in summer for declining bird species, may be extremely important as migratory stopover and refueling sites during spring and fall migration.

Landowners and land managers are encouraged to seek professional guidance for specific issues and any questions they may have about woodland management for birds. On-site assistance is available from Iowa Department of Natural Resources Biologists and Foresters. Contact information is provided at the DNR website: www.iowadnr.gov . In addition to printed materials from the Iowa DNR, the Iowa Natural Heritage Foundation can provide a very helpful reference entitled *A Bird's Eye View: A Guide to Managing and Protecting Your Land for Neotropical and Migratory Birds in the Upper Mississippi River Blufflands*, by Marlene Ehresman.

Recommended Woodland Management Practices

The following section contains summarized recommended woodland management practices.

Avoid further fragmentation or destruction of forest habitats that remain. The single most important step a landowner or land manager can take to maintain and possibly increase populations of species that require nesting toward the interior of larger woodlands, is to avoid fragmentation and destruction of existing large forest blocks. Unlike wetland and grassland habitat that can be re-created

within a couple of years, recreating a forest can take many decades. Therefore, the first rule is this: retaining an existing woodland is far superior and easier to sustain than trying to reconstruct a forest after it has been eliminated.

Many research projects have concluded that rare and declining area-sensitive species are found most often in mature, infrequently disturbed forests. Therefore, efforts to manage and improve woodland conditions are justified. Protecting and carefully managing tracts of timber that are known to support populations of IBA Criteria Species and various other species should be the highest priority.

Remove livestock from woodlots and control deer numbers. Most of Iowa's woodlands are in a degraded condition. It is, therefore, very important that improvements are made as soon as possible. Unfortunately, many Iowa woodlands still have cattle grazing within them. Livestock are extremely detrimental to forest health. Livestock remove understory woody and herbaceous vegetation that many woodland birds need for nesting and feeding, cause excessive compaction of woodland soils, and thus cause damage to trees of various ages. Fencing livestock out will allow woodlands to recover, but this can take years. It is best to eliminate grazing as soon as possible.

As browsers, White-tailed Deer are also destructive to shrubs, small trees, and other vegetation of the woodland floor. An overabundance of deer can cause damage that is evident for many years. Good examples of this can be seen in urban parks and state parks in which deer have not been hunted. With major deer predators such as Mountain Lions and Timber Wolves eliminated from Iowa, the best option for controlling deer numbers is now increased harvest by hunters. Numerous studies have shown that declines in populations of some woodland birds are directly related to increases in deer densities.

There is still a need to quantify and understand how certain woodland birds respond to various changes in deer densities, and also to know what deer densities are allowable without causing negative affects on IBA Criteria Species such as Veery, Wood Thrush, and Kentucky Warbler that nest near or a short distance above the ground. Until better information is available about what sustainable deer densities are for nesting birds, deer numbers should be reduced in any woodland where there is an apparent browse line from deer foraging. In such cases, a minimum response would be to reduce deer numbers to a level that allows the woodland to recover to the point where the browse line is no longer visible.

Manage for woodland quality and structure. The quality of a woodland is related directly to the structure and health of its component trees. Forest quality definitely plays a major role in providing stable breeding and feeding areas for IBA Criteria Species and other birds and wildlife. A well-developed forest canopy and sub canopy is crucial to some species; and maintaining a well-developed shrub layer with numerous flowering plants on the woodland floor is especially important to an even larger number of woodland birds. It is not well known that forest birds require the food, nest sites, and protective cover that a forest's lower level vegetation provides, but this is often the key component for at-risk bird species.

Landowners and land managers should strive to achieve a diverse assemblage of native trees and shrubs, as well as woodland grasses, sedges, flowers, and other vegetation. As the previous section described, removing livestock and significantly reducing deer numbers, will help all lower-level foliage recover. Another crucial factor is minimizing forest alterations

and disturbances of all types during the nesting season (late April through early August) to encourage maximum nesting success.

Manage for larger, non-linear blocks of habitat and manage to decrease edge. Landowners and land managers should strive for as large a block of contiguous woodland as possible, and manage the property so that it is round or square, and not linear in shape. The goal should always be to have as little edge as possible, as round or square shapes offer less access to the forest interior for predators and Brown-headed Cowbird nest parasites than do long, narrow strips of habitat with a larger proportion of edge. Research has shown that area-sensitive bird species such as the IBA Criteria Species Red-shouldered Hawk, Broad-winged Hawk, Worm-eating Warbler, Cerulean Warbler and Veery, are more likely to nest successfully within areas of woodland that are at least100 meters (100 yards) from a forest edge.

To further minimize fragmentation and edge with woodland tracts, power-line corridors, roads, campgrounds, and other human intrusions should be placed around the edges of woodland tracts – and not within the interior. It is unfortunate that many of Iowa's county, state and federal owned properties are highly fragmented by these types of developments. Managers of Iowa's IBAs should minimize fragmentation and edge whenever possible.

In general, the greater the fragmentation and the lower the proportion a woodland is to the overall landscape, the lower bird nesting success will be. Research in Illinois has shown conclusively that isolated woodlands of less than 175 acres are population sinks (where mortality is greater than reproductive production) for area-sensitive Neotropical migrant birds. Studies are needed in Iowa to determine what the minimum sized woodland tract is that will sustain multiple pairs of IBA Criteria Species such as those mentioned in the first paragraph of this section.

Manage for soft edges to woodland tracts. In addition to the total length of edge associated with a specific woodland, how that forested edge is managed affects nesting success by birds. For example, a sharp or "hard" edge as found where a soybean field meets a mature forest, will attract many nest predators such as raccoon, skunk, and Brown-headed Cowbirds.

Landowners and land managers can create a "soft" edge by allowing the edge to naturally re-vegetate or by planting a buffer strip of native shrubs or sapling trees. By blending two distinct habitats, such as a soybean field and a mature forest, more gradually, opportunities for nest predators will be significantly decreased, while nesting success for shrub nesting species – as well as nearby forest nesting birds that are no longer victims of predation – will increase.

Enlarge existing woodland tracts by selective reforestation. Replanting trees within forest openings will serve several woodland management purposes including: reducing edge, reducing fragmentation, and increasing overall woodland tract size. This recommendation applies especially to ridge tops and bottomlands within wooded areas that have been cleared to plant agricultural crops.

This practice of reforesting interior openings is also very effective in reducing nest predation and nest parasitism by cowbirds, and, thereby, increasing nesting success of many species of birds. Tips on tree planting or forest reconstruction can be obtained from DNR District Foresters and County Extension Service offices.

Consolidate and connect blocks of forest habitat. A key practice we recommend is that landowners and land managers work to minimize isolation effects

between wooded tracts. A wooded corridor that connects two isolated tracts of woodland will provide habitat to a greater variety of bird species than two tracts that are widely separated. Woodland species in connected woodlots experience higher nesting success, and land managers should concentrate on retaining connectivity where it exists, and re-establish it where it has been lost.

Whenever possible, adjacent landowners should cooperate and manage adjacent woodlands as one contiguous block. In general, the larger the block of woodland that is managed, the more species of birds and other wildlife that woodland will support. One way to achieve this is to plant the recommended native trees to increase connectivity. Such trees can be purchased from the Iowa DNR State Forest Nursery in Ames, or from private tree farms and nurseries.

Manage to reduce or eliminate invasive species. Non-native and invasive species are one of the fastest increasing threats to wildlife and wildlife habitat. Inappropriate woodland practices, such as livestock grazing and over browsing by excessive numbers of deer, can open the door to infestations of invasive species. Degraded woodlands can be restored with attention to removing undesirable non-native species such as garlic mustard, common buckthorn, honeysuckle, autumn olive, and multi-flora rose, whenever possible.

Garlic mustard, in particular, has already infiltrated most of Iowa's woodlands and is quickly carpeting woodland floors and choking out native vegetation that had previously provided nesting and foraging habitat for birds and other wildlife. Other invasives can create an equal number of problems for Iowa's woodland owners and managers.

Removal methods for invasive species include pulling, cutting, burning, and careful use of specific herbicides. Both the Iowa State University Extension Service and the Iowa Natural Heritage Foundation can provide information on how to reduce or eliminate invasive species from wooded property.

Riparian woodlands require additional consideration and management. Floodplain forests along Iowa's rivers and streams have generally suffered greater depletion and more degradation than upland forests. Coupled with this, are research reports which demonstrate that wooded riparian areas on the Upper Mississippi River floodplain support twice the abundance of birds as nearby upland forests. Taken together, these two characteristics of riverine (river and stream) woodlands make them critically important to conservation efforts.

Healthy populations of the birds that inhabit wooded floodplains require appropriate habitat, and this particular habitat is quite different from upland wooded habitat. Fortunately, after due consideration of the differences is taken into account, most of the practices used to manage upland woodlands for birds are also used to manage riparian woodlands for birds.

Because the woodland corridor that follows a river or stream (or forms a ring around a body of standing water) is extremely important to migrating (and especially nesting birds), a primary management recommendation is to prevent additional losses of this special riparian woodland, and to restore the diversity of the riparian forests that remain intact.

One of the key aspects of riparian woodlands that landowners and land managers need to remember in order to effectively manage these habitats for IBA Criteria Species and other nesting birds, is that riparian habitats have a relatively great length and narrow width. Specifically, when attempting to manage a linear *riverine*

habitat (one that runs parallel to a river or stream), the width of that habitat type is the primary dimension available for management. This stands to reason because the total length of a floodplain wooded habitat in a riverine system is nearly always beyond ones ownership or jurisdiction.

IBA Criteria Species such as Red-shouldered Hawk, American Woodcock and Prothonotary Warblers have a very strong affinity for riparian woodlands. But, typically these species do not nest in wooded riparian areas narrower than 50 yards. Some research indicates that riparian woodlands need to be at least 200 yards in width, and still other research, conducted on larger rivers, suggests that the width should be at least 600 yards to support appropriate assemblages of riparian nesting species. Clearly, achieving and maintaining a maximum width (perpendicular to flow of river or stream) for riparian woodlands, is a critical consideration when managing for nesting and migrating IBA Criteria Species, and other birdlife.

Another key practice that we recommend is either aggressive protection of boundaries, or re-planting of trees, to achieve the largest intact contiguous woodland, with maximum width to support area-sensitive species. In other words, the wooded riparian corridor should be as long and as wide as possible.

By maintaining floodplain woodlands with as much width as possible, and by using wooded corridors to connect these stands to woodlands in the uplands, managers can significantly reduce predation and cowbird nest parasitism; and at the same time increase the total reproductive capacity for all birds in both habitats.

Naturally recommended management practices for woodlands in drier situations also apply to riparian woodlands. If necessary, landowners and land managers may review this entire section on woodland management for birds, with riparian woodlands firmly in mind.

Section 3: Grassland Management for Birds

Less than 1% of the Midwest native prairies that dominated the landscape prior to Euro-American settlement remain today, so there are many reasons to be concerned about the birds and other wildlife that once were incredibly numerous across these landscapes. As one example, the entire mesic tallgrass prairie ecosystem is currently considered by experts to be critically endangered.

At one time, prairie plant communities covered at least 70% of Iowa, and these were diverse assemblages, with over 250 plant species at a single site, which on average, were 60% grasses, 35% forbs, and 5% shrubs. These vast landscapes were changed very quickly after settlement, and today the vast majority of those original prairie grasslands have been converted to agriculture, cities and towns, transportation systems, and a variety of other human uses. By the later half of the 20th Century, two crops, corn and soybeans, blanketed a great deal of a state that once was approximately 70% native prairie, 11% natural wetlands and 19% native woodlands.

During the last several decades, grassland birds of Iowa and the Midwest have declined more extensively than birds associated with other habitats of this state and the region. Three of these species, Grasshopper Sparrow, Bobolink, and Loggerhead Shrike, are among the fastest declining Midwest birds, and each is an IBA Criteria Species. Other grassland species that have declined as their preferred habitat has disappeared include: Greater Prairie-Chicken, Northern Harrier (endangered), Short-eared Owl (endangered) and Henslow's Sparrow

(threatened). Each of these is also an IBA Criteria Species.

Despite a history showing an extreme rate of wholesale elimination, and varied degrees of degradation of what little native prairie remained in the early 21st Century, there are some good reasons to have hope for a better future for this state's prairies and grasslands. As interest in native plants expands, and more and more effort is being put into prairie restoration and enhanced management of grasslands, the future looks brighter than many would have believed just a few decades ago.

There are several primary concepts behind improving grassland habitat for IBA Criteria Species and for other birds and wildlife. These include: protecting, and in some cases establishing large contiguous blocks of grassland habitat; developing structurally diverse grasslands; eliminating or managing detrimental disturbances to grasslands, especially during the nesting season; reducing problems associated with edge; eliminating and controlling invasive species; and controlling encroachment from woody plants.

Recommended Grassland Management Practices

The following sections describe recommended grassland management practices for bird species in need of help.

Avoid destruction or further fragmentation of grassland habitats that remain. A very high priority should be given to preserving, maintaining and restoring our state's remaining grassland habitats that are un-fragmented, or nearly so. Fragmented grasslands are those that have been subdivided by interior parcels of cropland, farmsteads, or other non-grassland landuses; or bisected by roads, highways and railroad lines that separate the "original whole habitat" into smaller and smaller sub-units.

It's a pervasive theme throughout conservation biology initiatives that birds (especially those in steep and steady population declines) and many other forms of wildlife, are able to sustain and grow their numbers more easily in the largest grasslands, than they are able to do in small fragmented grasslands. Therefore, special effort should be made to acquire or jointly manage adjacent grasslands in order to develop the largest possible grassland complexes and avoid fragmentation.

Each of the public property complexes of 2,000 acres or more of grassland that have been identified, or will be identified in the future by the Iowa DNR Wildlife Diversity Program as Bird Conservation Areas (BCAs), are synonymous with Iowa Audubon's IBAs. A prime example of a large BCA that is also an IBA, and deserving of protection from further fragmentation is the 67,000 acre Kellerton Grasslands in Ringgold County. Because of its size and quality of habitat, this IBA supports the only consistent breeding population of Greater Prairie-Chickens in Iowa (an IBA species of high conservation priority), as well as nesting Short-eared Owls (endangered), Northern Harrier (endangered), Henslow's Sparrow (threatened), Loggerhead Shrike (species of high conservation concern), and a number of other declining grassland species. It is more difficult to sustain populations of each of these IBA Criteria Species, and numerous other wildlife species in fragmented grasslands than it is in large grassland units that are not fragmented.

Manage grasslands for larger, non-linear blocks of habitat. Closely aligned with the need to avoid fragmentation is the important goal of securing the largest possible blocks of grassland habitats. As with wetlands and woodlands, the larger the block of contiguous grassland habitat – and the smaller the linear edge of an area that

is under active management – the better that habitat will support IBA Criteria Species and all wildlife that prefers grassland habitats.

Grasslands in a round shape provide maximum interior and minimal outside edge where two completely different landuse types abut each other. The next most preferred shape is square, followed by rectangular. Grasslands that are irregular in shape are likely to have too many unproductive linear edges that promote excessive nest predation by several mammalian species, and nest parasitism from Brown-headed Cowbirds. Irregularly shaped grasslands should be restored or reconstructed as quickly as possible to form round or square shaped habitats with minimal edge effect, and maximum potential for nesting success.

Some researchers and land managers have discovered that grassland management complexes in the Midwest should be at least 10,000 to 50,000 acres in total size, should contain a permanently protected core area of at least 2,000 acres, and have at least 35% of the overall complex maintained in permanent or long-term grass cover. However, to achieve appropriate habitat for species that are most sensitive to grassland fragmentation, at least 125 acres, and preferably 250 acres, should be managed for improved grassland habitat. For species that are the least area sensitive, grassland tracts of less than 50 acres can still benefit grassland species if carefully managed.

The critically important points of this recommendation are: 1) to prevent destruction and fragmentation of any grassland that may currently exist, and 2) to acquire or cooperatively maintain and manage the largest possible block of grassland acres.

Consolidate and connect adjacent blocks of grassland habitat. One of the major obstacles to the ability of a grassland to support significant populations of declining bird species is the surrounding landuses. For example, a small grassland that is surrounded by woodland, farmsteads or urban areas will be less likely to support good reproduction by IBA Criteria Species and other wildlife species. However, if that same grassland were surrounded by hay fields, pasture, small grain fields and even row crop fields, its potential for supporting these same species would surely increase.

When management of at least 50 acres of grassland is not possible, landowners and land managers can try to clump smaller units of grasslands as close to one another as possible. It is especially important to make sure that small grassland habitats are connected with corridors such as grassed waterways, vegetated fence lines, and similar vegetated lanes to make clumped small grasslands as much like large block grasslands as possible.

Manage to reduce depredation of nesting birds, and their eggs and young. When grasslands are small, made up of disjointed units, or have too much overall linear edge, nest predation and nest parasitism can be serious problems, and annual reproduction can be greatly reduced, or at times eliminated. Potential predators include raccoons, feral cats, skunks, opossums, foxes, American Crows and Blue Jays. Many of these predators concentrate on the edges of grassland habitats, and predation can impact both adults and recently fledged young birds.

In addition, raptors like Great Horned Owls and Red-tailed Hawks prey on adult and young birds, and concentrate their efforts near the edges of grasslands where they often scan and hunt from perches. Research done in Minnesota tallgrass prairie found that nest depredation rates were lower in large grasslands (described as being 325 to 1,215 acres in size) than on smaller (40 to 80 acre) grasslands; and

nest depredation was also lower beyond 50 to 55 yards from the outside edge of a grassland. To reduce predation by both mammals and birds, we recommend that managers create grassland blocks as large as possible.

Once again, reducing the amount of linear edges and maximizing the interior of grasslands is a key to successfully producing good numbers of IBA Criteria Species and other forms of wildlife.

Manage to reduce nest parasitism from Brown-headed Cowbirds. The reproductive strategies of Brown-headed Cowbirds, called nest parasitism, are interesting biologically, but also a significant threat to other grassland bird species. These strategies include: laying their eggs in the nests of other species; sometimes removing a host bird's egg before laying their own; laying a large number of eggs and spreading them widely among numerous host species during each breeding season; being able to lay an egg very quickly when a host nest is discovered; eggs typically hatching 1-3 days earlier that those of host species; and host species incubating cowbird eggs and feeding young cowbirds as their own offspring.

Taken together, the reproductive strategies that Brown-headed Cowbirds have evolved (since following constantly moving Buffalo herds across North America) have been successful for cowbirds, but quite detrimental to the annual reproductive success of many grassland bird species. Because female cowbirds find other birds' nests to parasitize by watching from perches in nearby tall trees, one way to manage grasslands to reduce the negative impact of cowbirds, where this species is a problem, is to remove woody vegetation perch sites near the edges of grasslands.

Because research projects have shown that nest parasitism by cowbirds decreases significantly the farther host nests are placed from perch trees, we can recommend an even better management strategy. Manage grasslands in maximum size blocks with the minimum amount of linear edge. Therefore, the larger the blocks of contiguous grassland, the more effective they will be in minimizing cowbird nest parasitism.

Manage to eliminate or reduce invasive species. Today, most of Iowa's grasslands are comprised of non-native, and invasive species. These invaders compete with and displace native plants. They reduce overall plant diversity and tend to create monocultures (single species) environments that are not beneficial to native bird species and other native wildlife.

Invasive plant species in grasslands that out compete and displace natives include: the European form of reed canary grass, fescue, smooth brome, crown vetch, sericia lespedeza, and leafy spurge. We recommend that none of these or other invasive plant species be planted or propagated in Iowa. And grassland management should be taken to eliminate or at least control the spread of all invasive plant species.

It should be remembered that Iowa's original grasslands and prairies included about 5% shrubs. This is a valuable guideline when determining the amount of shrubs that are appropriate in grasslands. Non-native shrubs should be avoided, of course, but native shrubs, making up to 5% of grasslands, can be beneficial to the following IBA Criteria Species of high conservation priority: Loggerhead Shrikes, White-eyed Vireo, Bell's Vireo, and Yellow-breasted Chat.

General overview of grassland management. Native grassland ecosystems across the Midwest have evolved over many centuries. Throughout this period, native grasslands have adapted to disturbances, and primary among these

are grazing by large ungulates, and periodic burning. Without some form of disturbance or specific management intervention, upland grasslands in Iowa will undergo a plant succession process that includes being invaded by, and eventually replaced by, woody vegetation – which will exclude grassland birds from using that space.

The three primary management tools that managers typically use to maintain healthy grassland habitats and prevent succession by shrubs and eventually trees, are: prescribed burning, grazing, and mowing. We recommend rotating these management practices in any specific grassland in order to increase or maintain the diversity of both vegetation and wildlife.

We also strongly recommend the correct timing of prescribed burning, grazing and mowing practices, in order to avoid destruction of nests. Whenever possible, management treatments should be conducted before grassland birds nest (before early April), or after the young are fledged (after mid-September). Each of these primary management practices is described in greater detail below.

Specific practice – prescribed burning. This grassland management technique is especially preferred for management of warm season grasses and forbs that evolved with sporadic fires. Periodic prescribed burning reduces woody plant growth, eliminates thatch build-up, and helps reduce and control nuisance problems from invasive plants, and can increase plant diversity and change plant structure.

To minimize negative impacts to reptiles and amphibians, prescribed burns should always be conducted by the beginning of spring in March, or in the fall during October and November.

Maximum success is usually achieved when managers select grassland areas of at least 250 acres, and then divide that area into prescribed burn subunits no smaller than 50 acres in size. We recommend a rotational burning program in which 20-30% of the entire grassland is burned each year – meaning that each subunit is burned at least once every five years. Burning over half of the area of small prairie remnants in any one season should be avoided. The only exception to this rule of thumb is when burning an entire fragment of grassland and there is another grassland remnant immediately adjacent that remains unburned.

Specific practice – grazing. Grazing is a valuable management practice for a number of the rapidly declining grassland bird species. This practice is especially useful for bird species that prefer short to medium vegetation heights. It can be used to achieve the following specific grassland objectives: reduce litter accumulation, reduce woody vegetation, and control vegetation height.

Grasshopper Sparrow and Bobolink (both IBA Criteria Species of high conservation concern), Eastern Meadowlark and Upland Sandpipers, in particular, greatly benefit from appropriately grazed pastures.

Light grazing is defined as grazing pressure that leaves no less than 40% of vegetative cover at 10 inches of height; and moderate grazing is when grazing pressure creates an average height of vegetation of 8-12 inches.

To increase the variation in vegetation heights and densities within and between grazing units, we recommend a rotational grazing system involving two or more grazing units and light to moderate levels of grazing. To maintain plant vigor, warm-season grasses in tallgrass prairies should not be grazed to a height that is less than 10-inches during the growing season. Cool-season grass pastures can withstand heavier grazing. In certain cases (where the species is probable), this practice will

create openings that are required for booming grounds by Greater Prairie-Chickens.

Specific practice – mowing. Like prescribed burning and grazing, the management practice of appropriate mowing can be used to lower vegetation height, reduce litter build-up (when mowed vegetation is harvested), and control woody vegetation. And the effect of mowing is most like that of burning.

Obviously, mowing during the nesting season is highly detrimental to grassland nesting birds of all types. Therefore, we recommend that no mowing take place until after the nesting season.

Where grasslands are being managed for the various sharply declining bird species, we recommend rotational mowing at a rate of once every two to four years. Species like Henslow's Sparrow (threatened IBA Criteria Species) do best with at least a two-year mowing rotation, while Grasshopper Sparrow (IBA Criteria Species of high conservation priority) do well with an annual or biennial mowing rotation. If at all possible, the mower height should be set at least six inches above the ground to lessen killing or injury to reptiles and amphibians that also utilize the grassland habitat.



Iowa Audubon

REAP
Resources Enhancement and Protection
IOWA DNR

Connecting Owners and Managers of Iowa Important Bird Areas (IBAs) to the Global Network of IBAs

Habitat Management Recommendations for 37 of Iowa's Most Seriously Declining Birds

Part 4: Species Accounts

Biology and Life Histories of Iowa's 37 Identified IBA Criteria Species

Part 4 provides 37 species accounts which summarize available information on the biology and life histories for each bird species that's at the core of the Iowa IBA Program. While each description was derived from data found within excellent references, the accounts are summaries only. When used in conjunction with popular field guides for the identification of birds (which are readily available to everyone who is interested in Iowa's birdlife), these accounts will provide landowners, land managers and others with the information needed to develop a good understanding of each species.

For consistency, and to meet our goal of being user-friendly, each species account consists of the following sections: common name, scientific name, photo, population status, introduction, habitat preference, feeding habits, breeding biology, concerns and limiting factors, and habitat management recommendations.

Owners and managers of IBAs and potential IBAs are urged to go first to the species account for the species or members of a suite of species for which they are interested in managing. They can then refer to the appropriate section within Part 3 (management of wetlands, woodlands or grasslands) for more habitat management recommendations.

LINK TO IOWA IBA:

Space limitations prevent an in-depth discussion of the fascinating individual physical characteristics and behaviors of each of the 37 species Iowa Audubon's Technical Committee identified as IBA Criteria Species. However, for those who wish to know our state's endangered, threatened, and high conservation priority species in more intimate detail, the following references, listed in order of helpfulness, are recommended:

Birds of North America Online This comprehensive resource from the Cornell Laboratory of Ornithology was used extensively to compile species accounts. It contains dozens of intricate details about the lives of all North American birds, and is highly recommended for those seeking more specific and little known details about the biology and life histories of various bird species: http://bna.birds.cornell.edu/BNA/

Lives of North American Birds, 1996. Kenn Kaufman.

The Iowa Breeding Bird Atlas, 1996. Laura Spess Jackson, Carol A. Thompson and James J. Dinsmore.

Birds in Iowa, 1996. Thomas H. Kent and James J. Dinsmore.

Species accounts for each of the following Iowa IBA Criteria Species are provided in this section.

Endangered Species

1. Bald Eagle
2. Northern Harrier
3. Red-shouldered Hawk
4. Peregrine Hawk
5. King Rail
6. Piping Plover
7. Least Tern
8. Barn Owl
9. Short-eared Owl

Threatened Species

10. Long-eared Owl
11. Henslow's Sparrow

Species of High Conservation Priority

12. American Bittern
13. Least Bittern
14. Black-crowned Night-Heron
15. Broad-winged Hawk
16. Greater Prairie-Chicken
17. Common Moorhen
18. American Woodcock
19. Forster's Tern
20. Black Tern
21. Black-billed Cuckoo
22. Chuck-will's-widow
23. Pileated Woodpecker
24. Loggerhead Shrike
25. White-eyed Vireo
26. Bell's Vireo
27. Bewick's Wren
28. Veery
29. Wood Thrush
30. Cerulean Warbler
31. Prothonotary Warbler
32. Worm-eating Warbler
33. Kentucky Warbler
34. Hooded Warbler
35. Yellow-breasted Chat
36. Grasshopper Sparrow
37. Bobolink

Sound Recordings in this Document

Sound recordings of bird calls and song are imbedded in each species account.

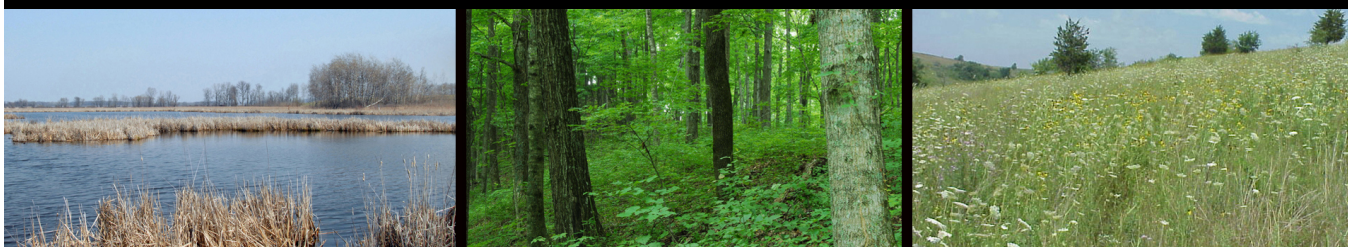
Click the title name of each species located on the first page of each species account to trigger an MP3 recording.

For example, click on the words Bald Eagle below:

Bald Eagle

You should begin hearing a recording of a Bald Eagle

If you do not hear any sound check your computer's volume control or, you may need to update your computer's media playback software depending on your computer's operating system.



STATUS: ENDANGERED

Listed as Endangered by Federal and State Agencies but at this writing, may be removed from the Federal List

Bald Eagle

Haliaeetus leucocephalus

Introduction

Because of its recent endangered status, when a habitat in Iowa supports confirmed or probable breeding Bald Eagles in at least 2 of the previous 6 years – that habitat will qualify for Important Bird Area (IBA) status. However, this species has made a strong comeback across our state, and it may be removed from the Threatened and Endangered Species list at some point in the future.

The Bald Eagle was selected by Congress in 1782 to be the national emblem of the United States. With a wingspan of seven feet and a snow-white head and tail that contrasts with a large dark brown body, the Bald Eagle is a magnificent national symbol that citizens should be proud of. The Bald Eagle has long been revered by a variety of human cultures, and parts have shown up regularly in archaeological investigations across North America. In recent years, the Bald Eagle has served as a symbol of freedom associated with democracy, wilderness and an environmental ethic.

Being one of the most studied North American birds, with well over 2,000 individual published articles on various aspects of its life history and biology, and being the subject of a large number of contemporary books, the Bald Eagle is more easily recognized and is better known than are the other 36 priority species that are part of Iowa's Important Bird Areas (IBA) Program.

During the past two centuries the Bald Eagle has undergone wide and dramatic population fluctuations in the United States. Early explorers of North America often reported it as being abundant, especially in areas with large expanses of aquatic habitat. In fact, Bald Eagles were so abundant in Alaska that a 50¢ bounty was placed on them in 1917. That was increased to $2 in 1949 and many thousands of Bald Eagles were purposely killed before the bounty was overruled by federal

regulation in 1952. Prior to 1830, Bald Eagles were common in and nested throughout Iowa but there was no nesting in the state between 1892 and 1905.

The species was listed for protection under the Bald Eagle Protection Act in 1940 and the southern subspecies was listed as Endangered in 1966 under protection of the Endangered Species Preservation Act. The entire Bald Eagle population in the contiguous United States was listed for protection in 1978 under the Endangered Species Act of 1973. In those places where this species continued to breed at mid-century, unusually high numbers of nest failures were noted following World War II. Pesticides, primarily DDT but also other man-made materials that were poisons, were proven to have drastically lowered reproductive success.

In the mid-1970's Bald Eagles began nesting in Iowa again, and their sharp and dramatic recovery in our state and elsewhere is attributed to the ban on DDT in 1972. Persecution in all of its many forms slowed as environmental awareness increased. The majority of nesting still occurs near large bodies of water such as the Mississippi River, but it has expanded rather quickly into the interior of our state. This rapid recovery is one of the continent's most successful conservation stories. It is a story that should be remembered as efforts to protect and restore other, less well-known species – that are also priorities species, begin to take place through Iowa's IBA Program and other bird conservation activities.

Habitat Preferences

The largest numbers of Bald Eagles occur in Iowa during the colder months when birds from northern states and Canada migrate south to utilize food and roosting resources along Iowa's larger rivers and reservoirs. Severe winters push the eagles further south, while mild winters allow them to remain further north.

In Iowa, Bald Eagles generally prefer tall trees in wooded areas adjacent to bodies of water for nesting. Most nests are placed within larger wooded tracts, away from human dwellings and roads. In some cases, distance from nest to water is not as critical as the quality of feeding opportunities found nearby. Preferred feeding areas provide diverse, abundant, and vulnerable prey species and little if any human development or disturbance.

The size of woodlands providing a potential nest tree may be of little importance if the wooded area is isolated from human development and disturbance, and food is readily available. Bald Eagles prefer to nest in large trees with relatively open canopies. Eagles tend to use as perch sites tall, easily accessible trees adjacent to water bodies where dead or dying fish can be located with their excellent eyesight.

Habitat use during migration is similar to habitat used in winter. Suitability of stopover habitat is mostly related to food availability rather than vegetation type. These sites may feature consistent fish-kills or water turbulence such as that found below dams or near the outfalls from electricity generation facilities, or possibly the presence of large mammals as carrion – especially where piglets and other livestock are disposed of in open fields. Most stopover sites have traditional, long-used roost sites, which are often clumps of mature deciduous trees near water bodies that are protected from human disturbance and near feeding opportunities.

Concentrations of several hundred Bald Eagles have been recorded at roost sites and areas of seasonally concentrated food along the Mississippi River and in adjacent counties in Iowa. Large winter concentrations may also be found along interior bodies of water that remain ice-free.

The preferred winter habitat has available food, roost sites that provide protection from severe storms, and the absence of human disturbance. Bald Eagles will tolerate some human activity in areas where fish are readily available for food.

Our national bird selects large roost trees that are open and accessible. Roosts are generally associated with aquatic feeding areas, but they are not located nearly as close to water as nests are. Eagles may roost many miles from feeding areas, but such sites are located away from areas of consistent human disturbance. The major factor driving roost-site selection may be the ability to save energy during winter, and most roosts are located in areas that are protected from prevailing winter winds.

The key to maintaining healthy numbers of breeding Bald Eagles in Iowa is unmolested nesting sites and availability of food – which is primarily fish.

Feeding Habits

The Bald Eagle is an opportunistic forager that eats a wide variety of prey. It prefers dead or dying fish over other types of food; and scavenges prey items, takes food from other species (including other Bald Eagles) when it can, and usually as a last resort, captures its own living prey.

Bald Eagles hunt from perches or while soaring over suitable water habitat, and sometimes over agricultural fields. They often attempt to take small prey on the wing (e.g., fish, waterfowl, small mammals) but success varies greatly. Carrion of many different kinds of fish, birds, and mammals are used extensively when encountered at sites that allow disturbance-free access to the ground. As an opportunistic feeder, the food habits of Bald Eagles are highly varied and based primarily on availability of particular prey species.

Hunting for prey over shallow water increases the likelihood that live fish will be seen and captured. Gizzard shad and other shallow water species seem to make up a large proportion of the diet of Bald Eagles in Iowa.

Any natural or human-caused event that kills or stuns fish or other potential prey species may also provide food. For this reason Bald Eagles commonly feed below large outflows from dams and electricity generating facilities, especially in winters when other bodies of water are ice-bound. High water temperatures and oxygen depletion in shallow areas during hot periods in summer, or oxygen depletion in shallow, iced-over areas during severe winters, often lead to sporadic fish-kills and concentrated feeding opportunities for Bald Eagles. This predator/scavenger also watches traditional waterfowl concentration areas in winter where hunter-induced mortality leads to a reliable supply of waterfowl carcasses for scavenging.

Adults are more apt to capture live prey than immatures because of superior foraging ability and experience. To capture live prey, Bald Eagles soar overhead to visually locate an item, then suddenly stoop (dive) and attempt to capture the food with their talons (feet). Most prey is taken to a nearby perch for consumption, although small items may be consumed on the wing.

Some large food items such as mammal carcasses may be fed on for many days. This species can consume large amounts of food at one time (gorging); and individuals may store food in their crop and digest it over several days. Bald Eagles are also capable of fasting for many days. There are very few documented cases of hazing attacks against living livestock; and very few, if any cases where Bald Eagles have been blamed for the death of livestock.

Breeding Biology

Bald Eagles usually construct a nest made of sticks in the fork of a large tree. Nests

are frequently reused year after year, with new sticks and other materials being added throughout the year, and specially during courtship and mating. Because the addition of new sticks is a part of their courtship ritual, nests can ultimately measure as much as 7 feet across by 12 feet deep, and may weigh two tons. These are among the largest nests of any bird.

Adult Bald Eagles can be seen perched near their large and conspicuous nests as early as late fall or early winter prior to the breeding season. In Iowa our national symbol may be on nests by mid to late-February. The female lays one to three white eggs. Two eggs are most common. Both adults incubate. Incubation lasts about 35 days.

Only 1 brood is raised per year. Replacement clutches are possible if eggs are destroyed during incubation. One egg is laid per day and incubation begins when the first egg is laid, thus young hatch over a period of several days. The difference in hatch date gives the first hatchling a significant advantage in competition for food. Both parents bring food to the nest and feed the young.

For several weeks prior to first flight from the nest (fledging), the nestlings flap their wings vigorously and walk to adjacent limbs to practice flight, and to develop muscle strength, flight coordination, and landing ability. Up to half of nest departures are unsuccessful; such young may remain on the ground for weeks before flying. In most cases, parents will continue to feed these young on the ground.

The young normally stay in the nest for 11 to 12 weeks, but nest departure can occur from week 8 to 14. Adults may “encourage” nest departure by flying near the nest with prey items vocalizing when young are hungry. Humans climbing to nests with eaglets more than 6 weeks old can cause premature departure.

Immediately after leaving the nest, the young are dependent on adults for all food, and often follow adults to feeding sites. The body mass of the young may peak prior to leaving the nest, and may decrease after fledging, depending on food availability. For about two months after first flight, the young remain in the adult’s territory and may return to the nest to be fed by the parents. Fledglings develop hunting/scavenging skills by trial and error rather than learning from adults. First they scavenge fish carcasses along shorelines and then by picking up floating dead fish when in flight. During this period fledglings require fish as food almost exclusively.

Immature Bald Eagles require a prolonged period of time to reach maturation. After the young go through brown and mottled plumages for three to five years they gradually attain the characteristic white head and tail of adults, and reach sexual maturity.

Juvenile Bald Eagles apparently have little or no fidelity for any one area. Dispersal movements from nest sites are largely opportunistic and may be related primarily to local food availability, and weather conditions. Patterns of movement then develop that may be repeated year after year, with the same immatures using the same areas in summer and winter, as well as for migratory stopover sites.

Concerns and Limiting Factors

One of the obvious limiting factors for Bald Eagle populations, is that it takes much longer for the young of this large bird of prey to reach full physical maturity than it does the young of song birds and other types of birds found in Iowa. Therefore, human activity within 400 to 500 yards of nest sites, during courting, incubating or rearing young, is one of the most significant sources of mortality for this species. Bald Eagle nests should be avoided if at all possible, from February through July. And

then any alteration to trees and other vegetation should be minimized. Overall, persecution of eagles from hunting and trapping is thought to have steadily declined since the 1970s. Public understanding of wildlife conservation and the value of predators, including raptors, has likely led to the reduction in intentional human-caused problems. Another reason is improved law enforcement including protection under the Endangered Species Act after 1973. Fortunately, the payment of bounties (for any form of wildlife), is becoming a thing of the past. The ongoing decline in furbearer trapping that began toward the end of the 20th century has probably led to decreased eagle mortality as well, although few reliable data exist.

Egg-collecting generally stopped with passage of Bald Eagle Protection Act in 1940. But since that time eagles experienced decreased reproduction and survival from intentional and unintentional effects of a wide range of pesticides and environmental contaminants. Raptors such as Bald Eagles become secondarily poisoned through consumption of prey killed or sickened by pesticides. Misuse and overuse of biocides leads to accumulations of poisons in all forms of wildlife that exist as predators or scavengers, and for this reason man-made chemicals continue to be a concern and a potential limiting factor. Nationwide research over the past several decades indicate that DDT, closely related DDE, and dieldrin, each contributed to reproductive failures and declines in populations of Bald Eagles.

Eggshell-thinning data have shown improvement for most Bald Eagle populations since the ban on DDT and other poisons in 1972. Eliminating or greatly reducing these poisons from the environment accounted for most of the improvement in reproductive performance across the eagle's entire range. Despite this positive trend, a wide range of pesticides, heavy metals, and other environmental contaminants continue to pose threats to the survival and reproduction of Bald Eagles, and thus man-made compounds continue to be a concern. Because new chemical formulations are introduced regularly and other environmental contaminants change in significance over time, monitoring of reproduction and survival of Bald Eagles is warranted to detect possible problems in the future.

Other concerns and potential local-level limiting factors in Iowa include lead poisoning (reported in at least 34 states) which is considered a significant source of sickness and death in Bald Eagles. Sources of lead are typically pellets and bullets in hunter-shot waterfowl, deer, and other game species. The incidence of lead poisoning in Bald Eagles did not decrease after the 1991 ban on use of led shot for waterfowl hunting, suggesting that non-waterfowl sources of lead (e.g., lead fishing sinkers and hunting away from water), may be important. Up to 1/5 of dead Bald Eagles that have been studied die from impact injuries. As eagle habitat becomes more human-developed, the importance of this form of mortality is likely to increase. Bald Eagles are susceptible to collisions with power lines, telephone lines and other obstructions, and these may lead to injury and death from the collision or from electrocution.

Human disturbance is always a limiting factor and a concern. This is defined as any human activity that produces a change in eagle behavior, in contrast to human developments that directly alter the structure or composition of habitat. Disturbances take many forms, including mere presence of humans, human recreational activities, research activities, noise from various sources, forestry activities, farming activities, or construction activities. In general, humans on foot evoke the strongest negative reaction in eagles. In

winter, any disturbance increase energy demands and may reduce survival if feeding opportunities are limited; and during nesting and rearing of young from February to July, disturbances may lead to nest abandonment and reproductive failure.

Habitat Management Recommendations

The Bald Eagle is protected under the Bald Eagle Protection Act of 1940 (now the Bald and Golden Eagle Protection Act); which prohibits taking or possessing a Bald Eagle or any parts including feathers, eggs, and nests. The dramatic Bald Eagle population recovery has been due to passage of this act and the Endangered Species Act of 1973, which has maintained endangered status for this species, and many other species that had similarly rapid population declines.

Because of significant increases in nesting pairs, increases in productivity, and expanded distribution in Iowa and 47 other contiguous states, recovery goals for the Bald Eagle have largely been met. As this text is being written a nationwide effort is underway to remove the Bald Eagle from Federal Threatened and Endangered species list.

It can only be hoped that the Endangered Species Act will be strengthened and continued into the future so that numerous other listed species with decimated populations will be able to make recoveries similar to that made by the Bald Eagle.

Management recommendations for Bald Eagles are officially outlined in regional recovery plans. Management is based primarily on protection of nest sites using buffer zones, protection of individuals via legislative measures, and monitoring of populations through counts of breeding pairs and young produced annually. Buffer zones around nest sites are comprised of 2 or 3 concentric circles of specified distance in which land uses and human activities are restricted. The buffer-zone concept also applies to communal roost sites. We recommend consulting with staff of the Iowa Department of Natural Resources, Wildlife Diversity Program, or the U.S. Fish and Wildlife Service for current regulations.

In various areas forestry has been implicated in reduced nesting densities and reduced productivity. We recommend avoiding logging practices near nests and communal roosts.

The impacts of human development on or near shorelines and in adjacent large wooded areas are cumulative over time and therefore are ultimately detrimental. In general, any type of landscape impact should be avoided or minimized wherever possible if Bald Eagles breed, roost, or feed nearby.

Tolerance of human development varies widely and may be increasing in some parts of Iowa. If direct negative impacts by humans are reduced, Bald Eagles may be more tolerant of human development in the future, thus increasing the amount of available habitat.

In summary, a combination of management strategies is recommended in order to strengthen and sustain populations of our national bird. Reduction in shooting, trapping, and poisoning, protection of nesting habitat with buffer zones, and restoration of aquatic environments, including reduction of biocides and other environmental contaminants, are all positive contributions. Human development on the shorelines of Iowa's rivers, streams and reservoirs may ultimately limit habitat availability and hence the carrying capacity for Bald Eagles where habitat is not otherwise protected. Encroachment of development toward key areas used by Bald Eagle should therefore be prevented, or at least strongly discouraged. Future population monitoring is needed to document the extent of Bald Eagle

recovery. Additional research/monitoring is needed where contamination problems occur, and where there is a risk from unwise human development. Research is also needed to better define tolerable limits of human development that will not compromise population viability, and to identify woodland management practices that do not have a detrimental impact to Bald Eagles.



STATUS: ENDANGERED

Endangered in Iowa

Northern Harrier

Circus cyaneus

Introduction

Because it is listed as Endangered in Iowa, field data that show confirmed or probable breeding of Northern Harriers in a particular habitat – for at least 2 of the previous 6 years – will qualify that habitat to become one of Iowa's Important Bird Areas (IBAs).

The Northern Harrier (formerly known as Marsh Hawk) is a slender, medium-sized, and low-flying bird of prey (raptor) of upland grasslands and low-lying marshes. It is easily recognized at close range by its white rump and owl-like facial disk. At a distance this hawk can be identified by its habit of hunting for prey back and forth over low vegetation from only 10 to 30 feet in the air. Unlike most raptors, the sexes differ in coloration. The smaller adult males are slate gray, while the females and immature birds are brown.

In Iowa, the Northern Harrier was once a common summer resident that nested most frequently in the northern part of the state. But by the early 1970's the harrier was considered uncommon in our state, and by the mid-1980's was considered to be one of our state's rarest nesting birds. Although 2 million acres of grassland were added to Iowa's landscape from 1985 to 1990 by the Conservation Reserve Program (CRP), there has been only a very slow increase in harrier numbers.

Like harriers from other parts of the world, the Northern Harrier nests on the ground, usually in tall, dense clumps of vegetation, either alone or in loose colonies. Most males have one mate, but some males may pair with up to five females in a season. Only the females incubate eggs and brood offspring, and males provide the bulk of food for their mates and nestlings. This species breeds in northern portions of the U.S. and in Canada, and migrates through Iowa to central and southern portions of the U.S. in winter.

Northern Harriers hunt from the air (not a perch), and captures a wide range of prey, mainly small and medium-sized mammals and birds, while coursing low and buoyantly over the

LINK TO IOWA IBA: NORTHERN HARRIER

ground. Unlike other hawks, this species relies heavily on its acute hearing to locate and capture prey. Annual breeding numbers and productivity are strongly influenced by the availability of the species' prey in spring, usually voles and other small mammals.

During field work on The Iowa Breeding Bird Atlas project, primarily in the late 1980's, Northern Harriers were reported in 29 counties, mostly in the northern half of the state, and particularly in the Des Moines Lobe region or prairie pothole area. All sightings were in or near public property and at some of the state's largest remaining prairies, grasslands and wetlands.

Habitat Preferences

The Northern Harrier is a bird of open landscapes and wide horizons. It prefers wetlands and marshy meadows; dry upland prairies and grasslands, and old fields; and wet, only lightly grazed pastures.

In both wetland and upland areas, the densest populations are typically associated with the larger tracts of undisturbed habitats that are dominated by low and thick wetland, prairie or grassland vegetation.

During migration, Northern Harriers may be seen hunting over these same types of open habitats. While in migration, juvenile birds may temporarily establish home ranges in habitats where their prey is abundant or more vulnerable. Winter months are spent in open habitats dominated by herbaceous cover and other low growing vegetation. In the winter, individuals frequently roost together on the ground.

Feeding Habits

Northern Harriers have a broad diet, with pronounced seasonal and geographic variations, which are influenced by prey abundance and availability. Harriers feed on deer mice, house mice, shrews, rabbits, and passerine (or perching) birds such as Northern Cardinal and Song Sparrow. Harrier flight tends to be too slow to overtake adult birds, so it ordinarily drops from the air to pounce on prey on the ground. This species has better directional hearing than other day-time (diurnal) feeding raptors. The owl-like facial disk may direct sound to the ears so that the harrier, flying low over the ground, is better able to located and capture its prey.

The frequency with which certain habitats are used for feeding appears to be closely related to a combination of prey abundance and vegetative cover. Areas of short vegetation, e.g., heavily grazed pasture and harvested fields; tend to be used only in a limited way, whereas idle and abandoned (often wet) fields with thicker vegetative cover are used most often. Males seem to prefer more open habitats than females, possibly because the female has a smaller home range around the nest site, and females often exclude the smaller males from preferred hunting habitats during winter.

During the breeding season the adults often prey on young and recently fledged birds of several species which they are not capable of capturing as adults. Harriers also take and consume reptiles, amphibians, insects, and occasionally, fresh carrion. Like most raptors, Northern Harriers are opportunistic feeders, and their food depends largely on availability and vulnerability of small prey species.

Breeding Biology

Migrant Northern Harriers begin arriving back in Iowa in late March; and spring migration peaks in mid-April. Nesting is preceded by an aerial courtship display called "sky dancing." During these maneuvers the male does a series of 20 to 70 circular loops, pulling out of the dive about 10 feet from the ground.

Nests are constructed by the female from grass, straw and sticks collected by the male. The nests are normally on the ground in treeless vegetated habitats, and can be in either wetlands or uplands. Many different types of vegetative cover are used for nesting, even within a single area. Most nests are built within patches of dense, often tall, vegetation (e.g, cattails) in undisturbed areas. At most sites, and even many of those in dry-land habitats, nests are located near wetter areas, e.g., near stock ponds or along creeks. Apparently fewer predators frequent such areas. Predation and human disturbance are always a threat to successful nesting.

Clutches range from four to nine eggs, but generally contain five eggs. Incubation is by the female only, and lasts from 30 to 32 days. Male harriers continue to supply food while the female incubates eggs and tends to the young. When prey animals are abundant, males may supply more than one female with food. If females are well fed, they may lay more eggs and raise more young.

Nestlings are able to walk at about 2 weeks of age, at which time they begin moving along small paths through surrounding vegetation to nearby resting and feeding sites. Juveniles make brief flights near the nest at four to five weeks of age. The young become independent and fly away from the nest site at about seven or eight weeks of age. Parents roost away from the nest area and interact with offspring only to deliver food. Fledglings roost close to, but not with, siblings; and follow parents on hunting flights. Parents can discriminate their own offspring from foreign fledglings, as parents chase and strike intruding fledglings but not their own.

Once all siblings are capable of flying, virtually all food items are exchanged by an aerial pass, and prey usually is relinquished to the first fledgling that reaches the parent. Fledglings practice capturing prey by pouncing on apparently inanimate objects, but spend little, if any, time hunting, and rarely capture live prey prior to independence.

Concerns and Limiting Factors

The Northern Harrier was once a characteristic species of Iowa prairies but it has disappeared from many former nesting areas. Some surveys suggest that it is still declining in various parts of North America. This species is one of the least tolerant of habitat fragmentation. The often unnoticed, but continuous, carving up of prairie and wetland habitats into smaller and smaller parcels is a major concern, and a definite limiting factor.

Management practices, such as mowing and burning, especially if poorly timed, will eliminate nesting success. Harrier nests are also preyed upon by raccoons, skunks, snakes, and other animals. Half of the documented nests during a 10-year period leading up to publication of the Iowa Breeding Bird Atlas, were unsuccessful.

In the twentieth century, when raptors were characterized as either “objectionable” or “beneficial” depending on their diet, Northern Harriers (because they feed largely on mice) were generally considered beneficial, and as such were rarely singled out as targets of predator control. Nevertheless, shooting pressure has been and remains a threat to harrier populations in certain regions, especially for birds wintering at communal roosts in southern portions of the U.S.

Eggshell thickness and mass were significantly lower between 1947 and 1969 than before World War II and the advent and widespread use of commercial poisons. Reproductive failure and population declines were linked to the use of several pesticides in mid-twentieth century; and populations recovered somewhat following the regulation of DDT in early 1970s.

Conversion of native prairie, grassland and wetland habitats to monoculture, row-crop farming has led directly to population declines, and poses a threat to both breeding and wintering populations. These continuous losses are an obvious major limiting factor. Early mowing and haying activities near nests, and in some cases, trampling by livestock, have increased the threat of nest destruction. Overgrazing of pastures, and the advent of larger crop fields and fewer fencerows, together with the widespread use of insecticides and rodenticides, have reduced prey availability and thus the amount of appropriate habitat for this species.

Nevertheless, Northern Harriers are food and habitat generalists, and the relative stability of the species in the second half of the twentieth century suggests that recovery is possible where appropriate habitat is maintained and then managed with diligence.

Habitat Management Recommendations

The Northern Harrier is listed as Endangered in Iowa, primarily due to its dependence on declining wetland and undisturbed grassland habitats. This species is protected under Migratory Bird Treaty Act of 1972. Previously, the preponderance of reports about this species came from public lands, indicating the value of these lands to the continued viability of this species in our state.

It should also be recognized that all forms of wetland preservation for waterfowl and habitat management for upland game birds are beneficial to harriers, and should be encouraged and supported. USDA programs such as the Conservation Reserve Program (CRP) and the Wetland Reserve Program (WRP) have provided habitats on privately owned lands for prey populations and nesting sites. Greater use of programs like these is needed to restore Iowa's wetland and prairie landscapes.

The size of a particular habitat is important, and the larger that habitat is, the better it will be for harriers, and for other species with similar ecological requirements. Protection and restoration of native wetland and prairie complexes and grasslands of 300 acres or more in size are very important to this species. We highly recommend partnerships between local, state and federal agencies; private conservation organizations; businesses; and private landowners to accomplish such large and important conservation initiatives. The Iowa IBA Program will strive to assist develop, facilitate and fund such partnerships at sites that have received IBA recognition.

On-site management recommendations include protection of undisturbed habitat in which annual vegetation and successional plants can grow and dead vegetation is not removed. Several researchers advocate reducing or eliminating winter livestock-grazing from wetland and grassland ecosystems to improve winter habitat. In areas where succession will lead to thick shrubby growth and eventual reforestation, active maintenance of old fields through prescribed burning and grazing (after young harriers have left the nest area) is recommended.

Please refer to the grassland management section in Part 2 of this document for additional habitat management recommendations.



STATUS: ENDANGERED

Endangered in Iowa

Red-shouldered Hawk

Buteo lineatus

Introduction

The Red-shouldered Hawk is listed as Endangered in Iowa. Field data that documents confirmed or probable breeding of Northern Harriers in a particular habitat – for at least 2 of the previous 6 years – will qualify that habitat as one of Iowa's Important Bird Areas (IBAs).

This species is described as a rare permanent resident in Iowa. It is most commonly seen in heavily wooded bottomland areas near rivers and streams in the eastern half of the state; especially near the Mississippi River in northeastern Iowa. During the first half of the twentieth century researchers called this a fairly common summer resident in the southern portion of the state, and uncommon to rare in the north. But populations declined rapidly, apparently in the 1950's and 1960's, and red-shoulders are much less common now than they were 50 years ago.

Red-shouldered Hawks are identified by "red" shoulder patches, black-and-white checkered flight feathers (seen from above), translucent, crescent-shaped wing panels in the outer primaries (seen from below when the wing is backlit), and reddish barring across the breast. The piercing, whistled calls of the Red-shouldered Hawk announce its presence, and it is often heard before it is seen.

The elimination, and the fragmentation (cutting large blocks of natural habitat into smaller and smaller parcels), of large wooded areas which are crucial for breeding; and competition from Red-tailed Hawks and Great Horned Owls (which benefit from fragmentation), are probable reasons for the decline of Red-shouldered Hawks.

LINK TO IOWA IBA: RED-SHOULDERED HAWK

Recent research has shown that Red-shouldered Hawks return to use previous nests again and again (e.g. demonstrate high nest site fidelity) and populations appear to be slowly recovering. However, some of the small increases that were noted may have resulted from expanded nest-searching efforts.

Habitat Preferences

In Iowa, the Red-shouldered Hawk favors extensive, mature, mixed deciduous woodlands, especially bottomland woods, riparian areas, and flooded deciduous swamps. Upland mixed deciduous forests may also be utilized. Extensive timber stands consisting of mature to old-growth canopy trees with a small amount of under-story are favored. At times woodlands with relatively open under-stories are utilized.

This species is generally secretive, especially during nesting season, and may not be observed during some survey and monitoring efforts. All of the confirmed breeding that was documented as part of the Iowa Breeding Bird Atlas project in the late 1980s and early 1990s occurred near large publicly owned forests or woodlands.

In our state, this raptor inhabits larger wood lots, closer to water and farther from roads and buildings than Red-tailed Hawks.

Feeding Habits

Red-shouldered Hawks hunt during the day and generally from a perch in the forest canopy, waiting for its prey to reveal itself and then swooping down to snatch it from the ground or water surface. The diet is quite broad, and varies by season. Small mammals (especially chipmunks, mice, and voles), frogs, and snakes comprise the bulk of the food in most areas. Birds, crayfish, and insects are also key food items at certain times of the year.

Breeding Biology

Migrants arrive in February and March and depart in September or October, and only a few individuals of this species over-winter within the state. The conspicuous vocalizations are more frequent early in the breeding season when courting and establishing its territory.

Courtship lasts about 3 weeks and building a nest or restoring a previously used nest starts before courtship ends. Nests are built below the canopy but more than halfway up a tree in a crotch of the main trunk (usually 35-65 feet above ground). Nests are located in the preferred habitat of bottomland woods, wooded stream-sides and swamps.

Three to five eggs are laid and incubation begins in late March to early April. Incubation lasts about 28-33 days and both parents participate. Females generally provide all of the brooding for the young, while males supply the female and young with nearly all their food, until the young near fledging.

Certain individual Red-shouldered Hawks have exhibited aggressive behavior toward humans who get too near the nest. These parents make close passes at intruders and do considerable calling while the intruder is present.

The young leave the nest at about 6 weeks of age, but may continue to be fed by their parents for another 8–10 weeks. The young are thought to stay in contact with the parents during summer or longer, although little is known about immature Red-shouldered Hawks after they leave the nest.

Concerns and Limiting Factors

The Red-shouldered Hawk is an area-sensitive, interior-forest species that requires large stands of mature bottomland forest habitat. A large portion of the population decline in this species in Iowa appears to clearly be due to the destruction, or at least the shrinking, of suitable nesting habitat.

A second significant factor is disturbance from human activities, which typically cause this secretive species to retreat into the most remote wooded areas, or to abandon nesting and feeding areas entirely.

Historically, shooting was a serious problem, but with enactment of laws such as the Endangered Species Act (1973) and education programs stressing the ecological value of raptors, this concern has diminished.

Pesticides and industrial chemicals are a continuing concern because of the way these compounds become concentrated from numerous prey species into the organs and tissues of individual predators. Adult Red-shouldered Hawks have died from a number of different pesticides; and several insecticides and industrial chemicals have been found in eggs and in the body tissues of nestlings.

Red-shouldered Hawks avoid nesting in areas that are bordered by agricultural fields, livestock pastures, and wetlands contained within levee systems. Breaking-up contiguous forested areas into smaller wooded blocks surrounded more closely by such human-manipulated properties has created habitat more suitable to larger and more aggressive Great Horned Owls and Red-tailed Hawks, the closest and most serious competitors with red-shoulders.

Research in nearby Wisconsin has shown that selective thinning of timber (which opens up the forest canopy layer) has favored Great Horned Owls, and thus had a negative impact on the number of Red-shouldered Hawks using those habitats.

Habitat Management Recommendations

Clearly, the best type of management for increasing and sustaining populations of Red-shouldered Hawks in Iowa is to preserve and maintain the largest possible areas of mature, contiguous floodplain forests. Research suggests that these blocks of timber need to be 600 acres or more in size, with open wetland inclusions, and low density under-story shrub and ground cover, in order to provide optimal habitat for this species.

In some areas red-shoulders may use smaller forest patches if it is part of a larger forested ecosystem. Replacement by Red-tailed Hawks is a concern in small or fragmented woodlands, but some researchers found that even in wood lots of less than 12 acres red-shoulders were not replaced by red-tailed hawks when mature canopy structure was retained. And the average size of wood lots occupied by red-shoulders in a study in one part of its range was just 43 acres.

The requirement of large tracts of forest limits the potential for privately owned lands to be managed for this species. The large blocks of bottomland forest in state and federal ownership are therefore the most likely sites for this hawk. The necessary size of a wooded area needed by red-shoulders is one issue that needs to be resolved with further research.

Certain types of logging are detrimental to Red-shouldered Hawk populations. Studies in Iowa and adjacent states indicate that large-scale, long-term timber harvesting, regardless of method, negatively impacts Red-shouldered Hawk reproductive success. In contrast, small-scale, short-term harvests may have a limited impact on Red-shouldered Hawk productivity if done properly. Importantly, if logging is done, it should only be allowed between July and January, and it needs to be kept to a small-scale.

Researchers also recommend maintaining and encouraging mature (50- to 100-year old trees, 100–120 trees/acre, diameter at breast height 8–25 inches) mixed hardwood bottomland forests. Other research suggests that high tree densities (between

150-400 trees/acre) of mature maple-elm communities should be maintained in bottomland forest for red-shoulders. Managing for a crown closure of greater than 70% should prevent Red-tailed Hawks from displacing Red-shouldered Hawks. Availability of nearby small marshes and wet meadows as feeding areas is crucial to Red-shouldered Hawks nesting success.

During the nesting season, human use and disturbance should be minimized in identified nesting areas, particularly from late February through May. A distance of at least 300 feet from the nest should be kept free from human disturbance during this period of time.

Woodland management for Red-shouldered Hawks may be considered difficult by some forestry-oriented individuals, but it should be recognized that several other Iowa IBA Criteria Species also benefit from the same management. These may include: Bald Eagles, Broad-winged Hawks, Pileated Woodpeckers, Veery, Wood Thrush, Cerulean Warbler and Prothonotary Warbler. Many other non-priority species of birds and other wildlife also benefit from management aimed at Red-shouldered Hawks.



STATUS: ENDANGERED

Endangered in Iowa

Peregrine Falcon

Falco peregrinus

Introduction

The Peregrine Falcon, listed by the State of Iowa as endangered, is the fastest flying bird in the world. In power-dives from great heights to strike prey, the peregrine has been timed traveling in excess of 200 miles per hour. Peregrines are regarded by falconers, ornithologists, and all who know this species, as one of the most noble and spectacular of all birds of prey (or raptors). Although widely distributed across six continents, the Peregrine Falcon is uncommon in most of its range. In North America it was seriously endangered in the early and mid-20th century because of overuse and misuse of DDT and various other persistent biocides.

The image of the peregrine as a symbol of wilderness diminishes when one sees this falcon breeding on urban bridges and skyscrapers, or watches one speed along only slightly above traffic-jammed streets chasing prey. But a Peregrine is truly special, and always worth watching. Humankind has long admired this species as nature's most perfect aerodynamic performer and a strikingly beautiful bird. The mere presence of this highly effective predator in a landscape has no doubt influenced the structural and behavioral evolution of countless avian species that are its prey.

The name peregrine means "wanderer," and northern-nesting peregrines are among North America's most amazing long-distance migratory species, some covering over 10,000 miles annually. It is difficult to characterize the resident status of the peregrine as a species. Most individuals spend just a few months in Iowa and in its northern breeding range, but others may remain sedentary in the north throughout the year.

LINK TO IOWA IBA: PEREGRINE FALCON

Few other North American species held such a high scientific and public profile during the twentieth century as the peregrine. Among the most studied of wild birds, Peregrine Falcons have been an icon of the environmental awakening since the 1970s. Ironically, its popularity increased with its disappearance as a breeding species in the eastern U.S.

Along with other birds of prey and some fish-eating birds, the peregrine was severely harmed by the widespread use after World War II of persistent chemicals that lowered reproduction and survival rates. By 1970, the peregrine was federally protected in the United States, and the chemicals that had caused so many problems were banned in North America by 1972. Peregrines have since made a steady recovery, aided by various restoration projects. But this species is still listed as endangered in Iowa.

Field observation data that documents confirmed or probable breeding of peregrines at a specific site for at least 2 years of the previous 6 years (the years being considered roll forward annually) is needed for Iowa's IBA Technical Committee to recognize that site as an Important Bird Area (IBA).

An abundance of natural history information and research data is readily available on the Internet for this species (as well as for other, less well-known IBA Criteria Species). The following information highlights some of the details that are most relevant to conservation of the Peregrine Falcon in Iowa.

Habitat Preferences

Peregrine Falcons originally occupied most landscapes found across the Americas. But despite its wide distribution, this species was never common. After many years of study, researchers estimated that only about 350 nesting pairs were present east of the Mississippi River prior to the use of the biocides that caused the rapid decline of this species. Predators are never as numerous as their prey species, and peregrines are no exception. Because they fiercely defend nesting territories, and also hunt over hundreds of square miles for their prey, peregrine populations could never be what we would think of as being dense.

Most North American peregrines originally nested on cliffs from which they could see great distances and hunt for prey, and this innate attraction to such sites make them their preferred habitat. In Iowa, prior to the 1950's when biocides were widely used, the cliffs along the Upper Mississippi River supported the highest concentration of peregrines. The high cliffs found on the western edge of the Mississippi River valley between New Albin and Dubuque appears to have attracted the most peregrines in Iowa in those years, although nests were also found along the Cedar River and other bodies of water in interior counties.

Despite their affinity for natural cliffs, peregrines have been established as an urban species over the past two decades by dedicated individuals and collaborative restoration efforts by a host of public agencies and private organizations. These efforts have achieved positive results and have been well publicized in the media.

Years of work to restore peregrines to our state have focused on urban sites partly because of the availability of a ready supply of the peregrines favorite food – Rock Pigeons. These projects have shown that peregrines are fairly adaptable to man-built environments – so long as they have safe places to nest and an abundant food supply. From this we can conclude that in the 21st century, with understanding by our citizens and help from falcon specialists, peregrines are likely to continue using a variety of natural and man-built habitats. In addition to resident populations, which occupy breeding habitats, migratory peregrines may also occur in open habitats

that lack cliffs or other tall structures. They are often found near water where they prey on shorebirds, waterfowl and other species.

Feeding Habits

Peregrine Falcons feed primarily on a wide variety of other birds. Around cities the often abundant Rock Pigeons (formerly known simply as pigeons) are a favorite source of nourishment. Peregrines are known to take prey as large as geese and large gulls, and as small as songbirds. Near water they prey on waterfowl and shorebirds, especially during migration. Occasionally a few small mammals will be eaten. Insects are seldom taken and carrion is rarely eaten.

Most prey is captured in the air, while peregrines are in flight. But this species also takes prey from the surface of water or ground; and may walk on ground is search of nestling birds or rodents.

Hunting may be best described as sequence of actions consisting of search, pursuit (attack), capture, killing, and eating. Usually peregrines search for food either from a perched position (most commonly) or while flying.

Especially during the breeding season, adults perch on a high vantage point or cliff, usually near the nest site, overlooking vast air space in which other birds fly. This position allows the falcon to dive (stoop) down easily on low-flying prey, or to maneuver upward into the sky to attack high-flying prey. The capture, killing and eating of prey is described thoroughly by a variety of books and Internet sources.

Some peregrines seem to fixate on 1–2 prey species to virtual exclusion of everything else. This sort of fixation on one kind of food probably leads to increased skill in capture this prey. Selective predation by peregrines very likely culls the weak, injured and unfit individuals from prey populations.

Breeding Biology

As stated previously some peregrines may remain as resident birds through the winter, particularly in locations where sufficient prey occurs. This applies to birds in urban settings as well as those in natural habitats. Migratory peregrines are often back at nesting sites in Iowa in March of each year.

Peregrine Falcons may mate for life. Territorial and courtship displays include high circling flight by the male and spectacular dives and chases by both sexes. After the incredible aerial maneuvers, the male tries to lure the female to a nest ledge by offering her food. Breeding peregrines defend the immediate area of the nest from intruders but hunt over a much larger area.

Nesting is usually on a cliff ledge, broken-off tree snag, or in an old nest of other large birds in a tree. Peregrines also use ledges of buildings, bridges and other structures. No nest is built per se. During early courtship small items of substrate (soil, sticks, sand or gravel) are scraped together to form a shallow bowl. This process continues until egg-laying in the scrape.

Peregrines will renest (usually within 14 days of egg loss) if the first attempt fails, and may renest 2 or 3 times if clutches are lost or removed early in incubation. There are no records of more than one brood per season. Many first-time breeders in expanding populations select non-typical nest sites. Recovery projects often provide nest boxes or platforms on high smoke stacks or cliff faces. There is considerable attachment to a nest location, but alternate nest sites are frequently selected on the same cliff or structure.

Usually 3 or 4 eggs are laid, but sometimes

2-5, and rarely 6. Incubation is mainly by the female, and lasts for 32 to 35 days. The male brings food for the female during incubation. Females stays with the young at

first, while the male feeds both female and young; later the female hunts also. Five days after hatching the chicks have doubled their mass, their eyes are open, and they can sit up with relative ease. Young are brooded roughly 80% of the time up until 10 days of age, then brooding gradually decreases and ends at about 20 days of age. The young take their first flight at 39-49 days of age.

Within 10 days of first flight, young peregrines pursue adults to solicit food. Flight progresses from Butterfly-Flight (1–2 days after first flight) to Flutter-Glide (3–9 days) to Powered Flight (15–25 days). Adult pursuit is accompanied by begging calls. Young will even pursue parents for food during territorial defense. As the young become more aggressive, adults sometimes begin to drop both dead and live birds in air. The young learn to pursue and catch these items.

In migratory populations, dependency of young toward adults may continue until onset of migration which is approximately 5–6 weeks after fledging. The period of dependency is longer in non-migratory populations (9–10 weeks after fledging). Most released (hacked) peregrines from recovery programs have dispersed by 6 weeks after fledging.

Concerns and Limiting Factors

The effects of human activity are the primary concern and the limiting factor for Peregrine Falcon populations. Pairs in more remote locations are most reactive to humans; while those breeding in urban areas or frequently visited sites become habituated to close human activities. In the distant past, some historical nest sites (eyries) were abandoned because of human encroachments or increased levels of nearby activity. Human presence near a nest site, especially during the critical breeding cycle, can be a major factor in the success or failure of a seasons nesting attempt.

Before legal protection, shooting, trapping and egg-collecting accounted for the loss of many hundreds of falcons and their eggs. Educational programs and broader public awareness have significantly reduced losses from these causes.

From the late 1940s to early 1970s, massive, continent-wide – and indeed, nearly global – use of organochlorine pesticides, particularly DDT, dieldrin and aldrin in agriculture, forestry and human disease control, resulted in the accumulation of toxic residues in prey species, which in turn contaminated falcons, causing both lethal and sub-lethal effects. Eggshell-thinning was a major and consistent cause of nesting failures. Banning DDT and many other biocides in the U.S. was very important; but unfortunately, peregrines that migrate to Latin America and elsewhere are still exposed to detrimental and poorly regulated or unregulated pesticides. Peregrines are also occasionally killed by eating birds poisoned by strychnine or other persistent toxic chemicals.

Urban-dwelling peregrines are killed or injured by flying into windows or other features of buildings while chasing prey, and occasionally by collision with moving motor vehicles, or aircraft at airports. Peregrines sometimes strike wires; recently fledged young sometimes fall down chimneys or are killed by air-conditioning equipment or other machinery on tops of buildings; and young in nests on bridges sometimes fall into the water, significantly reducing productivity at those sites.

Human encroachment is always a major concern, and can be a significant limiting factor. Inspection of nesting areas just

before or during egg-laying is likely to cause falcons to abandon that preferred nest site. Later in the breeding cycle,

careless attempts to get close to nests may result in injury or death for adults and young, or abandonment of eggs. Likewise, prolonged human activity that keeps parents away from their eggs or downy young for extended periods, can cause over-chilling, or over-heating, and death.

Habitat Management Recommendations

Although the iconic Peregrine Falcon has made a substantial comeback after suffering near extermination from Iowa and the eastern U.S., many former nest sites, especially those on natural cliffs, have no peregrines. Restoring peregrines to their original nest sites along the Mississippi River will be an important step in expanding and securing populations in Iowa and the Midwest, and this is where much of today's conservation work is being focused. In addition, specific release sites for young peregrines are also the focus of re-introduction efforts in other parts of Iowa. The Iowa DNR, Wildlife Diversity Program, is actively working with numerous partners to restore peregrines to carefully selected locations within our state. These efforts are long-term, they've been quite successful, and they are deserving of strong support from the public.

It is difficult to assess the impact that habitat loss or degradation has had on Peregrine Falcons because they use such a wide range of habitats and landscapes, including those highly modified by humans. But generally, habitat management for peregrines comes down to the following two basic concepts:

First, peregrines are most affected by loss or modification of nesting sites, which are limited in number and often non-replaceable (e.g., specific cliff faces, and special, previously used broken tree snags; and certain towers, buildings or bridges, and the ledges found at these sites). Any site known to be used for nesting by Peregrine Falcons – whether historically, or in recent years – should be protected and maintained as it was when it was last used for nesting, wherever this is possible.

Second, like all other members of the animal kingdom, Peregrine Falcons need access to a sufficient amount of food. Being a bird of prey (raptor), peregrines hunt for a living. Their primary food is other birds, and Rock Pigeons are the number one food item when available. Peregrines in Iowa and the Midwest also consume starlings, coots, Blue Jays, flickers, meadow larks, House Sparrows and other species. Therefore, maintaining habitats that support an abundance of other birds constitutes part of good management for Peregrine Falcons.

Unlike for many species of birds, agricultural practices are not usually detrimental to peregrines (except for the use of biocides), as this species readily preys on birds attracted to cultivated landscapes. Owing to its hunting style peregrines no doubt benefited from the conversion of closed-canopy forests to agriculture. Migratory and wintering peregrines, and some resident birds, favor wetland areas that support concentrations of waterfowl and shorebirds; therefore, loss or degradation of these habitats is detrimental to peregrines.

Efforts to propagate and release Peregrine Falcons began in late 1960s, and these projects involved many public agencies and private conservation organizations. A species recovery plan prepared and implemented by the Iowa DNR, Wildlife Diversity Program, established methods and criteria for recovery; and Iowa relied heavily on captive propagation and release of captive-produced birds. The recovery plan also emphasized the need for a reduction in environmental contamination by organo-chlorine pesticide residues, especially DDT.

The long-term, continuing objectives under Migratory Bird Treaty Act, for Iowa, other states, and Canadian provincial jurisdictions include: 1) habitat protection, 2) habitat improvements, 3) monitoring population trends and productivity, and 4) sustained use for falconry.

Again, the most important component of habitats requiring special attention are traditional nesting sites (eyries), which should be protected from physical alteration or destruction and from excessive human disturbances that might cause abandonment or repeated reproductive failure.

General habitat improvements that increase the abundance and diversity of bird life are also beneficial to peregrines. Detailed guidelines for managing peregrines (to be implemented by falcon experts) include: survey and sampling techniques, banding, observing behavior, collecting tissue samples, aging young, and management of specific types of nest sites (eyries).

Once nesting populations stabilize at carrying capacity, little active management should be needed, as peregrines historically survived for centuries in the face of both natural and human-caused losses. The existence of a sizable number of adult, non-breeding birds represents potential for further increasing the size of the breeding population by providing additional suitable nesting sites at specific natural cliffs, and certain bridges, smokestacks, buildings and towers.



STATUS: ENDANGERED

Endangered in Iowa

King Rail

Rallus elegans

Introduction

The King Rail is a chicken-sized marsh bird and the largest of the rails found in the U.S. This species is a rare migrant and summer breeder in Iowa, and is listed as endangered in our state. More than other members of the rail family in our state, King Rail numbers seem to be greatly reduced in comparison to the early 20th Century, and it has been nearly extirpated from the state.

Field observation data that document confirmed or probable breeding of King Rails at a specific habitat for at least 2 years of the previous 6 years (the years being considered roll forward annually) are needed for Iowa's IBA Technical Committee to recognize that site as one of Iowa's Important Bird Areas (IBAs).

The King Rail is dependent upon marshes and wetlands where its secretive behavior may make it difficult to find. But at times it may be seen rather boldly stalking along marsh edges in full view of observers.

Up until about 50 years ago, the King Rail was fairly common in Iowa, but it has declined alarmingly in the past 30-50 years. This trend is almost certainly due to the loss and/or degradation of the wetlands that this species is dependents upon. King Rails are the most threatened rail in North America.

Fewer than a dozen adults of this species were reported in most recent years, and these reports are primarily from areas near the Mississippi River, or from the prairie pothole region of north-central and northwestern Iowa. King Rails migrate at night.

Protection and restoration of wetlands and marshes may bring this species back to the population levels that were known prior to severe drainage efforts.

LINK TO IOWA IBA: KING RAIL

Habitat Preferences

King Rails found in Iowa depend upon wetlands and marshes and the dense vegetative cover that these habitats provide. At times they also make use of brushy swamps, or areas with a thick growth of willows.

This species appears to prefer to breed in areas of high marsh vegetation (cattails, bulrushes and other species) with scattered shrubs and small trees.

Breeding Habitats

King Rails found in Iowa depend upon wetlands and marshes and the dense vegetative cover that these habitats provide. At times they also make use of brushy swamps, or areas with a thick growth of willows.

This species appears to prefer to breed in areas of high marsh vegetation (cattails, bulrushes and other species) with scattered shrubs and small trees.

Feeding Habits

The diet of King Rails consists mainly of crustaceans and aquatic insects, especially beetles. They eat crayfish, snails, clams, grasshopper, frogs, spiders and seeds of aquatic plants. At times they also eat many small fish.

King Rails feed mainly during daylight hours. They usually forage in areas concealed by plant cover or in comparatively open areas where they blend with surroundings and are only a few steps from protective cover. Feeding is generally in water so shallow that only the bill, or part of it, disappears beneath the surface.

Food is usually obtained from aquatic habitats, but when feeding on land near water, this species often carries food to water and immerses it before ingesting. Larger items captured in the water may be carried to solid ground and dismembered before being eaten.

Breeding Biology

King Rails usually nest along the edge of wetlands, and the nest may be over water or land. The water at nests in northwestern Iowa averaged about 1 foot in depth. The nest is a cup of dead grasses and sedges placed on a mound of dead vegetation. Surrounding vegetation is often pulled over the nest to form a canopy. Additional simpler nests may be constructed nearby, and these are utilized after the young hatch.

Egg laying generally begins by mid-May. Peak nesting is from mid-May to mid-June. A typical nest will contain 10-12 eggs, sometimes 6-14. Incubation is by both parents, and lasts 21-23 days.

The downy young leave the nest a few hours after hatching. Day-old chicks can follow the parents for considerable distances. Both parents feed and care for the young for about three weeks. After that the young start to capture much of their own food. By 7 to 9 weeks of age the young are rarely fed by the parents. The young are able to make short flights at the age of about 9-10 weeks.

Young King Rails are normally independent of adults by mid to late summer; and usually depart from areas where they hatched by August or September.

Concerns and Limiting Factors

King Rails make heavy use of the sedge-meadow zone around the edge of marshes. This vegetation zone shows the affects of drainage most readily, and is probably more heavily altered by agricultural uses than deeper and wetter portions of wetlands and marshes. Loss of wetland complexes is by far the most critical threat to rail populations.

Alteration of the floodplain with flood control dikes and other land use changes along the Mississippi River flyway may have severely impacted King Rail numbers.

As nocturnal migrants, individual King Rails are prone to striking various illuminated structures such as television and radio towers; telephone and electrical wires; and tall buildings. This species is also vulnerable to vehicular traffic when it occurs near the wetlands they require for nesting.

Before the large-scale use of pesticides in the late 1940s and early 1950s, King Rails were more common in Iowa and other parts of the Midwest. Since that time they have declined to uncommon, and now, to rare status. The crustaceans and aquatic insects that King Rails feed on are severely affected by manufactured biocides. Runoff from agricultural fields may have contributed to the rapid decline in this species; as biocides are accumulated in the bodies of the prey that King Rails must feed on to survive.

A large concern is the extensive loss of wetlands in the lower Mississippi River valley and along the Gulf Coast where this species spends the winter. Loss of winter habitat may be more critical to King Rails than loss of breeding habitat.

Perhaps the greatest overall, and most direct threat to King Rails, has been the large reduction in herbaceous floodplain wetlands through agricultural, urban, and industrial developments.

Habitat Management Recommendations

Habitat management recommendations can be summarized as follows. King Rails require wetland, marsh and floodplain habitats for nesting. All forms of wetlands, marshes and natural swales should be maintained for nesting and feeding areas. Drainage and land leveling should be discouraged. Growth of beds of perennial vegetation should be encouraged. Shallow marshes and seasonally flooded sites are most easily drained and impacted by agriculture, and these should be retained in natural vegetation wherever and whenever feasible. Row crops have little value for King Rails, for other species in the rail family, or for species that have seriously declining populations generally.

Researchers have found that nesting success improves when dense wetland vegetation is encouraged within the interior, not the periphery, of managed wetland complexes.

Ditches and borrow areas may be the only remaining habitat available to rails in intensively farmed regions. These areas may be susceptible to rapid flooding that can destroy nests and/or young from mid-May through June. Care should be taken to avoid flooding during this period of time. Roadside mowing of areas with wetland vegetation should be discouraged during the period of nesting and brood raising.

The optimal situation in Iowa for King Rails is a complex of wetland habitats. Densely vegetated sites are necessary for migration and nesting periods, and slightly higher and drier areas within wetland complexes are most important to brood foraging. Restoring wetlands adjacent to core breeding habitats; and managing invasive plants in key breeding areas are also strongly recommended.

Despite conservation concerns, King Rails can still be legally hunted in all southern coastal states from Texas to Connecticut and this geographic area include the habitats used by a wintering species that is listed as endangered in Iowa. Although it is true that rails are only lightly hunted, clearly a reassessment of the status of King Rail as a hunted species is warranted. Greater public awareness and appreciation of this species and the rich biological habitats that it depends upon would be highly desirable.

See the wetland management portion of this information for additional relevant management details.



STATUS: ENDANGERED

Endangered in the U.S. (Upper Midwest Population) and in Iowa

Piping Plover

Charadrius melodus

Introduction

In terms of its ranking on national lists of endangered species of birds in the United States, the Piping Plover has become the most endangered bird species within Iowa. In the spring of 2006 the Piping Plover was also identified by National Audubon as being the sixth most seriously endangered species nesting within the entire Continental United States. This species is currently a rare and intermittent breeder at a small number of specific locations along the Missouri River, and a rare migrant at other locations within our state.

BirdLife International currently estimates the total population of Piping Plovers left in the world at 6,100. The decline to this low level is thought to be entirely due to human interference with this bird's breeding and winter habitats, and habitats used as stop-over sites during migration.

Field observation data that document confirmed or probable breeding of Piping Plovers at a specific habitat for at least 2 of the previous 6 years (the years being considered roll forward annually) are needed for Iowa's IBA Technical Committee to recognize that site as one of Iowa's Important Bird Areas (IBAs). To date, two small, privately owned areas in Iowa that are each known to support breeding Piping Plovers, have been identified as IBAs. Each of these is extremely critical to the continued existence of this species within our state. It is hoped that populations will rebound, and additional nesting sites will be located and given the protection they deserve.

LINK TO IOWA IBA: PIPING PLOVER

The Piping Plover is the smallest of Iowa's plovers, and originally nested on sand or gravel beaches and sandbars along the Missouri River. But populations have declined severely as these habitats have disappeared or have been severely altered. Various forms of development, recreational activities or manipulated water level fluctuations along shorelines are the primary causes of these declines.

Numerous studies have been conducted and conservation efforts have been organized at breeding areas across this species range in North America. Recent conservation efforts have also focused on the wintering areas used by this species. In general, the Piping Plover's coexistence with humans is increasingly dependent on management actions such as fencing-off nests, warning signs, restricting off-road vehicle access, and predator control.

Habitat Preferences

Piping Plover have specialized habitat needs. They favor sparsely vegetated, wide open, sand or gravel areas or beaches and sandbars. This species always nests near water, and feeds at the shoreline, or near nests.

When located and observed in recent years, Iowa's Piping Plovers were using large fly-ash deposits near ponds at power plants. They often nest near or within Least Tern nesting colonies.

During migration this plover may use the shorelines of reservoirs and natural lakes, rivers and wetlands. Piping Plovers spend the winter along the Gulf Coast on tidal flats and beaches.

Feeding Habitats

Piping Plovers normally feed along a shoreline at or very near the waterline, or near nest sites and other open sandy upland areas where they glean small invertebrates from vegetation and rocks.

Major diet items include a variety of small insects, worms, crustaceans and other invertebrates. Their endangered status prohibits collecting; and sensitivity to human disturbance makes sampling food on territories difficult and unwise if birds are present.

Food is captured through a series of short rapid runs interspersed with rapid pecks. Pecks and runs occur successively and so quickly that birds appear to be probing randomly rather than directing pecks at specific food items. Piping Plovers have been observed leaving nests to peck at insects in the sand or chase spiders and grasshoppers. Feeding is alone or in small groups (but not cooperatively) during all hours of the day, and throughout the annual life cycle.

Breeding adults alternate between 30 and 120-minute periods of feeding and incubation throughout the 24 hour day. Both adults and chicks spend more time foraging in habitats that have few people than in areas that are more populated by humans.

Breeding Biology

Piping Plovers normally arrive in Iowa in mid-April. Pairs at sites with fewer birds take several days or weeks to become established. Males then perform display flights over breeding territories with slow wing beats and piping call notes.

Prior to mating the male walks around the territory moving pebbles and small debris, stopping periodically, and squatting on the ground to form a shallow scrape with his breast. In cold, late springs, nest building and mating may be delayed for significant periods of time. Nests are placed on open ground some distance from water, and usually do not have direct shelter or shade. Piping Plovers may nest very close to, or within, breeding colonies of Least Terns.

Egg laying begins in early May and the usual number of eggs is 4, sometimes 2-3,

and rarely 5. Incubation averages 26-28 days, and is done by both parents. Hatching starts in late May and extends into mid-June. The downy young may leave the nest a few hours after hatching.

Young Piping Plovers feed themselves. Both parents brood the young during cool weather at first, but the female often deserts the young within a few days, leaving the male to care for their offspring. Generally, the young are able to fly at between 21 and 35 days of age. Females may lay several clutches if their nests are destroyed, but only one brood is raised. There is often intense defense of nesting territory and mate.

Concerns and Limiting Factors

In the mid-1800's Piping Plovers were harvested for food and brought to the verge of extinction. Piping Plovers were protected from hunting by legislation in 1913, but populations have not increased to former levels. Populations continue to decline primarily due to destruction and degradation of summer and winter habitat, shoreline erosion, human disturbance of nesting and feeding birds, and predation.

By the late 1970's more than 99% of the sandbar nesting habitat along the Missouri River that was available in the late 1800s had been lost to channelization and other human activities. A more recent problem has been choosing to increase river flows from upstream reservoirs at irregular intervals in order to maintain certain water levels for a very limited number of barges that use the middle stretches of the Missouri River.

The future of Piping Plovers in Iowa is probably linked to the future of Least Terns, as these species frequently nest together. Adequate nesting habitat continues to be the major factor that limits populations of these two species in Iowa.

Artificially increasing flows in the Missouri River while nesting is underway on sandbars and shorelines has had a very serious negative impact on Piping Plovers and Least Terns – both of which are endangered species in Iowa. If these species lose their nest sites, eggs or broods adjacent to the Missouri River floodplain, and are forced to use breeding sites away from the river that may be marginally suitable, the survival of Piping Plovers in Iowa may well depend on their ability to survive at two small existing habitats that are now IBAs.

Disturbance during nesting is the major limiting factor in many areas, and this is especially true when this species is only known to presently breed at two IBAs within Iowa. Human presence may inhibit courtship, incubation, and brooding. Human disturbance near nesting sites has reduced reproductive success at various locations across the nation, and habitat alteration and destruction is always a concern.

In certain areas of the Midwest, lowering of the overall water table due to irrigation projects and strip mines has been an additional concern. Natural encroachment onto lake shorelines, riverbanks and sandbars by woody vegetation may be responsible for habitat loss. Invasive plant species are also a concern in the limited habitats that are still available for Piping Plovers to utilize.

Habitat Management Recommendations

At the local level, at Iowa's IBAs or at any other sites where Piping Plovers might be found, the key to the continued existence of this endangered species in Iowa lies in providing or sustaining breeding and adjacent feeding habitat, and protecting those areas from any form of disturbance during nesting and brood rearing,

Local conservation efforts should begin with closing off, during spring and early summer,

significant portions of sandy areas or beaches that surround sites that Piping Plovers (and Least Terns) use for nesting and the rearing of young. Recreation vehicles, pets and continuous human disturbance have caused many nest failures within the range of Piping Plovers.

Probably the second most important management recommendation for Iowa is gaining full implementation of wildlife-friendly water level regulation policies and flow regimes within the Missouri River. When flows once again follow natural spring and summer fluctuations, few if any nests will be destroyed by flooding. The river and its floodplain may then return to being conducive to the continued survival of both Piping Plovers and Least Terns.

Other management recommendations include: using fences (sometimes electric) to prevent entrance by humans and mammal predators; using a variety of techniques to control vegetation encroachment at nesting and feeding sites; possible addition of sand and gravel to create artificial nesting sites; and in some cases, nest relocation to prevent flooding or other major threats.

Generally, intensive management at breeding sites is not ideal in that methods are temporary, and the success of some methods is uncertain and controversial. Nonetheless, management techniques are being assessed and refined and in some cases, activities aimed at increasing nest success have been achieved in other parts of the nation.

Continuous annual survey work by volunteer birders as citizen-scientists is needed to watch Piping Plover population fluctuations. Data that are collected should be submitted the Iowa Important Bird Areas (IBA) Program. The Wildlife Diversity Program of the Iowa Department of Natural Resources also plays a vital role in future conservation activities for Piping Plover.

LINK TO IOWA IBA: PIPING PLOVER



STATUS: ENDANGERED

Listed as Endangered by Federal and State Agencies

Least Tern

Sterna antillarum

Introduction

The Least Tern is the smallest tern in North America. It is often seen flying low over the water, with quick deep wing beats and shrill cries. This species originally nested on sandbars and beaches found on major interior rivers in Iowa and the Central U.S., and on widespread coastal beaches.

Although widespread during the breeding season, populations have been seriously diminished by recreational, industrial, and residential developments within its nesting habitats at both interior and coastal breeding areas. Research indicates that Least Terns appear to be most productive at breeding colony sites that have endured for a number of years. Thus it is essential that known breeding populations and the habitats they use, are sustained for as long as possible.

Once substantially reduced by killing for feathers to adorn women's hats, Least Tern populations seem to be currently in trouble throughout their range. In Iowa, significantly altered river flows at breeding areas since the 1950s, especially on the Missouri River, has led to declining populations of Least Terns. Listed as endangered both federally and within the State of Iowa, no other wide-ranging North American tern has that unfortunate distinction.

Field observation data that document confirmed or probable breeding of Least Terns at a specific habitat for at least 2 of the previous 6 years (the years being considered roll forward annually) are needed for Iowa's IBA Technical Committee to recognize that site as one of Iowa's Important Bird Areas (IBAs).

LINK TO IOWA IBA: LEAST TERN

To date, two small, privately owned properties in Iowa that are each known to support breeding Least Terns (as well as the even more endangered Piping Plover), have been officially recognized with IBA status. At each of these IBAs the terns and plovers are using fly-ash deposits for nesting sites – a poor, but essential substitute for the natural open sandy beaches, sandbars and unvegetated islands that nature provided for these species at the nearby Missouri River. Only a small number of nesting pairs are using each of these critical IBA habitats.

Despite widespread research, the population dynamics of this species are poorly understood, and the association between various endangered breeding populations and the wintering areas they use remain uncertain.

This dainty Least Tern is pugnacious when defending nest and young. Its well-known zwreep call of alarm identifies this species long before it comes into view.

Habitat Preferences

As with Piping Plovers, Least Terns have specialized habitat needs, and prefer to nest on low-lying and relatively open beaches, sandbars and islands kept free of vegetation by historically well-timed natural scouring action of the Missouri River.

However, a major problem at these preferred habitats in recent decades has been the choice to increase river flows from upstream reservoirs at irregular intervals to favor very infrequent and minimal barge traffic in western Iowa. The timing of artificially raised water levels during the breeding season for these two endangered species destroys nesting colonies and forces the birds to seek alternative and marginal nesting sites.

When observations of breeding were made in recent years, Least Terns were found to be nesting (in colonies with Piping Plover) on artificial fly-ash deposits at only two sites, and both of these were power plants.

The two nesting colonies are two of Iowa's smallest but most vital IBAs. Each of these is extremely critical to the continued existence of Least Terns and Piping Plovers within our state. Because they nest together so frequently, the long-term fate of these two endangered species in Iowa is closely linked.

Least Terns winter on marine coastlines in Central and South America. It is hoped that populations will rebound, and additional nesting sites will be located in Iowa and then given the strong protection they deserve.

Human-caused habitat changes have forced this species to occupy new areas, but negative factors such as excessive heat and domestic pets can markedly reduce productivity, and the addition of a very few new habitats is minimal compared to the amount of natural habitat lost to human activities. Habitats capable of supporting successful nesting require adequate supply of accessible prey species nearby. Prey accessibility may be limited by turbidity in silt-laden rivers and streams or by choppy water caused by frequent boat or jet-ski operations.

Feeding Habits

Least Terns feed primarily on small fish and small crustaceans and insects, and also some small mollusks and worms. Their diets vary with seasonal changes and location.

Foraging occurs in a variety of shallow-water habitats, including rivers, streams, sloughs, fields, marshes, ponds, sand pits, and reservoirs. Individual birds tend to be most successful when foraging in water less than one meter in depth.

Least Terns search for prey while flying or hovering 1–10 meters above the water, then quickly plunging to the surface; but not

becoming fully submerged. Plunge-dives lead to grasping prey with open mandibles. The bird then rises well above the water with captured prey to manipulate and swallow the food in flight. Frequently there are a series of short dives and hovering, as if unsure of prey location.

Studies have shown that up to 35% of plunge-dives were successful, but success rates differ among habitats. Occasionally flying insects are captured over land and water, or the water surface is skimmed to capture swimming insects and tadpoles. At times Least Terns capture crustaceans while standing in shallow water. Foraging is done throughout the daylight hours.

Breeding Biology

Least Terns arrive back in Iowa in mid to late May. Open areas that are mostly free of vegetation, above high water levels, and safe from ground predators are used for nesting. Thus islands are commonly favored where available. Courtship involves elaborate rituals of aerial and ground displays and distinctive calling by males, after which the male offers fish to the female.

Egg-laying typically begins by early June and most eggs are laid by mid June. This species nests in a simple scrape in sand, fine gravel or other fragmentary material throughout their breeding range. Gravel rooftops and a variety of deposited materials have been used in other parts of the nation with varied success.

A typical clutch consists of 2 or 3 eggs; both adults incubate during the 20-25 day incubation period. The young are semi-precocial but stay in the nest for four or five days and are fed by both parents. The first flight occurs at about three weeks of age, and parents continue to feed young for several weeks after fledging. Least Terns are single-brooded, but will re-nest if the first nest is lost early in the breeding cycle.

Concerns and Limiting Factors

Least Tern populations declined rapidly in the late 1800s and early 1900s because of exploitation to provide feathers for ladies hats, and egg collection. Numbers may have rebounded slightly following passage of the Migratory Bird Treaty Act of 1916 and with changing attitudes toward conservation. But populations declined in many breeding areas during 1950s–1970s, most likely due to the use of various biocides and disturbance of breeding habitats by humans.

Distribution of breeding populations in the Midwest have fragmented further since the 1940s as nesting habitats have been destroyed by untimely release of water from dams, channelization and other human activities. Importantly, by the late 1970s more than 99% of the sandbar nesting habitat along the Missouri River that was available in the late 1800s had been lost to channelization and other human actions.

A more recent problem has been choosing to artificially increase river flows from upstream reservoirs at irregular intervals in the Missouri River in an attempt to maintain higher than normal water levels for a very limited number of barges that use the middle stretches of this river.

Nesting is often underway on sandbars and shorelines during the normal low-flow periods and artificially raised river levels have had a very serious negative impact on both Least Terns and Piping Plovers – both of which are endangered species in the nation and in Iowa. If these species lose their nest sites, eggs or broods adjacent to the Missouri River floodplain, and are forced to use breeding sites away from the river that may be marginally suitable, the survival of Least Terns in Iowa may well depend on their ability to survive at two small existing habitats that are now IBAs.

Therefore, the future of Least Terns in Iowa is probably linked to the future of Piping

Plovers, as these species frequently nest together in a colony. Disturbance during nesting is the major limiting factor in most areas, and this is especially true when this species is only known to presently breed at two IBAs within Iowa. Human presence may inhibit courtship, incubation, and brooding. Human disturbance near nesting sites has reduced reproductive success at various locations across the nation, and habitat alteration and destruction is always a concern.

In certain areas of the Midwest, lowering of the overall water table due to irrigation projects and strip mines has been an additional concern. Natural encroachment onto lake shorelines, riverbanks and sandbars by woody vegetation may also lead to serious habitat losses. Invasive plant species are also a concern in the limited habitats that are still available for Piping Plovers to utilize.

Early population estimates were often low because of inadequate survey of available habitat, thus increasing numbers do not necessarily indicate growing populations. Furthermore, because Least Terns are relatively long-lived, numbers show delayed response to reproductive problems in the population. Thus it is imperative to monitor not just numbers, but also reproductive success at breeding colonies.

Because the Least Tern diet consists primarily of fish, the accumulation of biocides and heavy metals has potential for reducing populations. These impacts are not well understood or quantified, however. Oil pollution is a threat in coastal as well as inland habitats, on breeding and wintering areas, and along migration routes. In more arid portions of the Midwest, diversion of river water and withdrawal of water from aquifers for irrigation has lowered water tables such that some former rivers that supported Least Terns are now dry.

Habitat Management Recommendations

Range-wide conservation status is difficult to assess because Least Terns are highly mobile, and recognized subspecies are almost indistinguishable and some mix extensively. Standardized surveys are difficult, and leg-banding produces few recoveries and re-sightings. Undoubtedly the Midwest population of Least Terns will require continued attention to maintain water flows that promote natural nesting substrates wherever possible. Production of young appears to be seriously restricted in many areas, and the rate of post-fledging survival is unknown. Ultimately, comprehensive management plans are needed that integrate breeding, migration, and wintering habitat in context with potential mixing of the various recognized populations.

Efforts to protect and manage Least Terns are almost always directed at nesting areas and include signs and symbolic fencing. Generally, conservation measures have been directed at altering vegetation succession, reducing predation, or controlling human activities. In riverine habitat, attempts to restore or mimic natural flooding should take precedence over manual control of vegetation.

At the local level, at Iowa's IBAs or at any other sites where Least Terns might be found, the key to the continued existence of this endangered species in Iowa lies in providing or sustaining breeding and adjacent feeding habitat, and protecting those areas from any form of disturbance during nesting and brood rearing.

Probably the most important single management recommendation for Iowa is gaining full implementation of wildlife-friendly water level regulation policies and flow regimes within the Missouri River. When flows once again follow natural spring and summer fluctuations, few, if any

nests will be destroyed by flooding. The river and its floodplain may then return to being conducive to the continued survival of both Least Terns and Piping Plovers.

Local conservation efforts should also close off, during spring and early summer, significant portions of sandy areas or beaches that surround sites that Least Terns (and Piping Plovers) use for nesting and the rearing of young. Recreation vehicles, pets and continuous human disturbance have caused many nest failures within the range of these closely linked species; and these negative impacts should always be eliminated or minimized.

Other management recommendations include: using fences (sometimes electric) to prevent entrance by humans and mammal predators; using a variety of techniques to control vegetation encroachment at nesting and feeding sites; possible addition of sand and gravel to create artificial nesting sites; and in some cases, nest relocation to prevent flooding or other major threats.

Generally, intensive management at breeding sites is not ideal in that methods are temporary, and the success of some methods is uncertain and controversial. Nonetheless, management techniques are being assessed and refined and in some cases, activities aimed at increasing nest success have been achieved in other parts of the nation.

Continuous annual survey work by volunteer birders as citizen-scientists is needed to watch for Least Tern population fluctuations. Data that are collected should be submitted the Iowa Important Bird Areas (IBA) Program. The Wildlife Diversity Program of the Iowa Department of Natural Resources also plays a vital role in future conservation activities for Least Terns and the closely associated Piping Plovers.



STATUS: ENDANGERED

Endangered in Iowa

Barn Owl

Tyto alba

Introduction

The Barn Owl is one of the most widespread of all owls, and is among the most widely distributed of all land birds on Earth. Versatility in the use of nest sites and in selection of prey, strong powers of flight, and an ability to use human-modified habitats undoubtedly are significant factors in its large geographic range. Despite being common in some areas and often nesting close to human habitations, the secretive, nocturnal activity of Barn Owls renders them inconspicuous to most people. However, declining populations in several areas have raised public awareness of the species. The Barn Owl is one of the most intensively studied owls, especially in Europe and North America, but most of the 28 subspecies remain poorly known.

Barn Owls occupy a broad range of open habitats, urban to rural. Its northern range limit is determined by climate, specifically the severity of winter conditions, and they reach their northern limits in the northern tier of states. Iowa Barn Owls nest in a wide variety of natural cavities, and also a wide variety of cavities in human-made structures.

Its breeding numbers seem limited by the availability of nest cavities in proximity to adequate densities of small mammals (especially voles [Microtus spp.]), its primary prey. Its reproductive pattern is highly flexible, especially compared to other owls. Generally monogamous, Barn Owls are sometimes polygamous and can raise two or more broods per year. It can breed year round where climate conditions permit. Normally a strictly nocturnal species, the Barn Owl has evolved excellent low-light vision and remarkable hearing; indeed, its ability to locate prey by sound is the most accurate of any animal that has been tested.

LINK TO IOWA IBA: BARN OWL

Changing agricultural practices threaten some populations, but nest boxes have helped boost numbers in other areas. Barn Owls may not migrate, or if so, perhaps only for minimal distances. This species has been documented in Iowa in every month of the year, and it appears likely that some Barn Owls remain in Iowa year-round. There are no accurate data on the how many Barn Owls reside in Iowa, or how much movement they undergo.

Habitat Preferences

The Barn Owl seems best suited to oak savanna communities, but it also uses a variety of other open habitats such as grasslands, marshes, and agricultural fields; and it can be found in and around cities. In general, a broad array of habitats are utilized, and populations are probably limited most by availability of appropriate nesting and roosting sites near available prey, and by severity of winters.

The habitat preferences of Iowa Barn Owls lead them to nest in a wide variety of natural cavities including: trees, cliffs, caves, and riverbanks; and also in a wide variety of man-created cavities including nest boxes, and those in corncribs, grain storage bins, barn lofts, haystacks, attics of abandoned houses and church steeples.

Barn Owls respond favorably to nest box placement in abandoned and otherwise remote buildings that they frequent. Records show that in the mid-1990's seven of twelve nests known to exist in Iowa were in nest boxes. Fortunately, this owl is not very territorial, and during this same period three active nests (2 in nest boxes) were located within a 60-yard radius at the same farmstead in Taylor County.

Feeding Habits

Barn Owls utilize grasslands, marshes and open fields for foraging, and they hunt mostly at night, beginning about one hour after sunset and ending about one hour before sunrise, but also occasionally hunt by day. The preferred method of hunting seems to be flights about 4 feet to 14 feet above ground level, but hunting is sometimes done from perches. When feeding young, Barn Owls return to areas of recent successful prey captures until they are unsuccessful. Flight is silent to human ears as well as at ultrasonic levels. Prey is detected by excellent low-light vision and by extremely acute hearing. Ability to locate prey by sound is the most accurate of any animal that has been tested, allowing capture of prey hidden by vegetation or snow, or in total darkness.

Small mammals make up a majority of the diet, and were 74-100% of prey in 52 food-habits studies. Voles (Microtus) are the dominant prey in much of n. North America. Other small mammals are taken more or less as available, including shrews, moles, deer mice, house mice, pocket mice and flying squirrels. Juveniles of larger species are also taken including: wood rats, pocket gophers, Norway and black rats, muskrats, and rabbits. Rarely taken are strictly diurnal species such as ground squirrels and chipmunks. Birds are usually only a small percentage of the diet, and those that are eaten are mostly small species that roost in the open such as European Starling, Red-winged Blackbird, and meadowlarks. Amphibians, reptiles, fish, insects, scorpions, and crayfish are rarely taken. Extensive food habits data are derived mainly from pellet analysis. Prey remains in Barn Owl pellets are highly reliable indicators of diet.

Prey is captured with the feet and usually nipped through the back of the skull with the beak for the kill. Long legs facilitate penetration into long vegetation and snow to catch prey. Most prey is swallowed whole; those too large to swallow are eaten piecemeal. Rain tends to decreases the hunting performance of Barn Owls.

Breeding Biology

In courtship, the male Barn Owl performs flight displays, including loud wing-claps, and the male encourages the female by providing food. Courtship probably begins about one month before eggs are laid, but actual egg laying can take place from early spring to late summer. There is no evidence that day length influences the initiation of courtship and breeding; and it is likely that food availability and climate are important determinants of the breeding season.

When a nesting cavity is selected in a natural site or a man-made structure, small debris including grass and sticks are arranged into a crude depression. No real nest is built. The number of eggs laid is usually 3-8, but as few as 2 and as many as 12, or even more, have been observed. The eggs are whitish, but sometimes become stained in the nest. Incubation is by the female only, and lasts from 29 to 34 days. Males bring food to females during incubation, and females leave the nest during incubation only briefly at long intervals.

Female Barn Owls brood the young when they are small, and the male provides food for both adults. Only the female feeds the young. The female begins sharing the hunting duties again about 2 weeks after brooding begins. The young are roughly 55-65 days old at first flight, and return to roost at the nest or close by for several more weeks. When prey is sufficiently abundant Barn Owls may produce two broods per year, and sometimes three.

Concerns and Limiting Factors

From 1995 through 2005, just 37 Barn Owl nests were confirmed in Iowa (3.7 nests per year). And most of those were in the southern half of the state. Although there is some evidence of a decline in the number of Barn Owls in Iowa and nearby states, this species was never thought to be common. And Iowa lies at the Northern edge of where this species breeds.

The apparent decline in the Barn Owl population in Iowa is probably the result of a number of factors. The most serious limiting factor appears to be the loss of dense grass habitats where their primary prey is found. Other limiting factors include: loss of nesting and roosting sites, severe winter weather, predation by more abundant Great Horned Owls, collisions with vehicles, and the possible effects of pesticides and other man-made chemicals.

Many of the limiting factors that have had a negative impact on Barn Owls are directly related to land use changes. Today across most of Iowa there is fence row to fence row acres of corn and soybeans where fifty years ago crop rotations included 25% or more of hay or meadow. Barn Owls have found fewer habitats for hunting, nesting and roosting as industrial agriculture expanded and eliminated native vegetation and natural habitats.

Because of the secretive, nocturnal nature of Barn Owls and increasingly enlightened human attitudes toward birds and all wildlife, shooting and trapping are not considered to be major problems. There is some evidence that Barn Owls may have been affected much less by organochlorine pesticides than other raptors during the mid to late 20th Century. Overall, man-made chemicals entering the environment are not thought to be as negative as the loss of hunting, nesting and roosting sites due to the outright elimination of habitat, or the degradation of the habitat that remains.

Studies have shown that collisions with automobiles are a significant, and possibly increasing cause of mortality. Most of this mortality occurs from early autumn to late winter with a peak in autumn consisting mainly of immatures and corresponding to post-fledgling dispersal from nest sites. Electrocution via power lines is considered

to be a minor cause of mortality. Loss of nest sites by demolition or alteration of old buildings has had a negative effect on Barn Owls in Iowa as well as many other parts of North America

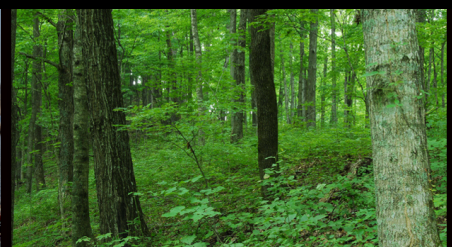
Habitat Management Recommendations

The lack of accurate data on population numbers and population trends in most parts of the range of Barn Owls complicates the assessment of conservation needs. Being nocturnal and secretive, the Barn Owl is a difficult species to assess. However, the most serious North American declines in Barn Owl populations seem to have been in the Upper Midwest, including Iowa.

Many believe that the key to increasing numbers of Barn Owls in Iowa are two straight-forward concepts: 1) to provide safe, predator-proof nesting and roosting sites near the habitats that they prefer for hunting; and, 2) to increase and maintain large blocks of dense grasslands that will provide the prey species that sustain Barn Owls.

Nest boxes can be fairly easily and inexpensively placed where they are most likely to be used. Locations for nest boxes include: within or on the outside of barns, silos, corn cribs, grain storage bins or machine sheds. Those with a desire to increase or sustain Barn Owl numbers may obtain nest box designs and installation instructions from the Iowa DNR Wildlife Diversity Program, Wildlife Research Station, Boone, Iowa. After nest boxes are placed it is important to monitor them for results. It is important to avoid disturbing Barn Owl nests during incubation, or until the young are at least two weeks old.

Because most of Iowa's best potential habitat for Barn Owls is in the southern half of the state, restoration efforts in this area are more likely to be successful, especially where savanna habitat still exits. Restoration of savannas anywhere in the state where it previously existed is likely to benefit a number of wildlife species, including possibly Barn Owls. Prescribed burning and understory thinning are management techniques that eliminate unwanted trees and shrubs, remove ground cover, and create open grassland and prairie habitats for the small mammals that Barn Owls require. To provide optimal benefits to Barn Owls, grasslands should be managed to enhance the dense ground cover that is essential for meadow voles, the primary food of this species, as well as other small mammals.


STATUS: ENDANGERED

Endangered in Iowa

Short-eared Owl

Asio flammeus

Introduction

One of the worlds most widely distributed members of its family; the Short-eared Owl is an open country, ground nesting species that inhabits wetlands, grasslands, prairies and tundra throughout much of North America and Eurasia. It also breeds in many other portions of the world. Few data exist for populations other than the widely distributed nominate race Asio flammeus flammeus in North America, Europe, and Asia. Most other races are considered island endemics.

Reproduction and population dynamics of this species are closely linked to the density of its primary prey, small mammals such as Microtus voles. Like other birds of prey that depend on fluctuating numbers of prey species, the Short-eared Owl shows considerable local variation in its numbers and reproductive success, and is even nomadic at times. Although the literature on its diet in the non-breeding season is extensive, few studies have thoroughly addressed other facets of its biology, ecology, and life history.

The most diurnal of Iowa's owls, this species may be seen actively hunting day and night. It tends to hunt at low heights above the ground, often quartering an area on slightly dihedral wings or hovering. Although it generally uses acoustical cues to locate prey, it can rely on vision as well. Its conspicuous flights and calls during courtship are a distinctive feature of the landscapes it inhabits. Short-eared Owls have declined in many areas of North America. Habitat loss due to land use changes and other human activities appear to be the major causes. As a ground-nester, it may also be vulnerable to increases in levels of predation.

LINK TO IOWAIBA: LONG-EARED OWL

Habitat Preferences

Short-eared Owls breed in, and are almost always associated with, open country that supports cyclical populations of small mammals. In Iowa these preferences typically include large expanses of marshland, native prairie or grasslands, but some agricultural areas are also utilized. As would be expected, this species tends to congregate where small mammal populations are highest.

This species is an opportunistic breeder, preferring to nest in areas with the most abundant prey. Nests are usually located on dry sites with enough vegetation to conceal the incubating female, and nests will be created on slight ridges or mounds if present.

Habitat preferences during migration or dispersal when prey populations have declined significantly are similar to habitats used when breeding, but may also include smaller open areas, if prey is available.

At other times when not nesting, Short-eared Owls may use small marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets which are surrounded by woodlands and other plant communities. Occasionally this species will roost in trees during winter, but it primarily roosts of the ground.

Short-eared Owls roost communally during winter, and groups of 8 to 20 have been reported in Iowa. Most winter reports are from the southern half of the state. Wintering areas often turn into breeding areas if food is plentiful.

Feeding Habits

Short-eared Owls feeds mainly on voles (Microtus), which are the dominant prey item throughout Iowa and most of most of North America. They also take other small mammals such as deer mice, pocket mice and gophers; and also shrews and rabbits. Bats and muskrats are only rarely taken. This owl preys less frequently on birds than mammals, and there is a strong positive correlation between vole abundance and owl abundance.

This predator hunts by flying low over the ground (1 to 10 feet in height), and often hovers slightly higher before dropping onto prey. Hunting flight is by buoyant, floppy wingbeats, which may give the appearance of a giant moth. Hunting may take place by day (especially on dark, overcast days), but mostly these birds are crepuscular, or most active near dawn and near dusk. Time of hunting is probably dictated by hunger, prey density, and nestlings' hunger. Research indicates that prey is found primarily by sound, but also by sight.

Small mammals are usually swallowed whole or by clipping off the head and eviscerating the prey. During the infrequent times when small birds are taken, the wings are clipped off and the body is swallowed whole. Pellet analysis provides reliable insights into actual diet and is the best method for quantifying small mammalian prey. Diet varies little throughout the range of this species, with apparently little difference in food eaten seasonally or by sex or age of individuals.

Food storage or caching of prey has been infrequently reported, but this behavior may be common. Adult birds feed flightless (dispersed) young, and have been known to stock-pile up to five prey items during these times. The lack of a crop in owls may also contribute to selection for this behavior.

Breeding Biology

Pair formation usually begins in mid-February and continues through June. The male's courtship includes flying in tight circles, making "barking like calls," diving, and "wing clapping" and male and female preen each other. This performance may be repeated for an hour or more, and prior to copulation, the male offers the female food.

Communal winter roost sites may turn into local breeding territories.

Short-eared Owls can be colonial nesters when location of prey and nesting cover make this the most feasible option. Nests are usually on dry ground and often on a raised hummock or ridge, especially in marshy habitats. The nest is build by the female and consists of a depression in the soil, lined with grass and feathers. These nests are usually concealed in tall grass or under a shrub, and are very rarely above ground level.

Eggs may range from 3 to 11, but more commonly are 6-8, with more eggs produced when prey is very abundant. Egg laying usually takes place from April through June. Incubation takes 24-37 days and is thought to be by the female only. Males feed incubating and brooding females, and bring food to the nest for the female to feed to the young.

The young may leave the nest on foot at 12-18 days of age. Once fledged, young form communal family groups and roost together during the day. Adults may participate at first, but it is not known for how long. As a ground nester, Short-eared Owls are vulnerable to mammalian predation. Selective pressure may favor rapid growth, development, and pre-fledging dispersal of young as an anti-predator adaptation to ground nesting. The young are able to fly at 27-36 days of age.

Concerns and Limiting Factors

Reports from Iowa in the late 1800's and early 1900's indicated that Short-eared Owls were common. But by the 1930's this species was considered to be a rare summer resident and an uncommon winter resident. And this has been the pattern until the present day.

As with most declining birds and other wildlife species, the primary concerns and limiting factors are specifically related to preferred habitats. In the case of Short-eared Owls, a huge percentage of the native prairies, wetlands, and grasslands that previously supported this species have been converted to crop fields, housing developments, transportation systems, and other human activities. Habitat that hasn't been lost may be severely altered, fragmented or degraded by these same factors, plus other forces. Consequently, the habitats available to this interesting species in Iowa have been sharply reduced.

Ground nesting and nomadic travels in search of prey make this species particularly vulnerable to habitat loss at any season. Reforestation in some areas may also contribute to habitat loss. Increased predation by skunks and raccoons on eggs and nestlings (especially likely to occur in small and fragmented habitats) is suspected of being an important reason for population declines. Disturbances at nests by domestic and feral cats and dogs are also known to be a problem at certain locations.

Illegal shooting occurs, but probably has less impact on populations than it did in years past. Although residues from pesticides and other contaminants magnify with successive trophic levels in the food chain, birds of prey such as Short-eared Owls that eat herbivorous mammals usually accumulate low levels of these man-made compounds. These low levels of contamination generally have little effect on eggshell thickness and breakage, tissue damage, or embryo mortality.

Habitat Management Recommendations

Management suggestions have included: maintaining large contiguous tracts of wetland, prairie and grassland habitat for these owls and their prey, controlling human disturbance and predation as well as possible, public education, and continued field research.

This species has benefited from the USDA Conservation Reserve Program, and indirectly from protection and restoration of nesting cover to support waterfowl populations.

Burning and maintenance of native prairies and grasslands to provide nesting and foraging cover has also benefited this endangered owl.

LINK TO IOWAIBA: LONG-EARED OWL



STATUS: THREATENED

Threatened in Iowa

Long-eared Owl

Asio otus

Introduction

Long-eared Owls inhabit open and sparsely forested habitats across North America and Eurasia. Despite their wide distribution, they are uncommon to rare throughout the Midwest. In Iowa this species prefers dense conifer groves or mixed conifer-deciduous areas, especially near water, for roosting in winter. This species is among the most nocturnal of all owls. They keep concealed in dense vegetation during the day and can be approached very closely before they flush. Long-eared Owls rarely nest in Iowa where it is listed as threatened, but populations appear to be stable in much of North America.

This owl nests in trees, and often uses abandoned nests that were constructed by crows, hawks or squirrels. Less often it nests in cavities in trees or cliffs, or on the ground. Although Long-eared Owls prefer to nest and roost in dense vegetation, it hunts almost exclusively in open habitats. With long and powerful wings, the Long-eared Owl is an active-search hunter, and preys on a variety of small rodents. It probably locates most of its prey by sound.

This species often roosts communally during the non-breeding season; typical roosts contain 2 to 20 birds, but up to 100 have been reported. Long-eared Owl numbers fluctuate with those of their principal prey, Microtus voles. Although this owl winters throughout most of its breeding range, some individuals migrate long distances, with several records of birds banded in the northern United States and southern Canada being recovered in Mexico.

LINK TO IOWA IBA: LONG-EARED OWL

Habitat Preferences

Long-eared Owls inhabit dense vegetation adjacent to grasslands, wetlands, and also open forests. Dense forests are normally used for nesting and roosting only. A rare nester in Iowa, this species is most often observed within the state in winter, when it prefers dense conifer groves or mixed conifer-deciduous areas, especially near water, for roosting. Since they forage in open grassy areas, this owl requires areas with both grassland and forest habitats.

Given the potential range of habitats encountered during migrations which sometimes cover large distances, this owl may use a greater variety of habitats on migration than during breeding and wintering seasons. One important attribute of winter roost sites seems to be dense vegetation for concealment and perhaps thermal cover.

Long-eared Owls occur somewhat more frequently in Iowa during the winter than during the nesting season, but are still uncommon. The most heavily used roost sites are conifer groves adjacent to open habitats used for foraging.

Feeding Habits

The diet of Long-eared Owls consists mainly of small mammals, and primarily voles (Microtus); although they usually feed on the most common local rodents that are present. Little is known about hunting habits, but presumably most food is captured on the ground (mammals and some birds) or from low vegetation (including birds that are roosting).

Although highly nocturnal, at times Long-eared Owls may begin hunting before sunset, especially during brood-rearing; and they may hunt from perches, especially in windy conditions. They are not known to pursue and capture prey in the air; and rain and wind may reduce hunting success.

The small mammals that make up the primary prey, are dispatched by biting the back of the skull, and prey is often swallowed whole. At times prey is eviscerated and entrails are left uneaten. This predator is known to capture and eat small birds, shrews, bats, lizards, snakes and other small creatures. When birds are taken the remains in pellets are similar to those in Short-eared Owl pellets, suggesting that Long-eared Owls discards wings, as do Short-eared Owls.

This owl is known to capture mice in complete darkness, therefore prey are probably located primarily by acoustical cues. Various adaptations for silent flight are well developed, and facilitate hunting success. External ear openings are asymmetrical (left higher than right) and large, which further aids in locating and capturing prey in darkness. Vision in low light conditions is apparently as good as or better than that of other North American owls.

Food-caching away from nests has not been reported but may occur. Prey captured by male is often stockpiled at the nest during incubation and early brood-rearing.

Breeding Biology

The actual timing of pair formation is unknown, but presumably begins at communal roosts from January through March, or soon after roost sites are disband. In some cases males have occupied breeding sites for up to 8 days before females arrive. Early in breeding season, males perform aerial displays, flying in zigzags around nesting area with deep wingbeats and glides, and occasionally clapping wings together loudly below their body.

The nest site is usually in a tree, 4-30 feet above ground, and usually at about midlevel in a tree. But no actual nest is built, and another nesting species may be

evicted to gain a nest site. Abandoned nests of squirrels, crows, various hawks, and other birds are utilized. In general, no material is added to the nest lining, although feathers lost from the brood patch of females may remain in nest.

The first clutch of eggs is usually laid between mid-March to mid-May, with earliest eggs being laid in late February. From 2 to 10 eggs may be laid, but the usual number is between 4 and 6. Incubation is by the female only, and usually takes 26-28 days. Males bring food to the nest for females during incubation. Prey is often stockpiled at nest shortly before the first young hatch. Young Long-eared Owls hatch from late March through June, with young leaving the nest from April through June. Normally there is just 1 brood per year.

The female remains with the young almost continuously for the first 2 weeks after hatching, and males continue to bring food for the female and young. Later the female also hunts. The young climb out of the nest and unto nearby branches about 3 weeks after hatching, and may not roost together. The young take short flights at about 5 weeks of age. Males continue to feed the young until they are 10-11 weeks old and they disperse from the nest site.

Renesting pairs have used the same nest twice in 1 season, and nests may be reused by Long-eared Owls in subsequent years, but often by different individuals.

Concerns and Limiting Factors

The distribution of Long-eared Owls may be limited by the amount of grassland that is located adjacent to suitably dense woodlands, especially stands of conifer trees. Even after 2 million acres of new grasslands were created in Iowa through the USDA Conservation Reserve Program, no overall increase in the numbers of Long-eared Owls was reported.

In some locations this species has declined because of destruction of isolated groves of conifers and dense stands of deciduous trees and riparian vegetation, conversion of hunting areas to agricultural fields, and reforestation of open areas that would otherwise support prey species. In some areas Long-eared Owl numbers may be limited through predation by and competition with Great Horned Owls – a larger and dominant species.

Long-eared Owls are occasionally shot by bird hunters, but this problem is not thought to be large enough to influence overall populations. Within heavily used outdoor recreation areas (e.g., fishing access sites, campgrounds), fledglings are sometimes killed, injured or harassed by humans. Another negative impact on populations of this species may be decreased prey populations due to chemicals to kill rodents.

Habitat Management Recommendations

As a nomadic owl with low population densities, it is difficult to manage property specifically for Long-eared Owls. However, management that creates or retains open grassy areas that support small mammal populations adjacent to dense woodlands that could be used for nesting, or winter roosting, will provide the best opportunities for this quite special owl species.

In some areas the preservation of grasslands and wetlands, and planting of conifers near these open habitats would be important management actions, and in other areas maintenance of healthy riparian stands of trees would undoubtedly be beneficial. For more information on managing grasslands and woodlands, refer back to Part 3.

In Britain, Long-eared Owls nest in artificial baskets and open-fronted nest boxes. Artificial structures such as these could mitigate for the lack of nests in portions of Iowa where the numbers of crows have

been reduced. According to some researchers, communal roosting behavior is well developed but unstudied in Long-eared Owls; and the vast literature on the evolution of avian communal roosting seems to have ignored owls completely.

However, information derived from banded birds has raised intriguing questions related to habitat management. For example, why do some Long-eared Owls migrate to central Mexico in the fall, whereas others winter near breeding sites north of Iowa? Why are so few adults that are banded near nest sites, recaptured in the same areas in subsequent years? Aside from being inherently interesting, these as well as other questions are central to a firm understanding of demographics and gene flow that is necessary for conservation of Long-eared Owl populations. The answers can only come from intensive banding and recapture efforts over many years. Comparative studies with Short-eared Owls might be especially rewarding.



STATUS: THREATENED

Threatened in Iowa

Henslow's Sparrow

Ammodramus henslowii

Introduction

Once common on the tallgrass prairies across the Midwest and wet grasslands of eastern North America, but now threatened in Iowa, the Henslow's Sparrow is a remarkably inconspicuous grassland bird. It prefers habitats with tall, dense vegetation and thick litter. Henslow's Sparrow is often difficult to detect because it sings from inconspicuous perches on low forbs, shrubs, or grasses. Even when singing from an exposed perch, it is easy to overlook this sparrow's dry, thin, insect-like song, has been accurately described as a "feeble hiccup."

Henslow's Sparrow populations have declined over the last half-century, and this species has recently been identified as the highest priority for grassland bird conservation in eastern and Midwestern North America. This species' long-term population decline appears to be attributable to the loss, draining, and degradation of grassland habitats throughout its range. More recently, conversion of hay fields and pastures to row crops and other intensively managed forage crops, such as alfalfa, have contributed to the continued population decline, estimated to be -7.5% annually over the last 3 decades (1966–2000), which is the steepest decline for any species of grassland bird in North America.

Very recent (since 1990), local population increases appear to be associated with the creation of undisturbed grassland habitat by the Conservation Reserve Program (CRP). However, it does not appear that these local increases have been sufficient to offset overall population declines. Despite the recent surge in research attention, many aspects of this species' ecology and breeding biology remain poorly understood.

LINK TO IOWA IBA: HENSLOW'S SPARROW

Habitat Preferences

Henslow's Sparrow is a bird of weedy and grassy summer fields where it hides in dense cover and is extremely hard to observe. This species is often absent from habitat that appears to be quite suitable. As native habitats declined, this species moved into additional habitats, in particular hayfields. And some researchers have noted a correlation between the summer range of Henslow's Sparrow and areas of heaviest acreages of hay production in the United States.

Recent quantitative analyses of Henslow's Sparrow breeding habitat have shown that litter density and depth, standing dead residual vegetation, forbs and woody-stem densities, vegetation height and density and field size, are important components of their habitat. Henslow's Sparrow also tends to occupy flatter portions of fields (<7% slope). In general, habitat can be characterized as relatively large fields consisting of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation.

When flushed it flies away low for only a short distance before dropping back into dense cover. When vocalizing this little sparrow throws its head back, and delivers one of the least impressive of all bird songs, a short tsilick. Despite the obvious lack of vocal ability, the Henslow's Sparrow has beautiful markings when seen well. Local population levels vary considerably from year to year, and overall, this sharp-looking sparrow has become quite scare over much of its range.

Feeding Habits

The main foods taken by Henslow's Sparrow when it is present in Iowa in summer are mostly insects and seeds. Feeding is done primarily on the ground, where many different kinds of seeds are eaten. And feeding is done individually. Henslow's Sparrow does not associate in flocks with its own kind or with other sparrows.

Among insects Henslow's Sparrow seems to prefer grasshoppers (Orthoptera) and beetles (Coleoptera). Some research has shown that from April to October, the diet is 82% animal matter and 18% is plant material.

Breeding Biology

Nesting begins in late April, with most first clutches completed by May 20-30. Nesting continues into August, with young in nest occasionally into September.

Nests are an open cup of grass and weeds, and are built primarily by the female, in 4–6 days. Nests are typically placed among layers of thick litter. In areas with little litter, nests are generally placed within large clumps of grass close to ground. Deep litter may contribute to higher nesting success. After construction of the nest, 3-5 eggs are laid at the rate of 1 per day.

Incubation is by the female only, and lasts for about 11 days. Both parents feed the nestlings and the young leave the nest about 9-10 days after hatching. More than one brood may occur in a single season, and a new nest is constructed for each nesting attempt.

Concerns and Limiting Factors

Henslow's Sparrow has declined seriously in Iowa and much of its former range, and is listed as threatened. The loss of proper habitat is thought to be the cause of the population decline, but overall, habitat requirements are not well understood.

Over the past decade or so, local populations have increased in association with the creation of undisturbed grassland habitat by the Conservation Reserve Program (CRP). But it does not appear that these local increases have been sufficient to offset overall population declines. The few native prairie tracts remaining in Iowa may be too small, too isolated, and too

frequently burned to support healthy populations of this distinct little sparrow. The information in the grassland management section should be followed carefully to allow grasslands and hayfields to support as many Henslow's Sparrow as possible.

Loss of suitable nesting habitat has been universally cited as most probable cause for recent populations declines of this species. Activities contributing to breeding-habitat loss for Henslow's Sparrow include: natural succession of vegetation due to fire suppression, conversion of pasture and hayfields to row crops, earlier and more frequent cutting of hayfields, wetland drainage, and urbanization. Since Henslow's Sparrow prefers tall, dense vegetation for breeding, too frequent grazing, mowing, and burning of these vegetation types all generally reduce local breeding densities.

Population numbers are often reported to vary greatly from year to year. Additional research is needed to determine the underlying causes of these local population fluctuations and to determine if populations at larger (multi-state) scales also fluctuate, and by how much.

Habitat Management Recommendations

The primary conservation strategy being used in Iowa for Henslow's Sparrow and other grassland birds are:

1) Establishment of larger grassland Bird Conservation Areas (BCAs) along with smaller IBAs

2) Following the recommended grassland management practices described in Part 3 of this writing.

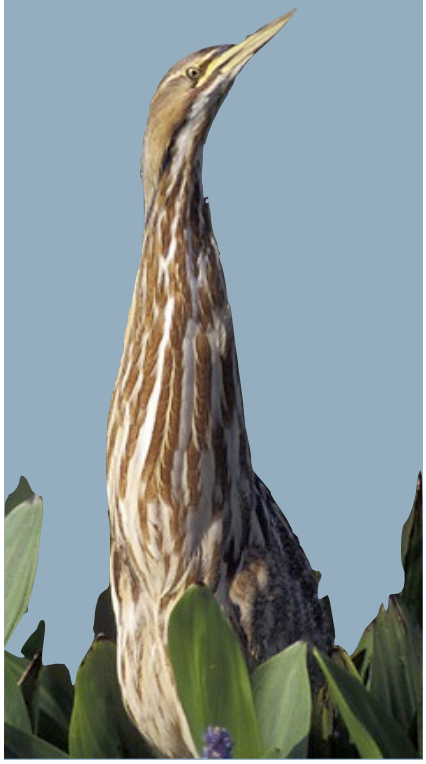
If widely implemented, such practices have potential to benefit Henslow's Sparrow, which appears to be habitat-limited and which is known to require large blocks of grassland habitat for breeding.

While the CRP initiative was not specifically intended to benefit this species, CRP has provided relatively large acreages of undisturbed grassland habitat, and Henslow's Sparrows have colonized these fields in many parts of Iowa. Creation of large tracts of undisturbed grasslands through this program appears to have been responsible for recent local reversals of long-term population declines. In other cases, four-to-six-year rotations of mowing, pasturing, and burning, when done correctly, may be beneficial. The best bet on small acreages, is to understand and follow what is provided above in Part 3.

LINK TO IOWA IBA: HENSLOW'S SPARROW



STATUS: HIGH CONSERVATION PRIORITY IN IOWA



American Bittern

Botaurus lentiginosus

Introduction

The American Bittern is a large, stout, solitary, cryptically colored heron that breeds in freshwater wetlands from the mid-United States to northern Canada. It prefers wetlands dominated by tall, emergent vegetation, and within these habitats frequents vegetation fringes and shorelines. It is seldom seen as it slips through the reeds, but its odd pumping or booming song, often heard at dusk or dawn, carries for long distances across the marsh. Once heard, these distinct calls are seldom forgotten.

American Bitterns rely on stealth more than pursuit to forage, waiting motionless for long periods to capture passing prey —mainly insects, amphibians, crayfish, and small fish and mammals. It is crepuscular and most active during earlier morning and late evening hours.

Because of this species' secretive nature and inaccessible habitats, remarkably little is known about basic aspects of its biology, including sources of mortality, habitat use, mating systems, and population structure. Basic research on its natural history would help to conserve the species, which is undergoing substantial declines over much of the U.S. owing largely to loss and degradation of wetland habitats.

LINK TO IOWA IBA: AMERICAN BITTERN

Habitat Preferences

The preferred habitats of American Bitterns are a rather wide range of chiefly freshwater wetlands and reedy lakes, with tall, emergent vegetation. It is also found at times in sparsely vegetated wetlands.

This species sometimes nests in upland cover that surrounds a wetland basin, provided that cover is not modified by agriculture. But it mainly breeds in large, shallow wetlands with abundant cattails and other tall marsh vegetation.

In comparison to the sympatric Least Bittern, also a species of high conservation priority in Iowa, the American Bittern uses a wider variety of wetland cover-types, with less dense vegetation, and shallower water depths.

Feeding Habits

The diet of American Bitterns consists mostly of small fish and various other aquatic life, including insects, frogs, salamanders, small mammals, garter snakes, crayfish, tadpoles, and assorted other prey. This species has also been observed catching dragon flies. At drier sites they may eat rodents, especially voles.

Vegetation fringes and shorelines are favorite foraging areas; and this American Bitterns seems to avoid even-aged stands of older, dense, or dry vegetation. These birds forage primarily by standing in-place at the waters edge and sometimes walking slowly and uses a sudden thrust of the bill to ambush prey that ventures too close. Thus, this solitary feeder relies on stealth more than pursuit to capture prey. Its coloration, particularly ventral stripes, provides camouflage in dense, vertical marsh vegetation, complements its inactive feeding style, and permits solitary foraging.

Prey is killed by biting or shaking, and swallowed headfirst. Foraging birds may remove dangerous dorsal and pectoral spines of fish prior to swallowing. Foraging may occur at any time of day or night, but these birds are most actively near dusk and dawn

Breeding Biology

The male American Bittern defends a nesting territory by advertising his presence with its unique “booming” or “pumping” calls. Pair formation takes place upon arrival of females from March to early May. Courtship displays have not been well described, but one male may mate with two or three females.

Nests are most often located in dense cattails and other tall emergent marsh vegetation above shallow water, but have also been found on dry ground in dense grasses. The nest, apparently built by the female alone, is a platform of small pieces of marsh vegetation, lined with fine grasses.

Eggs, usually 3-5, but can range from 2-7, are laid from late April to late June, and the first broods of the season arrive in May to early July. Incubation starts before full clutch is laid, perhaps beginning with first egg. The incubation period is 24 to 28 days. Incubation is by female only, but no information is available on length of incubation.

Brooding and feeding young is apparently by female only. Chicks are given regurgitated, partly digested prey. Young may leave the nest after 1-2 weeks, but remain nearby and are fed up to the age of 4-weeks. First flight may occur around age 7-8 weeks.

Concerns and Limiting Factors

Researchers have indicated that American Bittern were fairly common in Iowa through the 1940s. But birdwatchers reported population declines in mid-continent by the late 1970s, and the entire continent by 1986. Other data from the Midwest show an annual decline of 4 % per year from 1966 to 1987, which also indicated that the decline

in Iowa and the Midwest is more severe than elsewhere.

This trend of population decline in our strongly agricultural state no doubt continues. American Bittern is a rare breeder in our state, and is now considered a high conservation priority in Iowa.

The causes of population declines have been cited as habitat loss, human disturbance, and pesticides and other contaminants. Loss of wetland habitat is clearly the major cause of decline, starting as early as the 1890s in some states. Habitat degradation is also a factor. Eutrophication, siltation, chemical contamination, and human disturbance seriously reduce habitat quality, primarily by damaging prey supplies, even at large, protected wetlands. Furthermore, changes in wetland isolation and wetlands with more stabilized water regimes may seriously erode habitat quality for this bittern.

Little is known about effects of contaminants on this species. Agricultural chemicals may have significant, indirect effects on the species by entering wetlands via runoff from upland areas and reducing prey populations. Many prey of bitterns, including aquatic insects, crayfish, and amphibians, are vulnerable to agricultural pesticides. The invasion of wetlands by exotic plant species, e.g., purple loosestrife, may substantially alter waterbird habitats, but how this effects bitterns has not been assessed.

Habitat Management Recommendations

Preservation of freshwater wetland habitats, particularly larger wetlands, and shallow wetlands with dense growth of robust emergent vegetation, is the most urgent management need. Wetlands used for breeding by American Bitterns also need to be protected from chemical contamination, siltation, eutrophication, and other forms of pollution that harm the birds or their food supplies.

The concentration of both nesting and overwintering populations at protected and managed wetlands, e.g., state and national wildlife refuges, emphasizes the need to develop and implement habitat management procedures that benefit bitterns.

For more specific information about management of wetlands, see that portion of Part 3 of this project.

LINK TO IOWA IBA: AMERICAN BITTERN



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Least Bittern

Ixobrychus exilis

Introduction

The Least Bittern, one of the smallest herons in the world, is adapted for life in dense wetland vegetation. It is considered to be among the most inconspicuous of North American wetland birds. This colorful heron is quite vocal and can be found at surprisingly high densities—up to 15 nests in 37 acres. Suitable habitats include freshwater wetlands with tall, dense emergent vegetation and clumps of woody plants over deep water.

Least Bitterns forage by stalking along the open-water side of emergent vegetation, grasping clumps of plants with their long toes and curved claws as they move. They also build small foraging platforms at especially good feeding sites, catching fast-moving prey, mainly small fish and dragonflies, with their small, thin bills.

An extremely narrow body permits this bittern to pass easily through tangled vegetation. When encountered, Least Bitterns typically burrow like rodents through dense vegetation, fly away weakly over marsh vegetation with legs dangling, or “freeze” with their bill pointed upward, feathers compressed, and eyes directed forward.

Least Bitterns are often overlooked in surveys of bird populations because the species is so secretive. Reports from birdwatchers, however, have suggested that populations are reduced over much of the species’ range and extirpated in some areas. Basic research on the Least Bittern’s nesting biology, movements, population dynamics, and overwintering biology would help to clarify the status of the species and facilitate its conservation.

LINK TO IOWA IBA: LEAST BITTERN

Habitat Preferences

Research done in Iowa suggests that Least Bitterns are most abundant in freshwater wetlands during years when ratios of emergent vegetative cover to open water were equal. They appear to be restricted to deep- and shallow-water cattails stands, apparently avoiding areas of dry cattails, river bulrush, and sedge. Tall stands of wetland vegetation, often associated with stable water regimes at managed impoundments and larger ponds and lakes, are apparently favored.

This species is most regularly found in Iowa on wetlands of 12 acres or more in size, suggesting that the species may be area-sensitive; but territorial individuals have been seen on wetlands as small as 2 acres.

Feeding Habits

The diet of Least Bitterns consists mostly of small fish and insects; but it also feeds on leeches, crayfish, frogs, tadpoles, small snakes, and other prey found in dense, emergent, wetland vegetation.

This species forages by clambering about, sometimes clumsily, on stalks of vegetation over water, and jabs downward with its long, slender bill to capture prey at the water's surface. In daytime, it often frequents tall, dense stands of emergent plants along deep, open waters. Least Bitterns also build foraging platforms of bent reeds at productive feeding sites, and uses these platforms during periods of late-incubation and brood-rearing.

Among 28 recognized behaviors used by herons, Least Bitterns employ only 4: "standing in place," "walking slowly," "neck swaying" (to overcome glare, to increase camouflage, or to have muscles in movement when strike begins), and "wing-flicking," which involves quick, repeated extension and retraction of wings that may startle prey from hiding. By clinging to emergent vegetation and constructing platforms, this tiny heron is able to forage over water as deep as that used by the largest North American herons, although most foraging occurs at the water's surface. Incubating adults forage passively by reaching out from nest after passing prey.

Breeding Biology

Least Bittern nests are built of emergent aquatic vegetation and sticks, on elevated platforms. Nests are well concealed beneath an overhead canopy, and, built mostly by the male, are usually widely scattered across wetlands. Least Bittern may produce two broods in one year and at times will nest in loose colonies.

Usually 4-5 eggs are laid, but the number may vary from 2 to 7. Incubation is by both parents, and lasts from 17 to 20 days. Both parents feed the young b regurgitating partly digested prey items. When predators approach the nest, the adult bird may make itself look larger by fluffing its feathers out and partially spreading its wings.

Legs and feet of young develop quickly, and young may leave the nest as soon as 6 days after hatching if disturbed; however, they normally will remain in the nest for about 2 weeks. The young will generally stay near the nest for another week or more while being fed by the parents and learning to fend for themselves.

Concerns and Limiting Factors

Destruction of wetland habitat is likely the greatest threat to the existence of Least Bitterns with wetland loss during past decades contributing largely to the current declining status of this species across much of North America. If wetlands remain undisturbed and unpolluted, however, Least Bitterns seem tolerant of human presence, and may sometimes persist in highly urbanized areas. Water impoundments can create important nesting habitats for Least Bitterns in some regions but do not offset losses of natural wetlands.

LINK TO IOWA IBA: LEAST BITTERN

Since there are no effective ways to monitor populations of this secretive species, highly accurate population levels are essentially unavailable in Iowa. But several recent state surveys give strong evidence, that, populations have declined, apparently since mid-century. Consequently, Least Bitterns are a species of high conservation priority in Iowa.

Siltation resulting from erosion of farmlands and run-off containing insecticides may degrade nesting habitats and reduce food supplies in agricultural areas. High concentrations of dieldrin were detected in Least Bittern in some parts of the nation.

Invasion by purple loosestrife and phragmites may alter and degrade wetland habitats, and, are threats in many areas. Because Least Bitterns fly low to the ground, collisions with motor vehicles, barbed-wire fences, and transmission lines can be a significant mortality factor.

Conservation of this species would be facilitated by: 1) standardized, regional monitoring programs to determine abundance and distribution and to evaluate trends in populations; 2) studies of habitat associations during nesting, migration, and overwintering periods; 3) studies of breeding biology that examine movements, causes, and rates of juvenile and adult mortality, causes of nest failure, renesting, juvenile dispersal patterns, mating systems, and diet; 4) identification of major stopover sites for overwintering and migrant Least Bitterns; 5) investigation of factors that regulate populations; 6) monitoring of contaminant levels in adult birds (or their eggs) in agricultural, industrialized, and undisturbed regions; and 7) identification of management techniques that enhance manipulated wetlands or restore degraded habitats.

Habitat Management Recommendations

Preservation, protection, and improvement of wetland habitats for Least Bitterns, particularly large (12 acre or larger), shallow wetlands with dense growth of robust, emergent vegetation, are the most urgent conservation needs for this species.

Wetlands also need to be protected from chemical contamination, siltation, eutrophication, and other forms of pollution. Because the birds occur in many wetlands managed by state and federal agencies for waterfowl, there is ample opportunity for making minor alterations to existing management practices to improve nesting habitat for Least Bitterns.

As with its close relative American Bittern, the wetland management discussion in Part 3 of this project should provide a variety of ideas for protecting and improving the factors that will sustain populations of this species.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Black-crowned Night Heron

Nycticorax nycticorax

Introduction

The Black-crowned Night-Heron is a near-cosmopolitan species, breeding on every continent except Australia and Antarctica. This is a stocky bird that is most active at night. Historical records indicate that nested chiefly in northern and western Iowa, but in 1907 it was called a “rather rate summer resident. In 1984 the few colonies that were reported were usually in wetlands in northwest Iowa also.

Although widespread and often common at some places within North America, its nocturnal and dawn and dusk feeding habits, render it less obvious than diurnal herons. Black-crowned Night-Heron feed on a wide variety of freshwater organisms, especially on fish. Declines in many of its populations noted in the late 1960s were probably attributable to the use of DDT, a persistent pesticide. Because these birds are high on the food chain, accumulate contaminants, and have a wide geographic distribution, they serve as indicators of environmental quality. In the past, they were shot and trapped as pests at fish hatcheries, but have also been hunted for food.

Black-crowned Night-Heron are colonial breeders and gregarious throughout the year, often associating with other species of herons. They are flexible in their selection of breeding colony sites, but often nest on islands or in swamps, suggesting they gain some protection from predators in doing so. The tendency for their young to disgorge their latest meal when disturbed has made this species a favorite for feeding studies. For naturalists who enjoy wetlands, this heron’s distinctive call is a quintessential sound of dusk and night.

LINK TO IOWA IBA: BLACK-CROWNED NIGHT-HERON

Habitat Preferences

Black-crowned Night-Heron are colonial nesters, and at times nests together with other herons and egrets. In Iowa and the Midwest they frequently utilize large wetlands with equal proportions of open water and vegetation, but seem to prefer waters lined with trees, shrubs, and tall wetland vegetation.

This species may fly up to 15 miles from the nesting colony to feed. Therefore, where found, they may forage practically in any aquatic habitat. Where water levels vary drastically, Black-crowned Night-Heron usage fluctuates accordingly. Nesting colonies also occur in a wide variety of situations, including willow thickets, dry woods and open wetlands.

Feeding Habits

This is an opportunistic feeder that feeds mostly on small fish, but it also takes a wide variety of other foods including: leeches, earthworms, aquatic and terrestrial insects including moths, crayfish, mussels, amphibians, lizards, snakes, rodents, frogs, tadpoles, birds, eggs, carrion, plant materials, and even garbage and refuse at landfills.

Black-crowned Night-Heron are usually solitary foragers; and they defend feeding territories. They forage mostly by standing still or stalking very slowly at the edge of water bodies, waiting for prey to approach. It sometimes uses "bait," by dropping a feather or small twig on the water surface to lure fish within striking distance.

Feeding takes place mainly from evening to early morning, but also occurs during daylight in times of high food demand such as during breeding season. This species typically leaves roost sites shortly after sunset to feed, and will return about a half-hour before sunrise. Foraging throughout the night is thought to have evolved primarily to avoid competition with daylight feeding herons, which use the same habitats.

Breeding Biology

Most Black-crowned Night-Heron migrate into Iowa in mid to late April. Shortly after arrival, courtship often occurs at old nest sites, with the males performing a variety of courtship behaviors. These herons are monogamous, and usually breed when two or three years old, but they can also breed at the age of one.

Nest sites vary, and may include trees, shrubs, or tall vegetation such as cattails. Nests are built by both sexes, and are usually loosely constructed platforms of sticks, twigs, or reeds. Old nests are frequently reused, and nests may be at ground level to as much as 150 feet above the ground, but are commonly 10 to 40 feet up and on firm support. At times nests are located with those of other herons and egrets.

Eggs vary from 1 to 7, but average 3 to 4. Incubation takes 21 to 26 days, and is carried out by both parents. Both parents also feed the young, which is done by regurgitating partially digested food items. The young usually remain in the nest for 4 weeks, and fly at about 6 weeks of age. As soon as flight is possible, the young will sometimes follow parents to productive foraging areas and beg to be fed there.

Concerns and Limiting Factors

Since Black-crowned Night-Herons are high on the food chain, cosmopolitan in their distribution, and colonial nesters, they make excellent environmental indicators and are being evaluated as an indicator of chemical contamination in several areas around the nation.

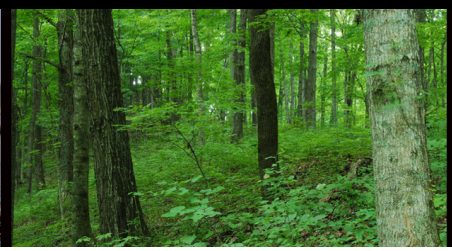
Human disturbance of nesting colonies is a major impact on nest success, and it has been determined that visits to colonies just before or during egg laying causes nest abandonment and increased predation of

nests. Disturbances of breeding colonies impeded success of more advanced nesting attempts, and in some situations caused young to die.

Although populations of Black-crowned Night-Herons are apparently stable, or nearly so across the nation; the loss of wetlands is no doubt affecting this species in Iowa.

Habitat Management Recommendations

Since many populations of Black-crowned Night-Herons are stable or increasing, management has not been a major focus. But in Iowa, little remains of the expansive wetlands that once supported vast numbers of wetlands species like this one. This makes the remaining wetland habitats and associated uplands all the more critical to ongoing conservation efforts. For details about wetland management see that section in Part 3 of this project.


STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Broad-winged Hawk

Buteo platypterus

Introduction

The Broad-winged Hawk is a crow-sized, stocky buteo with conspicuous, broad white-and-black tail bands. A common breeder in large, deciduous or mixed-deciduous forests throughout northeastern and north central North America, this species is secretive and not often noticed while nesting, but they form conspicuous and even spectacular concentrations when migrating. This is one of the few North American raptors that flock during migration; and tens of thousands of Broad-winged Hawks are commonly seen at the peak of their fall and spring migrations in southern Texas, Mexico, and Central America.

Nesting pairs spend most of their time beneath the forest canopy, perch-hunting for insects, amphibians, reptiles, mammals, and birds. Territorial adults can be located by their plaintive "*peee-uurr*" whistle, which is occasionally heard during soaring flights above the canopy.

It was noted in 1907 that this species was irregularly distributed across the state and that its status ranged from rare to common. Other more recent studies suggest essentially the same thing up until the 1970s, but since that time Broad-winged Hawks were no longer locally common anywhere in Iowa, and have been considered a rare nester and a common migrant here ever since. There is no readily apparent reason why this species is so uncommon in Iowa, when adequate populations exist in adjacent states. But due to its slow decline within our borders, today this species is on the Iowa list as a species of high conservation priority.

LINK TO IOWA IBA: BROAD-WINGED HAWK

Although some aspects of the Broad-winged Hawk's migration behavior and breeding ecology have been well documented, little is known about other facets of its life history. Many observations of its life history come from just one early study, and much remains poorly documented. Few studies have examined color-marked birds or have followed individuals for more than two years.

Habitat Preferences

Broad-winged hawks feed on prey and nests in continuous deciduous or mixed-deciduous forests, which have clearings and often water nearby. Foraging is focus in or near small openings in the canopy. Migrants may be seen over any kind of open country, but tend to stop at night roosts in forests or extensive groves of trees.

This species generally nests away from human dwellings. Although rare, it is detected more frequently in undisturbed woodlands than in areas used for agriculture or logging.

Compared to nesting Red-shouldered Hawks (one the endangered species in Iowa), Broad-winged Hawks use younger forests with more openings. The breeding home range may overlap at times with that of much more common Red-tailed Hawk.

Feeding Habits

Broad-winged Hawks perch-hunt below the canopy of woodlands and often do so near an opening, forest edge, or body of water. It may also occasionally hunt from flight, but rarely stoops.

This raptor is a generalized predator, taking a wide variety of food items. Amphibians, insects, mammals, and juvenile birds are the most common prey taken across its range. Small mammals and amphibians are the most frequent prey and greatest biomass in most studies. Most prey items are quite small. Birds taken during breeding season are predominantly nestlings or fledglings. Its propensity for amphibians (mainly frogs and toads) may explain habitat association with water and migration schedule. Insects are taken opportunistically on migration.

Broad-winged Hawk is a "sentinel forager," spending large proportions of its time sitting quietly, and scanning for prey. This raptor has been described as "cat-like" in pose when it spots prey and swoops down to snatch it from the forest floor. Studies have shown that it has been successful in 67% of foraging attempts, with highest success shown for reptiles and invertebrates. Adults tend to hunt more after midmorning; but prey deliveries to nestlings in creases through the day.

Mammal prey is fully consumed, and large snakes and frogs skinned. Birds are often plucked. Diet naturally depends on local availability of prey.

Breeding Biology

Early in the breeding season, pairs circle high in the air, calling. When in courtship display, one bird may fly high then dive steeply toward the ground. A mated pair usually takes 3 to 5 weeks to build their flimsy stick nest. The nests are usually new each year, but may be refurbished nests of a crow or another hawk. Nests are usually located in the lower third of the canopy (perhaps 25-40 feet above ground), in the main crotch of a tree. The nest is lined with strips of inner bark, with fresh green sprigs being added throughout incubation.

Eggs are most often 2 to 3 in number, but from 1 to 4 may be laid. Incubation takes from 28 to 31 days, and is almost entirely by the female. Males bring food to females while they incubate, and he may then sit on eggs while she eats.

The female remains with the young almost constantly for the first 1 to 2 weeks after they hatch; while the male continues to

bring food, and the female feeds it to the young. The young may climb out of the nest onto nearby branches at about 4 to 5 weeks of age; and can fly at about 5 to 6 weeks of age. Soon after first flight, they start learning to hunt.

Concerns and Limiting Factors

Early in the twentieth century, shooting this species on migration and during breeding was called "sport" and may have had a significant impact on this species. Reports indicate that 1,500–2,000 Broad-winged Hawks were killed in Minnesota during migration in April 1925; and one man shot 298 in 1 day in New Jersey. More recently, habitat elimination, alteration, or fragmentation, particularly on wintering range but also within the breeding range, may pose a more serious threat.

This species' reliance on amphibians for food may have allowed it to escape the drastic declines shown by other North American raptors due to DDT impacts in 1950s and 1960s. Recent increased use of DDT south of U.S. may affect some birds where winter diets may include more insects. Full pesticide impacts on this species remain undetermined, but impacts of recent forest insect pest control programs need further study. Regional pollution impacts on this species' amphibian prey also need study. Fragmentation, degradation and outright elimination of woodlands through human development may accentuate all other negative factors on this species.

Habitat Management Recommendations

Most of the areas where this species has been located in Iowa tend to lie along major waterways, such as sections of the Missouri, Des Moines, and Mississippi River, which contain significant forested corridors. Because it has been demonstrated that woodland fragmentation reduces populations of this beneficial raptor, woodland management plans ought to be written to avoid any form of woodland degradation, fragmentation or loss.

Broad-winged Hawks select larger trees for nesting, and small clearings and wetlands need to be maintained near nesting areas. Breeding birds appear to prefer mostly large, continuous forest, and management should provide for such habitats as often as possible.

Within the breeding range, research is needed on home-range size, minimum forest size for stable populations, lifetime reproductive output, long-term survivorship, and rates of return to breeding and wintering sites. Long-term studies of marked pairs are especially needed, as are nesting studies at the edge of this species' range.

Good woodland management practices such as those described in the woodland management section of Part 3 will help return higher numbers of this species back to Iowa where it was once much more numerous than it is today.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Common Moorhen

Gallinula chloropus

Introduction

Widespread in the Americas, with a striking appearance and a variety of loud and unusual calls, the Common Moorhen is a rail the size of a small duck, with short tail and wings, long toes, and (in the adult) a short, bright-red-and-yellow bill. Sexes are similar in plumage. This species is ecologically and behaviorally intermediate between the American Coot and the rails that are found in Iowa.

Several reports in the early 1900s indicated that this species was found across Iowa in suitable habitat, but was not common. And other reports from the 1930s indicated that it was a common to very common nesting species in the Northwest quadrant of the state. However, a serious decline has occurred. Moorhens were observed on only 2 of 40 selected Iowa marshes surveyed statewide in 1980; and none were seen on any of 30 wetlands that were surveyed in 1983 and again in 1984; nor have any been seen in several recent studies of restored wetlands in northern Iowa. Today the Common Moorhen is definitely not common in Iowa. It is now listed as one of our species of high conservation priority.

Closely associated with wetlands and other aquatic areas where submerged or floating vegetation are interspersed with emergent or shoreline vegetation, this species forages for plant materials and macroinvertebrates on the water surface, among submerged plants, and in shoreline and upland vegetation. Its diet and foraging modes are diverse.

Although tolerant of urban and agricultural habitats, pollution and alteration of wetlands constitute potential threats to this bird.

LINK TO IOWA IBA: COMMON MOORHEN

The Common Moorhen's striking appearance, loud and varied calls and "tameness" in many situations have attracted popular attention.

Habitat Preferences

Common Moorhens are an adaptable species and have been successful in many different habitats on 5 different continents. It is less bold than its relative the American Coot, and spends more time hiding in thick wetland vegetation. It prefers freshwater wetlands with some open water, as well as weedy ponds.

In Iowa and other northern portions of its U.S. range, moorhens breeds principally in permanently flooded deep wetlands, or marshes where robust emergent grass-like plants about 1 to 4 meters tall are interspersed with pools and channels that have floating-leaved and submerged plants, or with mudflats.

Feeding Habits

Moorhens are omnivorous. Major food items include leaves, stems and seeds of various aquatic plants, and fruits and berries of terrestrial plants. Animal matter consumed includes: insects, spiders, earthworms, snails and other mollusks, tadpoles, and other prey. This species even eats carrion and the eggs of other birds.

Foraging is done while swimming, walking on land, or making its way through dense wetland vegetation. It may dip its head underwater to feed, and also upends (with tail up, and head beneath the water surface), and sometimes it dives for food.

Breeding Biology

Moorhens arrive in Iowa in late April or early May. In courtship, male Common Moorhens chase females on land where both stop, bow deeply, and preen each other's feathers. Other courtship displays involve lowering head and raising tail, exposing white patches of feathers under the tail. Moorhens seem to be monogamous.

Nests are usually constructed on a mound of vegetation within stands of emergent vegetation such as cattails or bulrush, and are over water. But nests are sometimes on land, or even in a shrub that's near water. The nest is built by both sexes and is essentially a solidly constructed platform shaped like a wide, shallow cup, and often has a ramp of similar vegetated material leading down to the water. Other platforms constructed nearby may be used for resting or brooding young.

Eggs are most often 8 to 11, but can vary from 5 to 13. Incubation is for 19 to 22 days, and is done by both parents. Shortly after hatching the young can swim quite well. The young are fed by both parents and sometimes by older siblings from earlier broods of that year. They can find most of their own food by 3 weeks of age, but still are fed by parents until at least 6 weeks of age. Flight is possible at 40 to 50 days of age. Two broods often are raised in one year, and rarely 3 broods are raised in a single breeding season.

Concerns and Limiting Factors

While wetlands were disappearing, were fragmented, or were degraded by human activities across the landscape, Common Moorhens have declined. As with so many other IBA Criteria Species, the correct habitat quantity and quality is what determines whether or not Common Moorhens do quite well, or do very poorly.

Some of the other concerns related to moorhen populations include but are not limited to the following: rising mercury levels within aquatic ecosystems; build-up in the environment of dieldrin, and various other formulations of biocides; deaths from striking television towers and other obstructions during migrations or other flights; human disturbance at nesting or

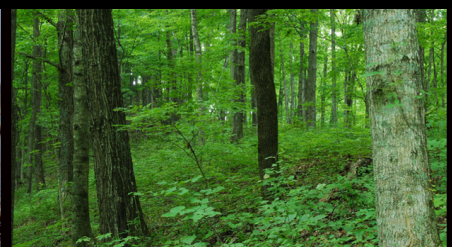
feeding sites; and predation from domestic cats, dogs and rats.

Habitat Management Recommendations

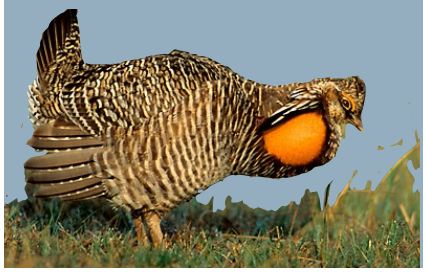
As a species declining at a rate that made it a species of high conservation priority in Iowa, Common Moorhens obviously need help from human beings to sustain, or to increase their populations within our state. While providing an abundance of the correct forms of wetland habitat is a key step, and more can be learned about the necessary practices in the wetland management section of Part 3 of this project, other questions are yet to be answered.

More field research is needed in the United States and Canada to determine if the many aspects of breeding and behavior described in Old World studies are similar in New World populations. The reasons for moorhen rarity or declines in the Midwest need elucidation. Effects of chemical contaminants on moorhens urgently need study, as contamination has harmed populations of many other waterbirds. Potential impacts of predators, especially increasing species such as raccoon, domestic cats, and domestic dogs, deserve a careful study. Better knowledge of population status and trends requires development of simple, accurate survey methods, and this will require refined understanding of the functions of vocalizations and other aspects of social behavior. And there are many other aspects of moorhen biology and ecology that are quite deserving of careful analysis.

Although the moorhen continues to persist over most of its original range, it is uncommon or rare over most other areas. Unfortunately, we still know little about the basic habitat needs of Common Moorhens, and until such information is readily available, it will be most difficult to try to manage moorhen populations.


STATUS: HIGH CONSERVATION PRIORITY IN IOWA



Greater Prairie-Chicken

Tympanuchus cupido

Introduction

At one time, the eerie hollow moaning of male Greater Prairie-Chickens displaying on their spring booming grounds, or leks, was a common sound across much of central and eastern North America. Where native prairie was intermixed with oak woodland in Iowa and other states, this species thrived. But due to a 99% + loss of native prairies, this interesting species is quite uncommon and severely localized where pockets of appropriate habitat still exist.

The distribution of this essentially non-migratory species changed as prairie and woodland habitats were converted to cropland. Remaining populations are restricted to prairie intermixed with cropland. In Iowa this is primarily in the Kellerton and Ringgold Grassland BCA and IBA in Ringgold County near the Southern border of the state.

The three recognized subspecies of Greater Prairie-Chickens vary only slightly in appearance but dramatically in status. One, the Heath Hen, became extinct in 1932. Another, Attwater's Prairie-Chicken, found in small parcels of habitat in Texas, is seriously endangered. The Greater Prairie-Chicken is extinct, or in danger of extinction, in 15 states and provinces; but numerous enough to be hunted legally in 4 other states. Some of the earliest efforts to manage wildlife populations in North America were initiated in 1791 when legislation was passed to protect the Heath Hen from market hunting. Declining populations, its status as a game bird, and spectacular breeding displays make the Greater Prairie-Chicken a popular subject of study.

LINK TO IOWA IBA: GREATER PRAIRIE-CHICKEN

Habitat Preferences

The primary habitat type that Greater Prairie-Chickens evolved with was native tallgrass prairie. Elimination or alteration of permanent grasslands which are suitable for nesting, brood rearing, and roosting was a huge factor in the drastic population declines that this species endured. It can be no surprise that when more than 99% of this once dominant habitat of native tallgrass prairie was eliminated from Iowa, Greater Prairie-Chickens were doomed to exist as best they could as remnant populations in a few localized, remnant habitats of this same type. It has taken a great deal of careful management by Iowa DNR Biologists at the Kellerton and Ringgold BCA and IBA in Ringgold County to produce the positive results that have been seen there.

Habitat used by this species is characterized by a quilt-work pattern of mid and tall grass prairie mixed with cropland. It is actually a testament to this species adaptability that it can survive in areas once dominated by native prairie are now equally dominated by fields of intensively used cropland, pasture and hayland.

Feeding Habits

The summer diet of Greater Prairie-Chickens consists primarily of seeds, buds, berries, leaves, and insects. The winter diet is also made up of leaves and seeds, but also waste grain from agricultural fields. Historical records indicate that acorn mast was a major component of the diet in winter, particularly during periods of heavy snow. Acorns may still be eaten where they are available.

Foraging is done largely on the ground, but occasionally in trees as well. Most feeding is done in early morning and evening.

Breeding Biology

In early spring males gather on booming grounds (leks) and display to attract females. Typically 8 to 20 males will be present, and at times many times more than this. When displaying, males lower their heads, raise their tails, inflate air sacs on their necks, and create hollow moaning sounds called “booming.” At times males also leap into the air and make loud cackles. Males also dance at the lek, and this involves elaborate and forceful stomping of the feet. Females eventually visit the booming ground and mates with the male of her choice.

After mating the female constructs a nest on the ground among thick tall grass. This nest consists of a shallow depression lined with fine grass, leaves and feathers.

Usually 10 to 12 eggs are laid, but the number may be as few as 7 or as many as 17. Incubation lasts from 23 to 25 days, and done by the female only. Shortly after hatching the young follow the female away from the nest and the precocial young begin to find their own food very early in life. Short flights are possible in as little as 2 weeks after hatching, and strong flight is achieved by 3 weeks of age. The young usually remain with the female for nearly 3 months.

Concerns and Limiting Factors

Market hunting and poaching once reduced or limited populations of Greater Prairie-Chickens. Non-hunted populations tend to have higher survival rates than hunted populations, 48% vs. 37%–41%; but hunting is not a factor in Iowa.

The Heath Hen subspecies became extinct primarily because of loss of prairie habitat. The Attwater’s Prairie-Chicken subspecies declined drastically in Texas as grazing pressure and cropland increased throughout its area that was once mostly native prairie. The same is true for the Greater Prairie-Chicken subspecies. Intensive agricultural activities have had tremendous negative effect on populations of all three subspecies as well as

agricultural practices simply eliminating the habitat that was needed for survival.

Interestingly, historical peaks in populations of Greater Prairie-Chickens in Iowa occurred during the transition from native prairie to cropland; and then populations declined to extinction as the proportion of cropland continued to increase. It has taken years of intensive grassland management for Iowa DNR Biologists to reintroduce and then nurture a small but evidently stable population of this species at the specific IBA and BCA locations in Ringgold County.

Pesticides are one of several other concerns in landscapes dominated by intensive agriculture, and may reduce insect availability during the breeding season, particularly for chicks.

Habitat Management Recommendations

The first legislation to protect the Heath Hen from market hunting in the New England states during spring and summer was passed in 1791. Subsequently, legislation frequently has been used to protect populations, with mixed success. Heath Hens became extinct in 1932. Similarly, populations of the Attwater's Prairie-Chicken subspecies have continued to decline in Texas despite their status as an endangered species. Legislative measures have been more effective with Greater Prairie-Chickens, perhaps because of their larger and more diverse distribution.

As large grassland areas continue to be fragmented into smaller parcels, understandably, prairie-chicken nests become more concentrated and more susceptible to predation; and planted hedgerows and trees invading grasslands provide hunting perches for raptors and travel lanes for mammalian predators, further reducing chances to sustain this species.

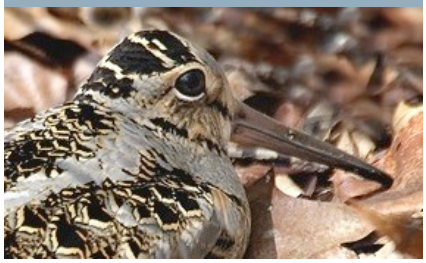
Several other factors also have an impact on prairie-chicken populations. Removal of pheasants may reduce inter-specific competition between pheasants and Greater Prairie-Chickens. Some have postulated that artificial food and water sources may be used by the Greater Prairie-Chicken, though this has not been shown to influence populations. While removal of predators may improve nesting success, predator removal has not been shown to improve the long-term size and stability of populations. Most management effort has been directed toward improvement of habitat. Effective strategies have included manipulation of grazing pressure, control of burning, provision of thick vegetation for protective cover, and establishment of preserves. Reintroduction of prairie-chickens into formerly occupied habitats may be necessary to expand their distribution, particularly in regions where there are no dispersal corridors between occupied and unoccupied habitats. But because of problems associated with inadequate habitat at the release site and/or poor survival and reproductive success of transplanted birds, few transplants have been successful.

When all discussions are over, protecting, restoring and managing the appropriate quantity and quality of grassland habitat is essential to sustaining prairie-chicken populations. And more specific information on grassland management is found under that heading in Part 3 of this project.

LINK TO IOWA IBA: GREATER PRAIRIE-CHICKEN



STATUS: HIGH CONSERVATION PRIORITY IN IOWA



American Woodcock

Scolopax minor

Introduction

Perhaps because of its bazaar looks and unique behaviors, the American Woodcock has gained ardent and appreciative followers among North America's hunters and birdwatchers. Writing of this plump, compact little shorebird's memorable spring courtship flights, in which males spiral up high on twittering wings with melodious chirping and then circle back sharply to the ground to resume their unique peenting display, the great conservationist from Iowa, Aldo Leopold, concluded that such dawn and dusk "sky dances" are "a refutation of the theory that the utility of a game bird is to serve as a target, or to pose gracefully on a slice of toast."

Several features help to distinguish this forest-dwelling shorebird from its more aquatic relatives: a long bill specialized for feeding on earthworms, a stout head with large eyes set far back for rearview binocular vision, a polygynous mating system, and leaf-brown patterns that blend superbly with the forest floor. Indeed, the body and behavior of the woodcock has given it many colorful vernacular names such as "timberdoodle", "night partridge", and "bog sucker".

Widely distributed in eastern North America, woodcock are migratory, nesting in young forests and old fields from the Gulf Coast through Iowa and on northward to southern Canada. Courtship displays and nesting span a six month period beginning in mid-winter in the south and extending into June in the north. Across its northern range, woodcock appear to be the earliest migrant species to breed.

LINK TO IOWA IBA: AMERICAN WOODCOCK

The popularity of this game bird is reflected by a rich history of its market and sport hunting, and by an extensive literature on its biology and management. Today, roughly two million American Woodcock are shot annually by about 700,000 hunters. Although its abundance has declined in recent years, particularly in its eastern range and probably owing to natural succession and human-caused loss of forests, there is no evidence that its overall range has shrunk. Further decline in numbers of woodcock may result if forest management practices increasingly favor uneven-aged stands, which do not provide suitably large areas of shrub and young forest that this species needs to breed successfully. Yet this bird's extensive use of northern coniferous forests that are being opened up by large-scale harvesting is encouraging and suggests that the species may be extending its distribution northward and westward.

Habitat Preferences

American Woodcocks prefer wet thickets, moist woods, and brush swamps. They also favor a mixture of woodlands and open fields, and often spend their days in woodlands and nights in open fields.

The preferred woodlands are mostly deciduous or mixed, with abundant young growth and moist soil, such as thickets along streams. At night woodcocks utilize open pastures, abandoned farm fields, open swamp edges, and even mowed lawns when near appropriate woodland cover.

Feeding Habits

The woodcock diet consists mostly of earthworms and insects; and earthworms are the signature food item in most places and at most times. Insects are also important, especially insect larvae that burrow in soil, such as those of many beetles, crane flies, and others. Snails, spiders, millipedes, and other invertebrates are also eaten. In the plant kingdom, the American Woodcock will consume seeds of grasses, sedges and smartweed.

Feeding is mostly individually although loose concentrations of woodcock may occur if suitable foraging sites are limited due to dry soil, surface frost, snow cover, or unevenly distributed food resources. The woodcock's long bill with flexible upper mandible is specialized for capturing and extracting earthworms from moist soil. Individual birds likely locate surface food visually, but mechanisms to locate subsurface earthworms may be tactile and auditory. It has long been claimed that woodcock can hear its prey moving underground.

Breeding Biology

Woodcock arrive in Iowa in mid t late March. Males take up territories and begin their courtship nighttime displays soon after they arrive on the breeding grounds. This involves the male giving a series of "peent" calls on the ground and then circling to a height of about 300 feet, producing twittering sounds with its wings as he ascends and performs a "sky dance." The male then drops in a zigzag pattern to the ground, where he walks stiff-legged around the female before copulating. According to researchers, the American Woodcock appears to be promiscuous.

Nests are on the ground, usually in open woods or in overgrown fields, in areas with many dead leaves. Females build the nest, which is little more than a scrap lined with dead leaves and other fine debris. Usually 4 eggs are laid, but the number is sometimes 1 to 3, and rarely 5 or more. Only the female incubates, and the process takes about 20 to 22 days.

A few hours after hatching the downy young leave the nest. The female tends to the young and feeds them. After a few days the

young begin probing the soil, learning how to search for food. At the age of 2 weeks the young can already make short flights, fly fairly well at 3 weeks, and are independent at about 5 weeks of age.

Concerns and Limiting Factors

An early alarm over possible extinction of American Woodcock was sounded due to market shooting. As a popular game bird, the harvest from hunting has increased near the end of the 20th Century, but at the same time, daily hunting success has declined. About 700,000 hunters have harvested perhaps 2 million American Woodcock annually in the U.S. in recent years. But mortality from hunting is now generally thought to equal natural mortality from all other natural limiting factors. In addition, many researchers believe that there are a number of possible causes for the decline in woodcock populations within the bird's annual life cycle.

Two of the most serious potential negative impacts on this species are loss, fragmentation and degradation of habitat; and pesticides entering the natural environment.

Breeding sites (singing grounds) are probably not limited in many areas within the overall woodcock range, but rather, the cumulative effect of habitat alterations on populations is likely to occur during other life history activities. Loss of suitable even-aged woodlands (low variation in tree age and structure, often is initiated by large scale natural disturbances, and other wholesale changes); and draining bottomland hardwoods and swampy areas also has degraded habitat – perhaps more so in the winter range of this species than in Iowa where it breeds.

Despite some uncertainties, the consensus among avian researchers, bird conservationists and ornithologists seems to be that the quantity and probably the quality of habitat is decreasing as the rate of change of farm land into young growth forests decreases. Habitat loss or alteration across the woodcock range still remains the primary suspected cause of region-wide declines in abundance. And the same is likely to be true in Iowa as well. One of the major expressed needs is better research related to specific limiting factors and associated population declines.

Pesticides are also of concern. In years past, American Woodcock were also found to carry dieldrin, PCBs, mercury, heptachlor epoxide, and mirex, though generally at low levels. Hunting had been closed previously for woodcock in some regions due to high levels DDT in breast muscle, resulting from long-term spraying in woodlands for insect defoliators. There is speculation that such spraying caused eggshell thinning. Population declines may be due as much too limiting factors at wintering habitats and migratory stopover habitats, as breeding habitats in Iowa. Much remains to be learned about this interesting species and its population dynamics.

Although prescribed habitat treatments can increase abundance on the local scale, there remains a long-term decrease in regional abundance. There is uncertainty whether singing ground surveys adequately track population levels, and whether they can monitor continental abundance adequately. Under the current state of knowledge, reviewing the contents of the woodland section of Part 3 of this project remains a good first step.

Habitat Management Recommendations

American Woodcock have done fairly well in Iowa during the past century. And although this species may never be abundant in our state, if many of the woodland management recommendations (especially for bottomland wooded areas) found in Part 3 are followed, woodcock should continue to survive in many of the

areas it now occupies Many of our state's publicly owned wetlands should continue to receive the kind of management that will provide the brush and second-growth habitat that this species needs to persist; and IBAs ought to receive the same thoughtful attention.

Hunting may influence population trends, but likely not in any dramatic way. Yet inadequate knowledge about harvest effect is unfortunate because current long-term natural woodland changes over most of the range of this species is probably not beneficial. Such habitat effect may be exacerbated by the move to uneven age timber management.

The 1990 American Woodcock Management Plan is a strategic plan to organize cooperative efforts to provide sufficiently good habitat to maintain and enhance populations. Some optimism for success derives from experiences on small woodlots by individuals and organizations like the Ruffed Grouse Society, and from other management experience gained in the New England states. Techniques tried there are widely applicable across the woodcock range.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Forster's Tern

Sterna forsteri

Introduction

Forster's Tern is similar in appearance and ecology to several other terns, but is the only tern restricted almost entirely to North America throughout the year.

This is primarily a marsh bird, spending the breeding season from Iowa northward across the prairie pothole region and into north central Canada, and at scattered wetlands throughout the American west. It is also found along Atlantic, Pacific, and Gulf coasts, where it winters.

LINK TO IOWA IBA: FORSTER'S TERN

Habitat Preferences

In Iowa, Forster's Terns most often utilizes larger wetlands, including marshy borders of lakes, islands, or streams. Open, deeper portions of wetlands with considerable open water and large stands of island-like vegetation and/or large mats of floating vegetation are preferred. Forster's Terns are primarily noted in wetlands of 10 acres in size or larger.

Feeding Habits

The primary food is small fish, insects, other arthropods and small aquatic life. Most foraging takes place across the deeper portions of the wetlands it prefers; but this species also forages in shallow water in the wetlands and marshy areas in which it breeds or uses during migration.

While foraging, Forster's Terns fly back and forth, typically about 18-25 feet above water, with bill pointing downward and feet folded against body, and either plunges directly into the water towards prey or hovers briefly before diving. The plunges are typically shallow with only bill and part of head submerged, but at times the whole body is completely submerged.

Sometimes foraging is from perches such as posts, bridges, telephone wires, or floating wood. Small fish are often swallowed as this tern regains foraging height. Larger fish may be dropped from a height of approximately 50 feet and then caught again at half that height. This behavior is often repeated 3–4 times and may be a necessary part of food processing. Forster's Terns also catch flying insects while in flight.

Most information that is available on diet is anecdotal or based on casual observations. However, one analysis of stomach contents of 15 individual birds identified 64 prey items, which were primarily small, or young of the year fish. Of 166 courtship feedings observed in Minnesota, the fish that were presented included 65 Yellow Perch, 25 shiners, 13 sunfish, and 5 Northern Pike. And, at this same location, 148 prey items brought to chicks included 79 Yellow Perch, 24 shiners, and 8 sticklebacks. Forster's Tern is not known to store food.

Breeding Biology

Pair formation begins or continues after arrival at breeding locations in mid-April to mid-May. Forster's Terns may breed in loose colonies, in which nest spacing is considered by some to be dictated by the arrangement of good nesting sites. At times nesting colonies may be associated with colonies of Yellow-headed Blackbirds.

Nest construction begins with courtship displays after arrival at breeding locations. Nests are on top of dense vegetation or mats of floating dead plants, often on top of muskrat houses. At times nests are placed on the ground or on an abandoned nest of a grebe. When nesting in the same wetland as Black Tern, Forster's Terns tend to choose higher and drier nest sites.

Both male and female construct the nest, and use various forms of wetland vegetation to do so. The center is a deep hollow lined with finer textured materials such as grasses, and often shells. Most often 3 eggs are laid, but eggs may range from 1 to 4. In Iowa, egg-laying takes place from early May to mid-June. Incubation is done by both sexes, and lasts from 23 to 25 days.

Both adults feed the young in the nest. The size of fish is correlated with age and size of young. Age at first flight is not well known, and little is known of post-fledging, or pre-breeding terns.

Concerns and Limiting Factors

Prior to Migratory Bird Treaty protection in 1919, Forster's Terns were shot for the millinery trade, but the impact on this species is unknown. Forster's Tern had the habit of flying towards and hovering over

those individuals that had been shot and thus was particularly vulnerable to millinery collectors.

Pesticides and other contaminants and toxins have been a concern over time, but no studies of Forster's Terns were done in the 1960s and 1970s, when effects of contaminants were greatest in other fish-eating birds. As a "top of the food chain," species, Forster's Tern can serve as a "biomonitor" of potentially harmful synthetic chemicals, and serve as a "littoral zone indicator." Thus, studies to examine chemical contaminants in Forster's Tern eggs and their effects on reproductive success would be useful, especially if extended to broader portions of the range of this species.

Loss of habitat due to degradation and fragmentation suggest that further studies of Forster's Tern ecology are desirable. Because low reproductive success within a given year is common, long-term studies of individually marked birds are required to determine longer-term population dynamics. Population trends cannot be measured easily in a species of such mixed breeding site-tenacity until more birds are marked individually and followed for several years.

Forster's Terns have been known to habituate to human presence and while some human disturbance at breeding colonies is unintentional, premeditated human vandalism has caused some breeding colonies to fail. Mink are known to prey upon eggs, young, and even adult birds. Nests are also sometimes lost from wave action during storms, and muskrat activity.

However, the most serious concern and limiting factor is habitat. As with most species, the Forster's Tern has suffered from habitat loss, fragmentation, and degradation; and its numbers have declined. Thus, concerns and limitations related to the quantity and quality of habitat continue to be a top priority.

Habitat Management Recommendations

Forster's Terns have demonstrated an ability to colonize newly created wetlands and marsh-like habitats, suggesting that management and restoration of large wetland systems should benefit breeding populations. Wetland preservation, restoration and management, and especially nest areas, which were previously used for breeding, are recommended for this species.

As one of Iowa's species of high conservation priority, Forster's Tern populations should to be monitored carefully and conservation plans should be developed and implemented – at IBAs as well as at other habitats used by this species – to ensure that this generally declining species does not fall into the threatened or endangered categories.

Specific wetland management recommendations that will benefit Forster's Tern are provided in Part 3 within sections entitled Wetland Management for Birds, and Recommended Wetland Management Practices.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Black Tern

Childonias niger

Introduction

A small and graceful wetland tern, the Black Tern differs from other North American terns in that it has a black and silver breeding plumage. In its choice of surroundings, this species leads a double life: in Iowa and across North America in summer it is found on freshwater wetlands and marshes, but in winter it becomes a seabird along tropical coasts.

Like most other terns, this species feeds on insects as well as small fish. Black Terns have been described as “a restless waif of the air, light and buoyant as a butterfly. Its darting zigzag flight as it mounts into the air to chase a fluttering moth is suggestive of a flycatcher or a nighthawk; as it skims swiftly over the surface of the water it reminds one of a swallow.”

A highly social species, Black Terns often forages in flocks. Populations have declined markedly in North America, at least since the 1960s. Loss of wetlands on breeding grounds and along migration routes is probably a major cause, but reduced food supplies through agricultural control of insect populations and by over-fishing in the marine winter range may also be a major contributing factor.

LINK TO IOWA IBA: BLACK TERN

Habitat Preferences

The Black Tern is a bird of marshes and wetlands, and nests in shallow freshwater wetlands with extensive open water and abundant emergent vegetation. Wetlands and wetland complexes of 10 acres or more in size are preferred. Nesting and feeding habitat also includes prairie sloughs, margins of lakes, and occasionally river or island edges.

In migration this species uses a similar variety of wetlands, lakes, larger rives and coastal waters.

Feeding Habits

On its breeding grounds Black Terns most often forage on insects and freshwater fish; and proportions vary with availability.

This species circles low (3 to 10 feet in height) over foraging areas with slow, shallow wing beats and bill pointed downward, and often feeds in flocks where food is concentrated. Black Terns hover briefly before a sudden drop or swoop to the water surface, where it dips its bill into water or picks insects off of vegetation. Infrequently, hunting will take place from a perch over water. Plunge dives are weak and rarely seen, but this species may catch insects in the air, especially when insects swarm over land. Agile zigzag chases of dragonflies can last several seconds.

The main summertime insect foods are damselflies and dragonflies, but mayflies, caddisflies, beetles, moths, grasshoppers, crickets, and locusts are taken. In addition, water scorpions, spiders, various grubs and larvae, amphipods, crayfish, and small mollusks are also captured and eaten.

Black Terns eat small fish in summer where available, but many prairie sloughs do not contain fish. Rare foods include juvenile tree frogs and lizards. Adults drink during bathing or swoop to water to dip bill several times, particularly after swallowing prey.

Breeding Biology

The Black Tern most often nests in scattered colonies, amidst emergent vegetation in biologically rich wetlands. Reproductive success is highly variable. Adaptations to wetland nesting include frequent renesting, low site tenacity, and eggshell morphology suited to damp conditions.

Nests are built by both parents in semi-permanent wetland ponds, which are most often on mats of vegetation. These may vary from a substantial floating platform of wetland plant material to simple depressions with only a few bits of vegetation added. Nests are also placed on old muskrat houses, on debris, or on the ground near water. Many nests are easily destroyed by wind action across the water, or by changing water levels.

The 2 to 4 eggs that are laid are often damp, and incubation, which lasts from 21 to 22 days, is by both parents. Young Black Terns develop rapidly, and are capable of flight 19 to 25 days after hatching; and may be fed by parents for up to two more weeks. There is usually one brood per year.

Concerns and Limiting Factors

Loss, fragmentation, and/or degradation of wetlands, both at breeding and migration stopover sites, in Iowa as well as in other states, are probably the important causes of population decline. In addition, a significant reduction in stocks of small pelagic fish in core wintering areas on oceans has been identified, but the effect on Black Terns numbers has not been officially proven. Nothing is known of physiological changes accompanying the shift of this species between freshwater and marine habitats.

Direct chemical toxicity apparently is not a problem, but pesticides may reduce favored insect foods. Nesting terns are tolerant of nearby human activity as long as the nesting colony itself is not entered.

Emergent vegetation usually prevents this, and frequently protects nests from disturbance from waves caused by boat traffic.

Low and variable reproductive success is probably normal, given the breeding biology of this relatively long-lived species. Research is needed on other critical aspects of population dynamics that might play a role in population decline, such as changes in first-year and adult annual survival, age of first breeding, and possible skipping of breeding after first attempt.

Better knowledge of migration and wintering biology, including stopover times and locations, and data on food sources and availability, would also be useful. For example, small fish abundance is probably broadly altered by El Niño events, over-fishing, agricultural runoff, or introduction of sports fish to freshwater lakes, but the impact on Black Terns has not been confirmed.

Habitat Management Recommendations

Most habitat management for Black Terns has been piecemeal, with unpublished results. There is a need for controlled tests of management techniques and for publication of recommendations for management of wetlands both on breeding and migration range. Standardized regional surveys are needed. But detailed site studies are not useful for regional population monitoring, as birds readily change colony sites.

Black Terns readily accept artificial sites such as restored wetlands and sewage settling ponds. Wetlands managed for waterfowl are attractive if flooding/drawdown regimes preserve appropriate emergent vegetation, nesting substrate, and stable water levels through the nesting season. Fish-stocking is an option, but the benefit to Black Terns is unknown.

Nest platforms are often accepted and utilized, and can lead to higher productivity where water levels fluctuate. Attractiveness of platforms seems to be increased when decayed vegetation is piled on, but it is unclear whether platforms attract birds to new habitats.

Wetland management recommendations that will benefit Black Terns are provided in Part 3 within sections entitled Wetland Management for Birds, and Recommended Wetland Management Practices.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Black-billed Cuckoo

Coccyzus erythropthalmus

Introduction

Graceful in flight but retiring in habit, the Black-billed Cuckoo is among North America's most elusive birds. It is heard more often than seen, and is frequently confused with the more common Yellow-billed Cuckoo, with which it shares similarities in plumage, behavior, and some vocalizations. Although both species occur in somewhat similar habitat through much of their ranges, the Black-billed Cuckoo has a more northerly distribution. In addition, this Neotropical migrant tends to prefer more densely wooded areas than its close relative.

In Iowa and in much of North America, the Black-billed Cuckoo is among the later migrants to return each spring. Arrival on breeding grounds is announced by its staccato, repetitive call "*cu-cu-cu cu-cu-cu*" uttered as individuals fly overhead on late spring evenings. Vocal night flights increase as breeding commences, and these flights, together with its quiet, sluggish behavior during the day, has lead some ornithologists to suggest that the Black-billed Cuckoo may be nocturnal in the summer.

This cuckoo was formerly much more common in North America. Population densities have declined across its range throughout the twentieth century, with particularly severe decreases in the 1980s and 1990s. Caterpillar irruptions are a great attraction to large numbers of this species, but since caterpillars have been controlled by pesticide use, cuckoos are rarely seen more than singly. It is likely that pesticides, and loss of prey availability, have played a large role in causing the decline in Black-billed Cuckoo populations, but these detrimental effects have never been quantified.

LINK TO IOWA IBA: BLACK-BILLED CUCKOO

Few aspects of Black-billed Cuckoo life history have been adequately studied. Many people have observed an association between local cuckoo abundance and insect irruptions. However, no comprehensive studies of the effects of food availability on Black-billed Cuckoo abundance, distribution, or fecundity have been performed.

Habitat Preferences

Habitat needs are similar to those of the Yellow-billed Cuckoo, although Black-billed tends to inhabit extensive woodlands more often.

Black-billed Cuckoos primarily utilize woodlands; and a variety of groves of trees, forest edges, and thickets, which are frequently associated with water. They are sometimes found in edges and clearings of young deciduous or mixed deciduous-coniferous woods; abandoned farmland with trembling aspen, poplar, and birch; and brushy hillsides and pastures, roadsides, and fencerows; orchards and berry patches; other upland thickets; and also in wooded wet areas.

Black-billed Cuckoos breed mostly in deciduous thickets and shrubby places, often on the edges of woodlands or around wetlands. During migration it frequents similar habitats at its essential stop-over points.

Feeding Habits

The Black-billed Cuckoo is a notorious consumer of caterpillars, with a demonstrated preference for noxious species, including the eastern tent caterpillar, fall webworm, and larvae of the gypsy moth. Recorded observations of cuckoos consuming 10 to 15 caterpillars per minute are testimony to the great service this species provides in forests, farms, and orchards. Stomach contents of individual cuckoos may contain more than 100 large caterpillars or several hundred of the smaller species.

Naturalists' accounts from the late 1800s speak of flocks of cuckoos descending on caterpillar-laden trees and not departing until every insect was consumed. Caterpillar irruptions still occur at times, but since they have been controlled nearly to the point of elimination by pesticide use, cuckoos are rarely seen more than singly. It is likely that pesticides, and the concomitant reduction of prey availability, have caused Black-billed Cuckoo mortality and reduced breeding success, but these detrimental effects have never been quantified.

The diet consists primarily of large insects including caterpillars, katydids, cicadas, crickets, grasshoppers, and butterflies. Occasionally eggs of other bird species are consumed; and rarely small mollusks, fish, and aquatic larvae. Fruit and seeds are rarely consumed in summer, and are more frequently eaten on wintering grounds in the Neotropics.

The Black-billed Cuckoo forages primarily by moving about through branches of trees and shrubs, clambering and hopping about, gleaning insects from the foliage. It usually feeds within the canopy, but occasionally takes prey from the ground. This species will also wait motionless for long periods, cocking its head and watching for prey to reveal itself, and then making running, hopping dashes to snatch slow-moving caterpillars and other prey.

This cuckoo may shake a caterpillar strongly and then hammer it against a branch before swallowing it. Each bird consumes thousands of caterpillars during the short season they are with us each season. Individuals frequently have in excess of 100 large caterpillars, and several hundred small caterpillars, in their stomach at one time. The bristly spines of hairy caterpillars pierce the cuckoo's stomach lining and remain there giving it a

furry coating. When this mass of caterpillar spines obstructs digestion, the entire stomach lining is sloughed off and is regurgitated as a pellet. Then feeding can continue.

Breeding Biology

Black-billed Cuckoos usually arrive in Iowa by mid-May, and leave by late September. Like other cuckoos, the Black-billed exhibits unusual breeding behavior. The onset of nesting is apparently correlated with insect outbreaks, particularly those of caterpillars and cicadas. Furthermore, localized food abundance has been linked to increased clutch size and nesting success and to the frequency of brood parasitism (laying eggs in the nest of another bird). Brood parasitism may be either inter-specific (eggs are laid in the nest of another Black-billed Cuckoo), or intra-specific (eggs are laid in the nest of another species).

In courtship the male feeds the female. Nests, which are probably built by both sexes, are a loose platform of sticks, usually well lined with leaves, grass and other soft material. Nests are placed in dense branches in low trees or shrubs, 1 to 20 feet above ground, and usually lower than 10 feet in height; but nests are sometimes on the ground as well.

Typically 2 to 3 eggs are laid, but the number is sometimes 4 or 5. Incubation is by both parents and does not last long. Young Black-billed Cuckoos are robust, and the shiny, black nestlings hatch following a brief 11-day incubation period. Feeding is by both parents. Within 3 hours of hatching, the young can raise themselves onto twigs, using their feet and bills. They mature rapidly, and at 6 days of age resemble porcupines, with their long, pointed feather sheaths. Just prior to the young leaving the nest on the following day, the sheaths burst and the chick becomes fully feathered, a process once likened to the commotion in a popcorn popper.

At this point in their lives the agile, young cuckoos are capable of hopping and climbing rapidly through the vegetation. When threatened, the young may “freeze” in a bizarre defensive posture—necks outstretched, bills pointed straight up, eyes wide open—that resembles the erect pose used by American Bittern chicks. The young take their first flights at about 3 weeks of age.

Concerns and Limiting Factors

Many aspects of the Black-billed Cuckoo’s life history remain poorly known, including spacing of territories, site tenacity, fecundity and mortality, and population structure. Although a correlation between prey availability and abundance of this species has been documented, little is known of how food availability is assessed, and the mechanism by which prey abundance determines breeding success.

The factors causing declines in population densities in both breeding and wintering ranges should be identified and quantified. Among those of greatest concern are the effects of pesticide use on foraging cuckoos, and habitat fragmentation or modification.

Black-billed Cuckoos are likely highly susceptible to pesticide-residue accumulation due to reliance on noxious caterpillars, but little information is available. As with a large number of passerine Neotropical migrants, this species is frequently killed by flying into television, radio and cell phone towers; navigation aids at airports, and lit up offices in tall buildings during nocturnal migration.

Habitat loss, fragmentation and degradation are naturally a high priority issue.

Habitat Management Recommendations

The Black-billed Cuckoo numbers may be underreported because of its elusive behavior. They are also prone to cyclical

population fluctuations, which have been correlated to outbreaks of tent caterpillars. Even considering these factors, overall populations are considered to be rather low and on the decline, and therefore this is a species of high conservation priority for the IBA Program in Iowa.

Some research in the Midwest has indicated that habitat changes such as a reduction in the acreage in orchards, and the destruction of many hedgerows and roadside shrubs along field boundaries, has caused a decline in cuckoo populations. In Iowa, the future of the Black-billed Cuckoo is thought to depend on preservation of existing woodlands, expansion of woodland acres where feasible, wise management of idle areas around farmsteads, and the reduction or elimination of the components that may harm birds within the agricultural chemicals used to control caterpillars.

For general information about habitat management for Black-billed Cuckoos, see the sections on Woodland Management for Birds. And for more specific details see Recommended Woodland Management Practices. Both of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Chuck-will's-widow

Caprimulgus carolinensis

Introduction

Species in this genus occur on six continents and contain well over half of all species in the nightjar family. Unlike the nighthawks, these birds are probably all strictly nocturnal, and have loud and distinctive voices.

Chuck-will's widow sings its name, and this loud song echoes through woodlands where it is found on summer nights. During the day, the bird is seldom detected as it rests on horizontal tree limbs or on the ground, where its dead-leaf pattern camouflage is very cryptic. If disturbed on the ground it will flap away on silent wings, sometimes giving a low clucking call in protest.

Chuck-will's widow is found throughout much of the Southeastern United States where open forests provide suitable habitat. This species is larger, equally vocal, and more likely to be found in the open than its well-known relative, the Whip-poor-will. Like most goatsuckers, the Chuck-will's-widow sings its distinctive song primarily at dawn and dusk, but also during nights when the moon is full or nearly so. The nocturnal habits have created mystery behind its life cycle and have limited research. Not one nesting study exists, for example, to provide information about their breeding success.

LINK TO IOWA IBA: CHUCK-WILL'S-WIDOW

Many reports of this species have been anecdotal and provide limited insight into its habits. Those studies that have significantly contributed to the understanding of the Chuck- will's-widow include only research on its vocal array and molting sequence. Little is known about its nesting behavior, habitat use, and population status, and each is a knowledge gap that is especially troubling. Although Chuck-will's-widows are known to nest in suburban habitat, the extreme nature of urban sprawl and intensified agriculture may be causing population declines that are as yet undetected.

Since the nineteenth century, this species has moved beyond its stronghold in the Southeastern U.S. to expand its range north and west. It is still rare in Iowa, but it seems to be present slightly more often in recent years, and it often returns to the same locations year after year.

Habitat Preferences

Chuck-will's widow occurs within open deciduous, pine, oak-hickory, and mixed forests. It also inhabits oak groves, forest edges, and riparian areas. Openings, including forest gaps, and pastures, appear to be an important habitat component for foraging, and it persists in areas undergoing suburban development, provided enough forest cover remains. But comparative use of habitat types has not been studied in this species.

In places where Chuck-will's-widow and Whip-poor-will both occur, the former is associated with more open habitat, while the latter with more heavily forested habitat. In the Southeastern U.S. along a roadside-count route, Chuck-will's-widow was more common than Whip-poor-will in areas that were about 50% forested and 50% agriculture, and the reverse was true in areas that were about 90% forested and 10% agricultural. The two species were about equally common when both were found in predominantly suburban areas.

Feeding Habits

The Chuck-will's-widow forages at night, and hunts actively by flying low over the ground in search of night-flying insects, especially beetles and moths, but also a variety of other insects. Foraging tends to peak near dusk and dawn (crepuscular feeding), and like Whip-poor-wills, crepuscular behavior may be because of visual constraints rather than changes in insect availability. This may also help explain why this species remains active all evening during full moons.

While in flight, Chuck-will's-widows "scoop" up insects using rectal bristles, which serve as sensory mechanisms and help, funnel insects and other prey into the large bill.

Occasionally, small passerines and bats are included in its diet. During primary molt, when maneuvering for flying insects may be difficult, individuals are sometimes seen on the ground under street lamps foraging for ground-dwelling insects and even small frogs. When outer primaries, some secondaries, rectrices, and rectal bristles are being replaced, ability to forage on the ground may be important for survival.

Small stones on roads are ingested at night. Diet samples from specimens indicate several had either stones or sand in their stomachs. Presumably these particles help grind up chitinous portions of insects on which this species regularly feed.

Breeding Biology

Chuck-will's-widows probably arrive in Iowa in later April or early May, and usually return to the same area, and possibly to the same site, year after year. During daytime courtships, males strut or sidle up to females with body plumage puffed up, wings drooped, and tail spread; and move with jerky actions and calls.

No nest is built per se, but 2 eggs are usually laid (with a range of from 1 to 4) on the flat ground on leaves or pine needles, with the location being in rather open areas within the shady understory of woodlands. Incubation takes 3 weeks, and probably is by the female only. If the nest is disturbed, the adult may move the eggs several feet away.

The young are apparently cared for by the female alone. The cryptic coloration of the adult conceals incubating and brooding individuals, allowing them protection from predators. This protective coloration also makes finding eggs or young difficult, because adult rarely move until nearly stepped on. Females brood the young and provide shelter for them during the day. Regurgitated insects make up the food for the young.

The first flight takes places about 17 days after hatching. And adults and young probably leave Iowa by late September.

Concerns and Limiting Factors

The nocturnal habits of Chuck-will's widow have created a sense of mystery about its life cycle and have limited research, and no detailed study has been conducted that provides information about their breeding success.

Another concern is that most of what we know about this species has been from anecdotal observations rather than from planned scientific studies. Consequently, little is known about nesting behavior, habitat use, or population status. Although Chuck-will's-widow is known to nest in suburban areas, the extreme nature of urban sprawl and intensified agriculture may be causing population declines that are as yet undetected and not evaluated.

Due to this species' insectivorous diet and its habit of foraging over fields and pastures, there is potential vulnerability to pesticides and other contaminants and toxins. But no data are available. Obstructions such as TV, radio and cell phone towers are also a concern for this nocturnal feeding and migrating species. Even with its increased ability to see at night, Chuck-will's-widows are frequently struck by vehicles as they dust-bathe, ingest pebbles, and roost on roads at night.

Changing landscape use may be correlated with change in ranges of both Whip-poor-will and Chuck-will's-widow. Chuck-will's-widows appear to be more common in agricultural landscapes, and adults are very sensitive to disturbance at nest sites, but instead of abandoning the site, adults may simply move the eggs or young to a location up to several feet away.

Vocalizations and molting have been covered by a major published paper, virtually every other aspect of the biology of this species is in need of additional information. Topics particularly in need of research include survival rates, fecundity, population density, territory size, habitat use for nesting and foraging, factors limiting populations, and the manner in which these factors relate to land-use patterns. Telemetry studies on these topics are likely to be especially informative.

Diet studies, while present in the literature, have tended to focus on unusual observations such as depredation on vertebrates, rather than quantification of normal prey – large insects. If these prey, especially large butterflies and moths, are declining in abundance due to pesticides, land-use changes, or other factors, then any of these factors could, in turn, be a cause for population declines.

Habitat Management Recommendations

While there are no known conservation or land management measures which have been directed toward helping this species, a *Species Management Abstract* has been

developed by the Nature Conservancy's Wings of the Americas Program.

As a species of high conservation priority for Iowa's IBA Program, there is concern about maintaining and hopefully improving the woodland habitats that this species requires.

For general information about habitat management for Chuck-will's widow, see the sections on Woodland Management for Birds. And for more specific details see Recommended Woodland Management Practices. Both of these sections are in Part 3.

LINK TO IOWA IBA: CHUCK-WILL'S-WIDOW



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Pileated Woodpecker

Dryocopus pileatus

Introduction

The size of an American Crow, the Pileated Woodpecker is a big, dashing bird with a flaming red crest, and the largest woodpecker found in North America (except for the Ivory-billed Woodpecker of the southeastern United States which is almost certainly extinct). Best recognized by its large, dull black body and eye-catching crest, the Pileated Woodpecker is a permanent resident of deciduous or coniferous forests in southern Canada and in the Western, Midwestern, and Eastern United States. The appearance and vocalizations of this conspicuous woodpecker are obvious.

Because of its large size and strong chisel-shaped bill, the Pileated Woodpecker is particularly adept at excavating, and it uses this ability to construct nest and roost cavities and to find food. Pileated Woodpeckers excavate distinctive rectangular holes – at times a foot or more vertically by 3 to 6 inches horizontally. In its excavating, this species plays a crucial role in many forest ecosystems in Iowa and across North America; as a diverse array of other birds, as well as mammals, reptiles, amphibians, and invertebrates use its cavities for shelter and nesting.

LINK TO IOWA IBA: PILEATED WOODPECKER

Since settlement, logging and land clearing has reduced the range of this species in Iowa. Availability of suitable woodland habitat with large trees is apparently the factor limiting most populations, but the species has recovered to a certain extent with improved woodland management. Where unmolested, it even lives in parks and woodlots around the edges of cities.

Habitat Preferences

In Iowa the Pileated Woodpecker favors mature deciduous and mixed deciduous-conifer woodlands, and at times smaller woodlots.

Dead trees provide favored sites in which nest cavities are excavated, and hollow trees are typically used for roosting at night and during inclement weather. Pileated Woodpeckers typically excavate only the entrance hole to gain access to the hollow interior of a tree and thus conserve energy. Roost trees typically have 1 to 16 entrance holes in the trunk, providing alternate escape routes should a predator enter the roost. Roosts in live hollow trees with multiple entrances have also been observed in Iowa.

Only large-diameter trees have enough girth to contain nest and roost cavities of this species. Consequently there is concern for populations of this woodpecker where old-growth forests are being converted to younger stands, or are being lost altogether.

Feeding Habits

The diet of Pileated Woodpeckers consists primarily of wood-dwelling ants and beetles extracted from downed woody material and from standing live and dead trees; but fruits and nuts, and termites and other insects are also foraged.

Carpenter Ants may make up 60% of diet in some habitats. And at times about 25% of the diet may be from wild fruits, berries and nuts.

Foraging is mainly by probing, prying, and excavating dead wood in search of edible items. Deep holes may be gouged in rotten wood to reach ant nests, and stumps and big sections of rotten logs may sometimes be torn apart in search of food.

Breeding Biology

A pair of Pileated Woodpeckers occupies and defends its territory year-round, and a pair member will not abandon a territory even if its mate is lost. Territory defense is done with loud drumming and ringing calls that can be heard at considerable distances. At a potential nest site, both sexes may tap or drum on wood. Courtship intensifies beginning in February and March. Courtship displays include spreading wings to show off white wing patches, raising its brilliant red crest, swinging head back and forth, and gliding display flights.

Both sexes excavate the nest site with males doing more of the work. Nests are in a cavity of a dead tree or in a dead branch of a live tree, and are usually located 15 to 80 feet above the ground. Potential nest intruders or are chased off by one or both of mates.

Generally a new nest cavity is excavated each year. When cavity is started, the bird excavates while perched on the tree trunk; as the cavity gets deeper, excavation is inside with tail sticking out of hole; and the bird excavates from inside the cavity when nearing completion.

Pileated Woodpeckers lay 3 to 5 eggs, and historical records show that clutches of 4 eggs is most common. Incubation is by both parents, for about 18 days. Both parents feed nestlings by regurgitating food items. The young leave the nest 26 to 28 days after hatching, and may remain with the parents for 2 to 3 months.

Concerns and Limiting Factors

Pileated Woodpeckers were regularly shot for food and sport by hunters early in twentieth century. Although now protected by law, shooting has continued (although hopefully a reduced problem).

Timber harvest has been the most significant impact on this species' habitat. Removal of large-diameter live and dead trees, of downed woody material, and of canopy closure eliminates nest and roost sites, foraging habitat, and cover. Forest fragmentation likely reduces population density and makes birds more vulnerable to predation as they fly between forest fragments.

Some individuals of this species are tolerant of humans near roost sites, while others change roost trees if disturbed. Research has shown that birds trapped at roost trees rarely used the same roost again.

Research is needed on population dynamics throughout the range of Pileated Woodpeckers to determine sustainable populations, reproductive success, and genetic variability. Additional information is needed on dispersal of young to determine the preferred locations of woodland management areas for this species. Better management of habitat components within home ranges would result from additional telemetry studies investigating roost and foraging sites, diet, and habitat used by prey.

Habitat Management Recommendations

As a species of high conservation priority in Iowa, there is concern about maintaining and hopefully improving the woodland habitats that Pileated Woodpeckers require. This beautiful, almost iconic species, will benefit when management actions prevent fragmentation of existing woodlands, and maintain as many large trees – both dead and living – within large woodlands and small woodlots as possible.

This fairly resilient species seems to have responded favorably wherever consolidation and expansion of Iowa's woodlands has taken place in the past. And as sound woodland management practices are planned and implemented more frequently across our state, and more attention is given to IBA Criteria Species, the Pileated Woodpecker should be able to sustain or increase its population.

For general information about habitat management for Pileated Woodpeckers, see the sections on Woodland Management for Birds. For more specific details see Recommended Woodland Management Practices. Both of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Loggerhead Shrike

Lanius ludovicianus

Introduction

The Loggerhead Shrike is the only one of the world's thirty species of true shrikes that occurs exclusively in North America. It is a year around resident throughout the southern half of the lower 48 states. Northern populations breed throughout the North Central states (including Iowa) and into the Prairie Provinces of Canada, and then migrate to winter in more southerly states. Where resident, this species usually lives in pairs on permanent territories. Some pairs spend the entire year on a single territory; but outside the breeding season, mates may defend neighboring territories, which are coalesced at the beginning of nesting.

Like other shrikes, the Loggerhead inhabits grasslands, savanna/shrub habitats, and other open habitats where it feeds on a variety of invertebrate and small vertebrate prey. Compared to most birds, its head is large in proportion to its body size – hence the name Loggerhead, which also means "blockhead."

This shrike, like others, is a small avian predator that hunts from perches and impales its prey on sharp objects such as thorns and barbed-wire fences. Although its foraging behavior mimics that of some raptors, its impaling behavior represents a unique adaptation to the problem of eating large prey without benefit of the stronger feet and talons of raptors. Being both a passerine (perching bird) and top-level predator, shrikes occupy a unique position, not only in the food chain, but also in the avian world.

LINK TO IOWA IBA: LOGGERHEAD SHRIKE

Despite its wide distribution, the Loggerhead Shrike is one of the few North American passerines whose populations have declined continent-wide in recent decades. Changes in human land-use practices, the spraying of biocides, and competition with species that are more tolerant of human-induced changes appear to be major factors contributing to this decline.

Habitat Preferences

Loggerhead Shrikes prefer open country with short vegetation: grasslands, pastures with fence rows, old orchards, roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands. Breeders usually settle near isolated trees or large shrubs. Its near relative, the Northern Shrike, found in Iowa only during winter, by comparison, prefers open deciduous and coniferous woodlands.

Foraging takes place in landscapes characterized by well-spaced, often spiny, shrubs and low trees, usually interspersed with short grasses, forbs, and bare ground including: scrub lands, savannas, prairies, agricultural lands (especially pastures and meadows with hedges or shrubs), and some suburban areas. This species favors fence lines and utility lines and poles for perching, therefore they are frequently found along roadways.

In many regions, indices of Loggerhead Shrike abundance correlate with percentage of pastureland that is present. Shrubs and small trees, and the presence of canopy cover are most important during the nesting season.

Additional IBA Criteria Species in Iowa that utilize the same general type of open savanna/shrub habitats – and each also a species of high conservation concern – include White-eyed Vireo, Bell's Vireo, and Yellow-breasted Chat.

Feeding Habits

This predatory songbird forages mostly on large insects, rodents and small birds. The breeding season diet consists mainly of insects, especially grasshoppers and crickets, but also beetles, wasps and various others.

Loggerhead Shrikes take mice and other small rodents during all seasons, but especially in winter. Small birds may be captured throughout the year. The annual diet also includes spiders, snails, frogs, lizards, small snakes, crayfish, small fish, and other items.

Like other shrikes, the Loggerhead kills its vertebrate prey by precisely attacking the nape area of the neck, and then severing the vertebrae in a series of grabs and bites. A special tooth in the upper mandible probably serves as a device for quickly penetrating the spinal cord through the space between the articulating vertebrae, thereby producing partial paralysis, and rendering the quarry easier to kill.

Foraging appears to be opportunistic; and like most predatory species the diet is adjusted to prey availability. The absence of heavy talons and strong feet cause 2 problems: self-defense, and holding the prey once it's killed. The first problem is overcome by avoiding dangerous prey through hovering, attacking from behind, and biting at the base of the skull of prey.

The second problem is remedied by impaling and storing prey on sharp spines in conspicuous places such as on vegetation, or on barbed wire, or wedging prey into narrow V-shaped forks in shrubs and small trees. Loggerhead Shrikes are well known for this unusual and complex behavior.

Impaling probably evolved as a feeding adaptation because it enables shrikes to immobilize larger prey than they could otherwise handle. The commonly used

terms *cache, larder,* and *pantry* describe the impaling that is used as a means of food storage, especially during winter when food is scarce, or during breeding season when energy demands are high and caching is a way of dividing labor between the parents. Caching may also function as mate attraction.

Breeding Biology

Migrant Loggerhead Shrikes arrive in Iowa by late March or early April, and males tend to use the same territories in successive years.

As with many predatory birds, nesting begins quite early in spring – in late April or early May – in Iowa. In courtship the male performs short flight displays, and provides the female with food. The nest is built by both sexes, and is located in a spot well hidden by foliage in a dense and often thorny tree or shrub, usually 5 to 30 feet above ground but occasionally higher.

Generally 5 to 6 eggs are laid, but the number may range from 4 to 8. Incubation is by the female, and usually lasts from 16 to 17 days. The male feeds the female during incubation, and this food may be some that he stored on thorns earlier. Both parents feed the nestlings, and the young leave the nest at about 17 to 21 days of age. Fledglings continue to be fed by both parents for another 3 to 4 weeks.

Concerns and Limiting Factors

Loggerhead Shrikes are one of the few North American passerines whose populations have declined continent-wide in recent decades. Changes in human land-use practices, the spraying of biocides, and competition with species that are more tolerant of human-induced changes appear to be major factors contributing to this decline.

Although pesticides have not been linked to a reduced reproductive success in this species, additional studies of other impacts of pesticides on Loggerhead Shrikes should be conducted. The impacts of habitat fragmentation certainly need to be addressed. One approach could involve comparing size and degree of isolation for blocks of suitable habitat among areas that have a stable, declining, or extirpated Loggerhead Shrike population.

Research needed to aid management practices include the following poorly understood topics: 1) determining migration routes, stopover and wintering areas, and susceptibility to human disturbance; 2) evaluating dietary needs and how weather, season, land use, and biocides influence food availability; 3) determining mortality rates of fledged juveniles and adults throughout the annual life cycle in different habitats, and at the same time identifying factors contributing to mortality and causing population declines; 4) comparing different populations to find where problems are, and allowing identification of regions that are population sources and those that are sinks; and, 5) determining degree of niche overlap between Loggerhead Shrikes and potential competitors to see whether shrike productivity is correlated with the presence or absence of these species.

Reproductive studies have not provided convincing answers to help land managers. Coordinating research efforts to make productivity and mortality estimates comparable and more accurate would make future results most useful. In regions where Loggerhead Shrike populations are small, tracking nesting locations and nesting attempts would probably be worthwhile. This might identify site-specific problems that could be managed for and help contribute to determining causes of the decline.

Studying foraging success and overall vigor of nesting shrikes may also provide valuable information for future management, but the loss and fragmentation of savanna/shrub habitats is

undoubtedly the major contributing factor to continuing population declines.

Habitat Management Recommendations

Since reproductive rates are potentially high in this species, Loggerhead Shrikes could expand their current numbers and perhaps their range if the factors responsible for recent declines can be identified and eliminated or reduced significantly.

An Ontario, Canada, Loggerhead Shrike Working Group has defined Loggerhead Shrike habitat as including all suitable grassland and pasture habitat within a 400 yard radius of their nests. At present, no habitat management programs at a larger scale than this are known to be underway, but providing the necessary savanna/shrub habitat in smaller units is something that county and state biologists and private landowners should be able to accomplish.

Despite the dangers inherent in creating linear habitats, roadside habitats could be incorporated into management plans, and state and county departments of transportation could be encouraged to leave shrubs standing along roadsides. Use of biocides on these lands should be eliminated or reduced. Better maintenance of roadside nesting habitat could also be achieved. It is also desirable to maintain shrubs and brush along fence-lines, scattered trees in pastures and fields, and hedges as potential nest sites.

Implementation of the above recommendations is problematic because many areas that are a mixture of grassy open areas and small woody plants are considered prime real estate for suburbs, farming, ranching, golf courses, etc. In addition, mid-succession grasslands are often overlooked in grassland management plans, which usually concentrate on early succession habitat. However, managing habitat for Iowa's high conservation priority Loggerhead Shrikes is also likely to benefit White-eyed Vireo, Bell's Vireo, and Yellow-breasted Chat – each with the same status as a species with high conservation priority in Iowa. Consequently, special attention ought to be given to this entire suite of species.

For more information about conservation efforts for Loggerhead Shrikes, see both the sections on Woodland Management for Birds and Grassland Management for Birds. And for more specific details see Recommended Woodland Management Practices and Recommended Grassland Management Practices. Each of these sections is found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

White-eyed Vireo

Vireo griseus

Introduction

The White-eyed Vireo is a migratory songbird more frequently detected by ear than by eye. Although cryptic in both plumage and behavior, male White-eyed Vireos compensate with explosive and complex singing. Individuals have repertoires of a dozen or more distinct songs, each comprising six to ten highly variable elements. Because of its complex song delivery, this species is a compelling subject for studies of vocal communication.

The White-eyed Vireo's preferred habitat is dense secondary deciduous scrub, wood margins, and overgrown pastures. Since the dense scrub this species prefers has little economic value, it is rarely protected. A principal restriction on White-eyed Vireo numbers appears to be the declining availability of this type of habitat. This species is thought to be rare in Iowa.

Predominantly a southern species, the White-eyed Vireo has expanded the northern edge of its range into Iowa, and is most frequently encountered in the southern half of the state. It is gradually being seen further north. As long as secondary deciduous scrub is available, some White-eyed Vireos should continue to persist in the state. Consequently, ensuring that the preferred habitat type is protected and managed in a sustainable way should be a consideration in most if not all large-scale habitat management plans where the habitat type is present.

LINK TO IOWA IBA: WHITE-EYED VIREO

Habitat Preferences

This species most often utilizes secondary deciduous scrub, overgrown pastures and abandoned farmland, wood margins, late- to middle-stage succession, stream-side thickets; and areas characterized as intermediate between shrubs and low trees.

Common birds in the same breeding habitat as White-eyed Vireos include Carolina Wren, Blue-gray Gnatcatcher, Tufted Titmouse, Gray Catbird, Brown Thrasher, and of course the suite of species that are also species of high conservation priority in our state: Loggerhead Shrike, Bell's Vireo and Yellow-breasted Chat. In general, White-eyed Vireo prefers slightly later succession stages than do Yellow-breasted Chat, and Bell's Vireo.

Feeding Habits

The diet of White-eyed Vireos is primarily made up of insects and berries. Insects are known to be almost the entire diet during the breeding season, when nearly one-third of that may be caterpillars, moths, and butterflies. Also included can be true bugs, many kinds of beetles, ants, wasps, scale insects, bees, and grasshoppers. Prey, less often taken includes snails, an occasional small lizard, and spiders.

In breeding season foraging is done in deciduous growth including shrubs, vines, and trees. Most foraging takes place at intermediate heights, between 5 and 20 feet above ground.

A skulker and a foliage gleaner, White-eyed Vireos forage deliberately in dense, low cover foliage, with short hops or flights, pausing to look for insects by tilting its head and peering. Insects are captured by vireos picking, hovering, reaching, lunging, hanging, or leaping actions.

After food is captured this species typically perches and pins larger prey to a branch with one foot, before disassembling and eating.

Breeding Biology

In the breeding season, male White-eyed Vireos sing incessantly from early spring to late summer, and defend territories for the monogamous breeding pair. In courtship, males display to females by fluffing plumage, spreading tail, and uttering a call that might be called whining.

Nests are pendulous cups that are usually well hidden in dense shrubs or saplings. Nests are within 25 feet of the ground and are frequently much lower than this. Both parents participate in nest-building.

Four eggs are normally laid, but the number may range from 3 to 5. Incubation is by both parents and takes from 13 to 15 days; and both parents care for the nestlings. The young leave the nest about 9 to 11 days after hatching. Nearly half of all White-eyed Vireo nests are parasitized by Brown-headed Cowbirds, in which case vireo offspring do not survive.

Concerns and Limiting Factors

As with many nocturnal migrants, concerns for White-eyed Vireos include: collisions with artificial structures such as TV, radio and cell phone towers; dependence on biocides in agriculture and other land-uses; and, the most serious issues of habitat loss, fragmentation and degradation.

Because typical White-eyed Vireo habitat is not valued by humans, nesting areas, particularly in rural regions, are frequently cleared mechanically. When this happens, the resident birds usually wander in adjacent areas for several weeks, even if habitat is less than suitable, and eventually depart.

Many aspects of the natural history of the White-eyed Vireo are poorly understood. Studies of regional differences in reproductive success and impacts of pervasive Brown-headed Cowbird parasitism are needed. The nature, control, and routes of migration remain largely

unknown. The White-eyed Vireo provides an excellent subject for studies of vocal communication, as its song system is complex in both structure and function.

Habitat Management Recommendations

Because this vireo utilizes a fairly broad array of habitats, and has a large contiguous geographic breeding range, it generally is considered not at risk. Nevertheless, significant declines in White-eyed Vireo populations have been reported since the 1960's, suggesting that carefully planned conservation measures should be considered. Perhaps the most feasible would be to promote suitable scrub habitat, either by leaving open areas to grow or by opening some forested areas through partial cutting. The effectiveness of these measures remains untested.

As more attention is given to IBA Criteria Species, and more and better management practices are planned and implemented across our state, and the White-eyed Vireo should be able to sustain, and possibly increase its population.

Managing habitat for Iowa's high conservation priority White-eyed Vireos is also likely to benefit Loggerhead Shrikes, Bell's Vireo, and Yellow-breasted Chat – each with the same species of high conservation priority status – in Iowa. Consequently, special attention ought to be given to protecting and maintaining habitat for this entire suite of species.

For general information about habitat management for White-eyed Vireo, see the sections on Woodland Management for Birds and Grassland Management for Birds. For more specific details see Recommended Woodland Management Practices and Recommended Grassland Management Practices. All of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Bell's Vireo

Vireo bellii

Introduction

Bell's Vireos are small, insectivorous, Neotropical migrants that are most common as a breeder in the central and southwestern United States and northern Mexico, and they winter primarily in central and southern Mexico. The species has no distinctive plumage characteristics and both sexes are the same in appearance. In breeding season, males are territorial and most pairs are monogamous.

Male Bell's Vireos sing a distinctive song through the spring and summer from dense vegetation characteristic of early succession stages, or any stage exhibiting dense understory vegetation – riparian areas, brushy fields, and young second-growth woodland.

High rates of brood parasitism by Brown-headed Cowbirds and habitat loss, fragmentation and degradation have negatively affected nesting Bell' Vireos. The other IBA Criteria Species that share this general savanna/shrub type of habitat – Loggerhead Shrike, White-eyed Vireo, and Yellow-breasted Chat – each suffer from the same or similar problems.

LINK TO IOWA IBA: BELL'S VIREO

Habitat Preferences

Bell's Vireo prefers dense, low, shrubby vegetation, generally early succession stages in riparian areas, brushy fields, young second-growth woodlands, and brush-lands. Nearly any dense understory vegetation may be used for nesting.

One assessment for Iowa (from the mid-1980s) indicated that Bell's Vireo was an uncommon but locally common breeder in southwest Iowa, but that its population appeared to be in a long-term decline. Although this species may be found throughout the majority of Iowa at this time, its primary range is south and southwest of this state.

Feeding Habits

Insects are by far the major food item for Bell's Vireo. In breeding season it feeds almost exclusively on large insects, including caterpillars, bees, wasps, and stink bugs. Some spiders and berries are also consumed.

Bell's Vireo usually forages in low brush, within 10 to 12 feet of ground level; but at times will forage much higher. It will sometimes fly out to catch, or "hawk" insects in midair; but the primary foraging technique is to search for insects among the foliage, and occasionally hover to pick food items from leaves and twigs.

Breeding Biology

The Bell's Vireo arrives in Iowa in early to mid-May, and the male establishes a territory almost immediately. Females settle on male territories within 2 days of arrival, and courtship begins immediately. Nest building is intimately tied to courtship. Both sexes construct the nest, which usually takes 4 to 5 days. Nests are placed in low shrubs and saplings, usually 2 to 5 feet above ground, and in the fork of a horizontal branch or twig.

Usually 4 eggs are laid, but the number may vary from 3 to 5. Females do most of the incubation, but males do some; and the incubation process takes about 14 days. Both parents feed and care for the young, which leave the nest about 11 to 12 days after hatching, and are fed by the parents for at least another 3 weeks.

Throughout Iowa and the entire breeding range, Brown-headed Cowbirds parasitize Bell's Vireo nests by laying 1 or 2 eggs (rarely 3) in parasitized nests. Early in the nesting season cowbird eggs laid just prior to vireo egg-laying may bring nest abandonment, but later in the nesting season cowbird eggs laid prior to vireo eggs are usually accepted. Female cowbirds lay 1 egg per day in vireo nests and may simultaneously remove or destroy (by pecking) one or more vireo eggs (or young). Bell's Vireos generally incubate cowbird eggs along with theirs once the former egg is accepted.

Vireos display various anti-cowbird strategies: male vireos, uttering a loud, scolding call, may confront and chase away female cowbirds near the nest; cowbird eggs may be removed from nests by vireos; and cowbird eggs are sometimes punctured by pecking or layered-over with nesting material. The most common anti-cowbird strategy is nest abandonment in response to appearance of a cowbird egg, and this has caused a substantial proportion of overall nest failures.

In addition, cowbird nestlings out-compete vireo nestlings for food and parental care so that vireo nestlings are often neglected and die. Non-parasitized vireo nests successfully fledge more young than parasitized nests.

Concerns and Limiting Factors

Many of the same concerns and limitations that apply to the White-eyed Vireo also apply to the closely related Bell's Vireo.

Refer to the previous species account for that information.

Land use patterns, particularly along streams and rivers (riparian habitat), strongly influence abundance in some portions of Iowa and the overall breeding range. Land-use changes – including agriculture, urbanization, firewood cutting, grazing, flood control projects, and reservoir construction – have reduced habitat for this species.

Land-use modifications that promote habitat patchiness apparently increase the rates of cowbird parasitism and act to segregate remaining breeding Bell's Vireos into scattered subpopulations that are more susceptible to local extinction. In some areas, overgrazing suppresses shrub growth and reduces available nest sites and vireo density.

Habitat Management Recommendations

Unfortunately, no special management practices are known to have been focused on Bell's Vireo over large portions of Iowa or in the eastern half of this species' breeding range. But it has been shown that trapping cowbirds significantly reduced brood parasitism in western states; and cowbird trapping is now a standard management tool there. Selective shooting of cowbirds, relocation of feedlots, dairies, and stables away from riparian areas, and reduction of grazing in certain riparian areas is also recommended, as well as re-vegetation of riparian areas to increase the extent of nesting habitat and deter cowbirds.

Since significant declines in Bell's Vireo populations have been suspected over several decades in Iowa, carefully planned conservation measures should be considered. Perhaps the most feasible would be to promote suitable scrub habitat, either by leaving open areas to grow or by opening some forested areas through partial cutting. The effectiveness of these measures remains untested.

As more attention is given to IBA Criteria Species, and more and better management practices are planned and implemented across our state, the Bell's Vireo will hopefully be able to sustain its population.

Managing habitat for Iowa's high conservation priority Bell's Vireos is also likely to benefit Loggerhead Shrikes, White-eyed Vireo, and Yellow-breasted Chat – each with the same species of high conservation priority status – in Iowa. Consequently, special attention ought to be given to protecting and maintaining habitat for this entire suite of savanna/shrub species.

For general information about habitat management for Bell's Vireo, see the sections on Woodland Management for Birds and Grassland Management for Birds. For more specific details see Recommended Woodland Management Practices and Recommended Grassland Management Practices. All of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Bewick's Wren

Thryomanes bewickii

Introduction

A century ago, Bewick's Wren (pronounced like "Buick") was beloved as the "house wren" of the Appalachians Mountains and the Midwest. But today, the species is greatly reduced in number east of the Mississippi River and has declined in western parts of its range as well. Reasons for this widespread decline include competition with the European Starling, House Sparrow, and Song Sparrow; the use of pesticides on agricultural lands; and loss of habitat. But the decline appears most likely to be due to competition from the nest-destroying House Wren whose range expansion has accompanied the quiet exit of the Bewick's Wren.

Recognized by its white eye-line and longish tail with white corners (which it wags from side to side), Bewick's Wren is nearly as active and noisy as the House Wren, but unlike its close relative, it is considered to be rare in Iowa.

LINK TO IOWA IBA: BEWICK'S WREN

Habitat Preferences

Bewick's Wren breeds in open woodlands, upland thickets, and hills in any suitable cavity or cavity-like structure, including rock crevices, outbuildings, abandoned automobiles, and centers of brush piles.

It prefers thickets, underbrush and certain heavily vegetated gardens. Breeding territories usually contain mixtures of thick scrubby vegetation and open woodland, and nests are well concealed. Iowa wrens may be located around out buildings of farms near brushy or wooded areas in cleared or fairly open country; but finding a Bewick's Wren, even in what appears to be suitable habitat, is by now means easy to do.

Feeding Habits

These birds glean insect adults, the eggs and larvae of insects, and other small invertebrates from leaves, branches, and trunks of trees and shrubs; and they seldom feed more than 8 to 10 feet off the ground. They may forage on the ground rather frequently in areas of sparse vegetation.

Bewick's Wren gleans a wide variety of insects from leaves, branches, and trunks of lower strata of weeds, brush and trees; and also probes at crevices in branches and trunks, and flips and probes (but does not scratch) dead leaves and other detritus on the ground. In denser vegetation, this bird relies on hopping quickly among lower branches to capture food.

A very active forager on trunks, branches and twigs of trees, Bewick's Wren climbs and hops about pecking for food at a fast pace, and occasionally "hawks" insects. It seizes prey in its bill; and subdues prey by crushing it with mandibles, by shaking it, or by striking it against a branch. Prey is generally swallowed whole, but wings are often removed from butterflies and moths before they are consumed.

Breeding Biology

Bewick's Wrens arrive in Iowa in April, and are probably monogamous. They defend a territory that averages one acre in size; and this defense is done entirely by the male through song. No information is available on courtship.

Nests are constructed in nearly any kind of cavity, including natural sites such as hollows in trees and old woodpecker holes; and in artificial sites such as nest boxes, holes in buildings, mailboxes, tin cans, and many other locations. The selected nest site is almost always less than 20 feet above ground. Males may build a number of incomplete "dummy" nests, and the female probably chooses one site and completes that nest for raising the young.

Typically 5 to 7 eggs are usually laid from a range of 4 to 11 eggs. Incubation is probably by the female only and lasts about 14 days. Both parents feed nestlings and young leave the nest about 2 weeks after hatching. Once fledged, both parents young for up to 2 additional weeks. Two or three broods may be reared in one nesting season.

Concerns and Limiting Factors

Bewick's Wrens were probably never common in Iowa, but historical data indicates that they were once found in greater numbers here than they are today. There have been few records since 1960, and this species has definitely been on a downward trajectory. Observations in recent years may simply be the result of birders searching specifically for this species in the extreme southeastern corner of the state; the quadrant of the state that is thought to have always had the highest numbers of Bewick's Wrens.

The most likely cause of the population decline is the range expansion of egg-removing House Wrens, which is probably a result of two human-related factors: long-

term habitat changes such as succession in abandoned agricultural fields, and increases in the availability of human-placed nest boxes. Collisions with TV and radio towers have caused mortality within this species. Mortalities by other causes may include collisions with cell phone towers, glass windows, and attacks by feral house cats.

Few populations of Bewick's Wrens have been well studied and additional basic data on population dynamics is needed, especially in areas where Bewick's Wrens are more abundant than they are in Iowa. More research is needed on nest-site limitations, ecological factors affecting the dispersal of immature birds, and winter survival of juveniles and adults. Long-term studies of banded birds are needed to examine responses to drought cycles, as droughts may benefit Bewick's Wren in areas where it coexists with the House Wren.

Because the House Wren is strongly implicated in the severe decline of populations of Bewick's Wren, interactions between these two species should be investigated further. Factors that may limit nest destruction by House Wrens include differences in breeding phenology, nest-site and habitat selection, inter-specific territoriality, other aggressive interactions, and nest attentiveness. The ultimate consequences of widespread supplementation of nest boxes for House Wrens on the Bewick's Wren and other cavity-nesting species needs to be investigated on a landscape scale. Developed areas with abundant nest boxes may be the source of House Wrens that spread into the surrounding rural areas that were once populated with Bewick's Wrens.

Habitat Management Recommendations

As a species of high conservation priority in Iowa's IBA Program, Bewick's Wren should receive attention when conservation plans are written and implemented for the state's IBAs.

This species might benefit locally from removal of House Wrens, but it is not known if a removal program has ever been attempted. Although House Wrens are protected under the Migratory Bird Treaty Act, it might be possible to reduce populations by removal of supplemental nest boxes. Nest box supplementation for Bewick's Wrens may be effective only in areas where House Wrens are absent or rare.

Since reproductive rates are potentially high for Bewick's Wrens, it might be possible to expand their current numbers and perhaps their range, if the primary factors responsible for ongoing population declines can be identified and eliminated or reduced significantly.

At present, no large-scale habitat management program is known to be underway for this species, but providing the necessary mix of habitat in small units is something that county and state biologists and private landowners might wish to attempt.

Implementation of specific habitat management practices for this species is problematic because many areas that might be thought to be suitable habitat are also considered to be prime real estate for suburbs, farming, ranching, golf courses, etc. Perhaps the best that can be done is to protect the existing habitats that this species is known to utilize, and attempt to create or restore similar habitats within the surrounding landscape.

For general information about Woodland and Grassland Management for Birds, and Recommended Woodland Management and Grassland Management Practices, see those sections within Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Veery

Catharus fuscescens

Introduction

A shy, tawny colored thrush with a beautiful song that cascades through the deep woods on its breeding grounds in the U.S. and Canada, the Veery was once a familiar sound in parts of Iowa. But the species is apparently disappearing from many of the habitats where it was once more numerous.

This Neotropical migrant crosses the Gulf of Mexico in spring and fall, and breeds in damp, early-succession, deciduous forests, often near streamside thickets or swamps. The Veery's distinctive song prevails at dusk, and this species can distinguish between the vocalizations of neighbors and strangers, reacting aggressively when the latter intrude on a territory.

LINK TO IOWA IBA: VEERY

Habitat Preferences

Generally, Veery will inhabit damp, deciduous forests, and seem to have a strong preference for habitats that are near water. Its breeding range overlaps that of the Wood Thrush, but Veery generally choose wetter, younger woodlands. Some research indicates that this species prefers disturbed forest, probably because a denser understory is not found in undisturbed forests.

In mature woodlands, moisture regime is the chief factor in habitat selection, and is more than twice as important as herb cover. Shrub cover is another chief vegetative consideration in habitat selection – probably because shrubs and abundant understory vegetation provide safe nest sites and feeding sites.

Veeries are area-sensitive breeders, requiring large woodlands for successful nesting. Research has indicated that they seldom nest in woodlands of less than 250 acres in size. They are also very susceptible to nest parasitism by cowbirds – which is exasperated by the fragmentation of woodlands into smaller and smaller units. Therefore woodland fragmentation is a direct cause of serious problems for this species of high conservation priority. Like other deep-woods species, Veeries are especially susceptible to habitat loss.

Feeding Habits

Veery may forage in trees and shrubs, but is primarily a ground forager. Food is approximately 60% insects and 40% fruit during the breeding season, and the percentages may reverse in late summer and fall.

The insects eaten during the nesting season include: beetles, ants, small wasps, caterpillars, and crickets. And spiders, centipedes and snails may also be consumed. Salamanders and small frogs are rarely eaten.

Breeding Biology

Veeries arrive in Iowa in early May, and males arrive first. Males defend a nesting territory by singing, and courtship involves the male chasing the female, and both birds calling back and forth. Nest building is by the female, and begins from mid-May to early June. The nest is typically placed on or near the ground in dense woodland. The nests that are off the ground are less than 5 feet high.

The average number of eggs that are laid is 4, and the range is from 3 to 5. Incubation lasts about 10 to 14 days, and apparently is by the female only. The female might spend much time brooding the nestlings at first, and both parents feed the young. The young leave the nest at about 10 to 12 days of age; and some pairs may raise two broods in a nesting season.

The Brown-headed Cowbird is a significant brood parasite on Veeries that reduces annual productivity, but to an extent that is not yet fully known.

Concerns and Limiting Factors

Collisions with human-made objects such as TV and radio towers, and perhaps cell phone towers and other structures, during nocturnal migrations, is a serious problem. But elimination of preferred woodland habitats in both breeding and wintering habitats is likely a major reason for declining Veery populations.

Fragmentation of woodlands into smaller and smaller units, and loss of second-growth in woodlands are major threats to Veery populations. Fragmentation increases likelihood of nest parasitism by Brown-headed Cowbird. Increased browsing of understory by growing populations of White-tailed Deer is likely a problem for nesting Veery in many areas.

Several questions about the breeding biology of this species remain unanswered. Perhaps most importantly, the location where most Veeries over-winter still remains largely unknown.

Habitat Management Recommendations

Woodland management practices that leave large tracts of mature forest undisturbed is probably necessary if this species is to survive as a breeding bird in Iowa.

As sound woodland management practices are planned and implemented more frequently across our state, and more attention is given to IBA Criteria Species, the Veery will hopefully be able to sustain or even increase its population. Consequently, development and implementation of conservation plans at IBAs and at other woodland habitats that support, or have the potential to support Verries, is a worthwhile goal.

For general information see Woodland Management for Birds, and for more specific details see Recommended Woodland Management Practices. Both of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Wood Thrush

Hylocichia mustelina

Introduction

The Wood Thrush has become a symbol of seriously declining Neotropical migrant birds, its population having decreased significantly over much of its range just since the late 1970s. Its conspicuous song, widespread occurrence in a variety of wooded habitats, and vulnerability to parasitism by the Brown-headed Cowbird make it a frequent subject for ecological research and popular articles.

The flutelike song of the Wood Thrush is one of the most popular and widely recognized bird vocalizations, and is a familiar sound in eastern deciduous woodlands throughout summer, especially at dawn and dusk. Males are versatile singers, sometimes singing two notes at once. By combining different variants of each part of the three-part song, a male also can deliver a broad array of songs, especially during his intense vocal display during the “dawn chorus” on a May morning. Henry David Thoreau wrote that: “the thrush alone declares the immortal wealth and vigor that is in the forest.”

The Wood Thrush inhabits a wide variety of deciduous and mixed forests. Destruction and fragmentation of forests in both breeding and wintering areas are factors in the species’ declining abundance. Individuals in smaller woodland fragments experience more nest predation and more cowbird parasitism (especially in the Midwest) and consequently poorer reproductive success than individuals nesting in larger areas with larger contiguous woodland landscapes.

LINK TO IOWA IBA: WOOD THRUSH

Habitat Preferences

The Wood Thrush is an area sensitive species that is closely linked to large deciduous woodlands. Primary habitat features are a shrub-sub-canopy layer, shade, moist soil, and leaf litter, each of which enhance feeding and nesting.

According to written reports, for areas where Wood Thrush and Veery both occur, the Veery is more often in slightly different sites – those with shorter trees, less canopy, more shrubs, and less leaf litter.

Feeding Habits

This species feeds mostly on invertebrates and on fruits from shrubs; and the latter are especially important for energy prior to fall migration.

Wood Thrush forages primarily on the ground in woodland undergrowth, and mostly for soil invertebrates including beetles, caterpillars, ants, crickets, moths, spiders, earthworms, and snails. Berries and small fruits are eaten in all seasons, but mainly in late summer, fall, and late winter, and these are taken up in shrubs and trees.

Breeding Biology

Wood Thrushes arrive in Iowa in early May and defend territories that average about three acres in size by singing. They are monogamous, and during courtship the male may chase the female in fast circular flights among the trees. Wood Thrush often react aggressively toward other thrushes that enter their territory.

Most nests are built below 20 feet in height in shrubs and small trees, but some nests may be up to 60 feet high in trees. Nests are built by the female, and are similar to the nests of American Robins.

Usually 3 to 4 eggs are laid and incubation is by the female only, and lasts from 13 to 14 days. Both parents – indistinguishable in appearance – feed the nestlings. The young leave the nest at about 12 days of age.

Most females attempt to rear two broods a summer; and under good conditions about half are successful, but 3 to 4 re-nesting attempts may be required to do so. Second nests usually have fewer eggs.

Brood parasitism by Brown-headed Cowbirds may reduce annual fledgling production in some areas to the extent that it threatens population stability, but the overall demographic effect of parasitism on Wood Thrush remains poorly understood.

Concerns and Limiting Factors

The concerns and limitations for Wood Thrushes are similar to those for Veery. Due to the loss of so much woodland resource over time in Iowa, these thrushes are undoubtedly less abundant today than they were a century ago.

Collisions with human-made objects such as TV and radio towers, and perhaps cell phone towers and other structures, during nocturnal migrations, is a serious problem. But elimination of preferred woodland habitats in both breeding and wintering habitats is likely a major reason for declining Wood Thrush populations.

Fragmentation of woodlands into smaller and smaller units, and loss of second-growth in woodlands are major threats to Wood Thrush populations. Fragmentation increases the likelihood of nest parasitism by Brown-headed Cowbird; in fact research in Illinois found that nearly half of Wood Thrush nests were parasitized by cowbirds. Woodland thinning and fragmentation of breeding areas encourage nest parasitism by cowbirds.

Increased browsing of understory by growing populations of White-tailed Deer is likely a problem for nesting Wood Thrush in many areas.

Despite an abundance of research on Wood Thrush, several questions about the

breeding biology and population dynamics of this species remain unanswered.

Habitat Management Recommendations

Habitat management recommendations for Wood Thrushes are similar to those for Veery. Further declines in Wood Thrush numbers can be expected in Iowa if habitat losses continue. Woodland management practices that leave large tracts of mature woodland undisturbed is probably necessary if this species is to survive as a breeding bird in Iowa.

With more frequent planning and implementation of bird conservation projects across our state, and as additional focus is placed on IBA Criteria Species, the Wood Thrush will hopefully benefit and be able to sustain its population. Therefore, development and implementation of conservation plans at IBAs and at other woodland habitats that support, or have the potential to support Wood Thrush, is a very worthwhile goal.

For general information see Woodland Management for Birds, and for more specific details see Recommended Woodland Management Practices. Both of these sections are in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Cerulean Warbler

Dendroica cerulea

Introduction

This small, canopy-foraging Neotropical migrant insectivore breeds across much of the eastern United States in locally mature deciduous forests punctuated with broken canopies. With sky blue upper plumage, busy sky high in the canopy, the Cerulean Warbler is difficult to observe, and has been little studied.

This species forages and nests higher in the canopy than the majority of warblers, and migrates farther and earlier, than most others. Its social system remains poorly understood; and management actions to enhance its habitat have not yet been clearly specified.

Although the Cerulean Warbler was formerly among the most abundant breeding warblers in the Mississippi River valley, its numbers plummeted in the 1900s. Concern for the future of this species is warranted. Yet even in the face of steep declines, some populations seem to be holding on.

LINK TO IOWA IBA: CERULEAN WARBLER

Habitat Preferences

Cerulean Warblers have been routinely identified with predominantly forested landscapes, mature woodlands, large and tall trees of broad-leaved, deciduous species with an open understory and gaps in the canopy; in wet bottomlands, or drier upland situations.

Historical accounts described this species as especially abundant in old-growth bottomland forests of the Mississippi Alluvial Valley, and most of these forests no longer exist. Dry and semi-dry upland forests of the type this species once inhabited are now scarce as well (replaced by farmland); occurrence in flood plains thus may be an artifact, rather than a preference.

Cerulean Warblers are usually considered to be an area-sensitive species. The estimated minimum woodland tract size required to support stable breeding populations varies from about 10 acres estimated by some researchers to more than 3,200 acres suggested by other researchers working in the Mississippi Alluvial Valley. It seems fairly obvious that this popular but quickly declining species will receive much greater attention from investigators in the future, and the new data will hopefully address and resolve woodland management questions.

Feeding Habits

Cerulean Warblers are primarily insectivorous, foraging on insects in the upper foliage of the large trees they inhabit. Insect food is taken from leaf bases and foliage in the canopy of a great variety of trees. No tree species seems to be preferred. The primary mode of foraging is gleaning insects from leaves and twigs, and moving rapidly from limb to limb.

Breeding Biology

Cerulean Warblers arrive in Iowa in late April to early May, with the male preceding the female by a few days to establish a territory. Pair formation begins soon after the females arrive.

Nesting behavior has been little studied due to the difficulty of observing the nests placed so high in tall trees.

Nests are probably constructed by the female only, and are placed on a horizontal branch of a deciduous tree, far from the trunk and usually from 15 to 90 feet off of the ground. Oak, maple, basswood, elm, hickory, and sycamore trees seem to be favored, although other species of trees are also utilized for nesting.

Nests contain from 3 to 5 eggs, but usually 4. Incubation is by the female only, and lasts for 11 to 12 days. Both parents feed the nestlings. The age at which the young leave the nest is not well known.

It is thought that Cerulean Warblers are not the victim of nest parasitism by Brown-headed Cowbirds as often as many other species, as long as large, unbroken mature woodlands are available for nesting. However, Cerulean Warblers have been found to suffer from nest parasitism more frequently when they are forced to nest in fragments of once larger woodlands.

Concerns and Limiting Factors

The Cerulean Warbler is currently listed as a species of high conservation priority by Iowa's IBA Program but if populations continue to decline, it might soon slip into a more serious category such as threatened or endangered.

Previous Breeding Bird Survey (BBS) information has shown that the Cerulean Warbler has experienced a dramatic long-term population decline that averaged 3.4% per year (e.g. a 68% loss in number in just 20 years). This is the greatest decline of any warbler and one of the greatest of any passerine (perching bird) species in North America. From this, as well as other newer data, it is obvious that this species clearly

merits close scrutiny and careful protection wherever it occurs in Iowa, and across its entire range.

Land-use changes brought about by increasing human populations within the breeding, migratory, and winter ranges of Cerulean Warblers appear to be the underlying cause of the population decline during the late 20th Century. For example, within its breeding range, the preferred habitat types are becoming scarcer, and more fragmented, due to human land-use practices, diseases of tree species, insect blights, and other factors.

Researchers have identified 4 breeding-season constraints, and each of these relate to habitat. They are:

1.) Loss of mature deciduous forest, especially along stream valleys: This is clearly the most serious long-term problem facing the species on its breeding grounds.

2.) Fragmentation and increasing isolation of remaining mature deciduous forest: Perhaps more than most North American bird species, the Cerulean Warbler is sensitive to landscape-level changes in habitat.

3.) Change toward shorter rotation periods and even-aged management of woodlands, so that less deciduous forest habitat reaches maturity. As land uses become more competitive with each other on a regional scale, pressure to achieve particular rates of return on investment increases – and populations of Cerulean Warblers (as well as other species) steadily decrease.

4.) Loss of key tree species, especially oaks from oak wilt and gypsy moths, sycamores from a fungus, elms from Dutch elm disease, and American chestnuts from chestnut blight.

The extent to which Cerulean Warblers are limited by migratory-stopover habitats is unclear, but thought to be a serious problem that may well be getting worse. Numerous ecologically interesting and relevant habitat management questions remain unanswered about the species, and further, more comprehensive research is certainly needed.

Habitat Management Recommendations

Current conservation actions for Cerulean Warblers include planning projects that use estimates of minimum tract size for the species as criteria for habitat acquisition, protection, and management. No specific results of long-term experimentation with woodland management on its breeding grounds are known to exist at this point.

Simple protection woodlands in as large a blocks as possible, and wise application of sound woodland management principles applied to breeding habitats, are the primary tools available to an individual land manager in Iowa.

For Cerulean Warblers, management of breeding habitat means management for premium quality saw-timber products, involving long rotations with intermediate treatments directed toward fostering tall trees with large diameters, and full canopies of dominant trees. It also means strategies to produce a varied 3-dimensional stand with extensive development of vertical diversity, such as tall canopies of dominant and canopy emergent trees towering above mid-story or intermediate trees. Conditions such as these can be produced by uneven-aged management of extensive stands, and by old-growth management techniques that foster an extensive network of canopy gaps. Other strategies, including even-aged management with long rotations, may also be effective.

Landscape context of the managed stands is an important woodland management consideration because the Cerulean Warbler is area-sensitive, and found only in

large tracts of woodland. Future policy and land-use planning decisions that favor the existence of large tracts of woodland and forest, or landscapes that are primarily forested, will definitely benefit these birds. Where woodland landscapes can be self-sustaining, i.e., maintained by their own reproduction, Cerulean Warblers will likely prosper. Where extensive economic subsidy is required to maintain the landscape in primarily forested condition, the future of the species would seem more tenuous.

Cerulean Warblers may respond favorably where consolidation and expansion of Iowa's woodlands has taken place. With implementation of sound woodland management practices, and with more attention being paid to IBA Criteria Species, this species should be able to sustain its population.

For general assistance see the section on Woodland Management for Birds, and for more specific details see the section Recommended Woodland Management Practices. Both are found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Prothonotary Warbler

Protonotaria citrea

Introduction

One of the most striking wood-warblers of North America, Prothonotary Warblers, "the golden bird of wooded swamps," intrigue and delight those who visit its very specialized habitat.

A medium-distance Neotropical migrant species, the Prothonotary Warbler inhabits wet forests throughout its range across the southeastern United States and northward into Iowa and other parts of the Upper Midwest. It is a bird of bottomland hardwood forests and other wooded wetlands.

Prothonotary Warblers have the distinction of being the only eastern wood-warbler that nests in tree cavities. It often uses holes excavated by Downy Woodpeckers, but will also nest in a variety of other cavities.

Because the species has specific habitat needs in breeding as well as wintering areas, the greatest threats to its survival are degradation and destruction of its habitat. Logging and agricultural conversion of bottomland hardwood forests throughout its breeding range have been detrimental.

Because of its tame nature and ready acceptance of artificial nest sites, the Prothonotary Warbler has become a relatively popular study species, and may be a useful indicator species for environmental quality of wooded wetlands. Although the species has been studied fairly well in breeding areas, information about effects of habitat loss on migrating and wintering populations is currently lacking and is critical for future conservation and management of the species.

LINK TO IOWA IBA: PROTHONOTARY WARBLER

Nest box programs are proliferating across the breeding range to bolster diminished local populations, as professional land managers recognize the educational and aesthetic value of this colorful warbler to the general public.

Habitat Preferences

Prothonotary Warblers breed in floodplain, river bottom hardwood habitats, which include tree species of black willow, ash, red maple, and cottonwood. It also breeds near borders of lakes, rivers, and ponds, but normally only in areas with slow moving or standing water.

This colorful species is rarely found outside of its specialized habitat, and therefore are usually found only by the birders and others who specifically seek it. It may be locally common in optimal habitat in Iowa, where it is almost exclusively associated with larger rivers. It is more common in eastern Iowa, and there appears to be little historical change in distribution in the state despite major habitat destruction.

Habitats utilized at stopover and refueling sites during spring and fall migration are not well known; but are thought to be similar to the habitats used for nesting.

Feeding Habits

Prothonotary Warblers primarily feed on insects throughout their annual life cycle, and capture butterflies, moths, flies, beetles, mayflies, and spiders; and also take other small invertebrates including mollusks. In non-breeding seasons it can be more opportunistic, feeding on some seeds, fruit, and even nectar.

Foraging is normally low in wooded thickets where it sometimes hops about on floating pieces of floating wood and mossy logs, searching crevices and gleaning insects from low-growing tree trunks, branches, twigs and foliage. It may occasionally forage by winding its way up tree trunks like a nuthatch. Among the colorful wood-warblers, this is a relatively slow-moving, “thorough” forager.

Breeding Biology

Prothonotary Warblers begin arriving in Iowa in late April and early May. Males precede females by several days, when they sing to establish territories. Some males may even start nest building at that time. Pairs form soon after females arrive. Males defend territories fiercely, and may even be aggressive toward other species that encroach.

Males display intensely to the female during courtship by fluffing plumage and spreading wings and tail. Only females build the real nest. Nests are most often 5 to 10 feet (but sometimes from 3 to 30 feet) above standing water. The holes excavated by Downy Woodpeckers are apparently favored, but rotting knotholes and other cavities are also used as nest sites, and this species may sometimes excavate its own holes in very rotten stumps. Artificial nest boxes and nesting gourds have proved to be effective as nest sites where natural sites are lacking.

In comparison to other warblers a high number of eggs are laid. Eggs usually number 4 to 6, but the range is 3 to 8. Incubation is by the female, and lasts from 12 to 14 days. Nestlings are fed by both parents, and are able to leave the nest at 10-11 days of age. Young can supposedly swim at fledging; often a second broods is raised in the same nesting season.

Concerns and Limiting Factors

The greatest negative impacts to Prothonotary Warbler populations are the destruction, fragmentation or degradation of their specialized habitats throughout the breeding and migratory range.

Bottomland hardwood forests, the warbler’s prime breeding habitat, have been logged or converted to pasture or cropland throughout south eastern U.S, and only

10% of original bottomland forest in the lower 48 states remains. Primary negative impact of woodland management is the removal of decayed trees that could provide nest sites, and alteration of hydrological regime, causing drying of seasonally flooded areas. Channeling of streams to control flooding also lowers habitat quality.

Prothonotary Warblers exhibit a moderate level of sensitivity to area size on breeding grounds, avoiding wooded tracts of less than 40 acres, and riparian areas that are less than 100 feet wide.

Direct contact with pesticides is probably limited due to the strict habitat associations that Prothonotary Warblers maintain. But there may be contact with biocides used in agricultural systems such as citrus groves, where species can be numerous during migration.

During migration, this species is frequently found among killed birds at TV and radio towers, and at tall buildings that remain lit up with lights through the night. Collisions with automobiles probably are very infrequent.

Although details of the general breeding biology of the Prothonotary Warbler have been well studied, most information has been collected through the use of nest boxes, which can influence the number of breeding birds and increase the annual reproductive success of individuals – but has little to do with the population as a whole.

More information is needed for a better understanding of the impacts of habitat degradation on breeding populations. Very little is known about the specific impacts of mangrove destruction or degradation on overwinter survival, and almost nothing is known about habitats used during migration. Such information is important to any future conservation or management efforts. Another limitation is the absence of information about dispersal from nest sites, and breeding ecology in the first year. It is also not known how the combination of limited nest sites, strict habitat specificity, and long-distance migration influence lifetime reproductive success for this species.

Habitat Management Recommendations

Prothonotary Warblers are vulnerable to destruction of their specialized breeding habitats, throughout their migratory range, and on wintering grounds. Consequently, Iowa DNR and the Iowa IBA Program are incorporating specific habitat management concerns into regional conservation plans being developed by Partners in Flight along with grassroots conservation projects.

Fortunately for researchers, land managers, and bird educators, this species is very tolerant of human activity and can be quite tame, sometimes foraging within 3 to 6 feet of human observers; and incubating females captured repeatedly at nests will not abandon their nests. This has led to a proliferation of nest box programs across the breeding range to bolster diminished local populations, as professional land managers recognize the educational and aesthetic value of this colorful, cavity nesting warbler to the general public.

Use of nest boxes in wooded wetlands where natural nest sites have been lost over time can be important tool for enhancing declining local populations and increasing public recognition of habitat conservation issues. However, birds dependent upon nest boxes may suffer elevated predation rates, particularly if high numbers of nest boxes are placed in close proximity to each other. In some areas, House Sparrows and House Wrens may out-compete warblers for nest boxes.

Despite some of these minor positive steps, it should always be remembered that placement of nest boxes is no substitute for long-term protection and oversight of the

large bottomland woodlands that will determine the ultimate fate of this beautiful species.

For assistance in this regard, see the section on Woodland Management for Birds, and for more specific information see the section Recommended Woodland Management Practices. Both of these sections are to be found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Worm-eating Warbler

Helmitheros vermivorum

Introduction

The Worm-eating Warbler is a shy, difficult to observe, Neotropical migrant that breeds primarily in the southeastern United States. Its breeding range extends northward into the southern and eastern counties of Iowa, and it is one of our state's rarest breeding birds.

Less colorful and more sluggish than most of its relatives in the warbler family, the Worm-eating Warbler is an inconspicuous bird with an inconspicuous song. Even with the dry trill it sings, this species is not easy to observe among the deeply wooded hillsides it inhabits. Despite the name, this warbler does not feed on earthworms.

Based upon knowledge of its habitat, this warbler may have been more common and more widespread in Iowa prior to the clearing of so much woodland habitat.

This is one of a suite of woodland songbirds of Iowa and the eastern United States that nest on or near the ground is a species of high conservation priority in Iowa. In addition to Worm-eating Warbler, this suite of species, all of which need conservation help sooner rather than later, includes Veery, Wood Thrush, Kentucky Warbler, and Hooded Warbler. Thoughtful protection and management of woodlands can benefit each of these species at the same time when they are found together.

LINK TO IOWA IBA: WORM-EATING WARBLER

Habitat Preferences

Nesting habitat is mainly where large tracts of dense deciduous and mixed woodlands overlap with moderate to steep slopes, and where patches of dense understory shrubs are found.

Worm-eating Warblers prefer cool, shaded hillsides, gullies and banks, which are found near steep, wooded slopes covered with medium-sized trees and undergrowth of saplings and shrubs. Plant composition of the wooded community appears less important to this species than forest age and size, presence of hillsides, and occurrence of dense patches of shrub cover.

No detailed information is available on habitat preferences during migration stopover and re-fueling. But these are probably restricted to deciduous and mixed deciduous-coniferous forests.

Feeding Habits

The diet of Worm-eating Warblers is mostly insects, smooth caterpillars (once known as "worms" – hence this warbler's name), grasshoppers, bugs, bees, walkingsticks, beetles, and spiders. Nestlings are also fed moths and grubs.

This warbler is perhaps best known for its habit of hopping through the understory and probing into suspended dead leaves for food, especially before leaves come out in spring. Foraging is also in trees and shrubs, and on the bark of tree trunks and limbs.

Breeding Biology

Worm-eating Warblers probably arrive in Iowa in late April or early May. Territories are quickly established by the male and defended by his singing, which often takes place from high in a still leafless tree, as well as from the ground and at tree mid-level.

Males sing a varied song during flight as part of courtship. Nests are constructed by the female, and placed on the ground, and normally on hillsides beneath or against a deciduous shrub or sapling. The nests are well concealed by dead leaves.

From 4 to 5 (but sometimes 3 to 6) eggs are laid. Incubation is by the female only, and takes 13 days. Nest parasitism by Brown-headed Cowbirds is rare in most areas, possibly because this warbler chooses to nest mainly in dense woods far from the edges of woodlands.

The young are fed by both parents, and leave the nest at only 10 days of age. There is probably only one brood per nesting season, but the female may produces up to 2 replacement clutches if earlier attempts fail.

Concerns and Limiting Factors

As with other Neotropical migrants that migrate almost entirely at night, radio and TV transmission towers and tall buildings that remain well lighted all night, may cause significant mortality during migration. At the Kennedy Space Center in Florida, 148 Worm-eating Warblers were killed over 11 years; and at one TV tower in Leon Co., Florida, 182 were killed during 25-year period. There are thousands of similar obstructions dotting the U.S. and Western Hemisphere.

However, the key factor in the decline of Neotropical migrant songbirds lies elsewhere.

As with other species of high conservation priority in Iowa, such as Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Kentucky Warbler, and Hooded Warbler, the Worm-eating Warbler is seriously impacted by the loss, fragmentation and degradation of the woodlands where breeding takes place.

Alteration of essential habitats should always be the first and primary concern and limiting factor that is considered by owners

and managers of IBAs as well as non-IBA woodlands that these important species depend upon.

Habitat Management Recommendations

Perpetuation of Worm-eating Warblers in Iowa will require maintenance of a system of large woodlands where this species is found, which will serve as source populations for new breeders. Large contiguous woodland areas with a minimum of non-forested edge will produce the highest densities of breeding individuals, and will increase reproductive success by decreasing cowbird parasitism and nest predation by other species. New breeders dispersing from source populations to less suitable smaller sites will help maintain regional populations.

The same general prescription holds true for Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Kentucky Warbler, and Hooded Warbler. Each of these is a species of high conservation priority for the IBA Program in Iowa, and the number one need of each is habitat for nesting and feeding.

Members of this list of fairly resilient species appear to respond favorably wherever Iowans protect and maintain large blocks of woodland, and those essential habitats receive appropriate woodland management.

For general information about habitat management for Worm-eating Warbler, as well as for the other declining species listed above, see the sections on Woodland Management for Birds and Recommended Woodland Management Practices - both found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Kentucky Warbler

Oporornis formosus

Introduction

The fast, rolling spring and summer song of the Kentucky Warbler is a familiar sound of rich, moist, deciduous forests in the southeastern U.S. and in the northern and western portion of its range in the southern and eastern portions of Iowa.

This Neotropical migrant is a skulking bird, which spends most of its time on the ground. Despite bright colors – this species is heard more often than seen. In early spring, the male sings incessantly, sometimes partly concealed and almost motionless except for his vibrating throat, in bouts from the same perch for 5 to 15 minutes, and typically at heights of 15 to 50 feet.

Numbers of this species appear to be declining, and more in some regions than in others.

LINK TO IOWA IBA: KENTUCKY WARBLER

Habitat Preferences

Kentucky Warblers depend upon deep shaded woods with dense, humid thickets, bottomlands near creeks and rivers, ravines in upland deciduous woods, and the edges of wooded swamps.

Dense understory appears to be a key component of this warbler's habitat, and it is rarely observed in agricultural areas. Well-developed ground cover and a thick understory seem to be essential for ground nesting.

Studies of forest fragmentation in Missouri indicate that blocks of suitable habitat of at least 200 acres in size are necessary for successful breeding. Little is known about habitat requirements during spring and fall migration or for its winter range.

Feeding Habits

Kentucky Warblers forage mainly by walking on the ground, seeking prey among the leaf litter, flipping over dead leaves, and sometimes leaping up into the air to capture insects from the undersides of leaves.

The primary diet is made up of insects, caterpillars, and small spiders, and rarely seeds, during breeding season. Major food items include: moths, bugs, ants, grasshoppers, beetles, caterpillars, aphids, and grubs; but also spiders and a few berries.

Breeding Biology

Male Kentucky Warblers arrive in Iowa in early May, and usually precede the female by several days. The breeding territory is 1 to 2 acres in size, but almost 750 acres of quality woodland is required to maintain a stable population.

Males defend the breeding territory with persistent singing, vocalizing as often as every 12 seconds.

Female Kentucky Warblers choose the nest site within minutes of arriving, and after pair formation and copulation. Male usually remains in visual contact with the female during this time – i.e., to begin the mate-guarding behavior that will continue through egg-laying and sometimes incubation.

The nest is constructed by both sexes, and is located on, or within a few inches of the ground, at the foot of a shrub, or sometimes in the lowest fork of a small tree.

Usually 4 to 5 eggs are laid, but the number is sometimes as few as 3 or as many as 6. Only the female incubates, and this lasts 12 to 13 days. Nests of this warbler are often parasitized by Brown-headed Cowbirds, in which case reproduction capacity can be severely impacted.

Nestlings are fed by the female, and rarely by the male. The young leave the nest at the age of 8 to 10 days. Then both parents feed the young for up to 17 days.

Concerns and Limiting Factors

Dead Kentucky Warblers, presumably on migration, have been recovered from under communications towers, and large glass doors and windows. Also, excessive disturbance by humans at nest sites cause parent birds to desert eggs and, infrequently, nestlings. Human attention to nests is also likely to increase the probability of predation.

But these are not the key factors in the decline of Kentucky Warblers and other Neotropical migrant songbirds.

As with other species of high conservation priority in Iowa, such as Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Prothonotary Warbler, Worm-eating Warbler, and Hooded Warbler, the Kentucky Warbler is seriously impacted by the loss, fragmentation and degradation of its essential woodland habitat where breeding occurs.

Protecting, restoring and otherwise managing these essential habitats should always be the first and primary concern and

limiting factor that is considered by owners and managers of IBAs as well as non-IBA woodlands that these important species depend upon.

Research priorities for management of the breeding grounds should include assessments of minimum area requirements, and quantification of specific habitat requirements, especially of nest sites, as related to breeding success. In addition, research is needed to determine minimum viable population sizes and the impacts of woodland fragmentation (including its effect on predation and cowbird parasitism).

Habitat Management Recommendations

Forest management practices that encourage a dense understory and well-developed ground cover should enhance woodland stands for this species. Because Kentucky Warblers are tolerant of openings in canopy, harvesting techniques such as group selection, small or narrow clear-cuts, thinning of "over mature" trees, and selection-cutting may be acceptable practices. Light timber stand improvement should also be acceptable to Kentucky Warblers. Although this species was thought to benefit from selective logging, numbers actually declined after such practices in a neighboring Midwestern state. Clear-cutting temporarily eliminates habitat for Kentucky Warbler, but regenerating woodlands might possibly be reoccupied after a 6 to 7 year wait.

Sustaining viable populations of Kentucky Warblers in Iowa will require maintaining large woodlands where this species is found, which may serve as source populations for new breeders. Large contiguous woodland areas will produce the highest densities of breeding individuals, and will increase reproductive success by decreasing cowbird parasitism and nest predation by other species. If new breeders disperse from source populations to less suitable smaller sites, they may help maintain regional populations.

The same recommendations holds true for Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Worm-eating Warbler, and Hooded Warbler. Each of these is a species of high conservation priority for the IBA Program in Iowa, and the biggest need of each is habitat for nesting and feeding.

For general information about habitat management for Kentucky Warbler, as well as for the other declining species listed above, see the sections on Woodland Management for Birds and Recommended Woodland Management Practices - both found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Hooded Warbler

Wilsonia citrina

Introduction

The Hooded Warbler is a small Neotropical migrant songbird that is common across the southeastern U.S. but rare throughout the Midwest, and extremely rare in Iowa.

It is considered a forest-interior species because it is restricted to larger woodlots. Males have individually distinctive songs and are known to associate the song of each neighboring male with its usual location, a form of individual recognition. And long-term memory enables males to remember their individual neighbor's songs, from year to year, and this presumably reduces the amount of territorial defense that otherwise would be needed. The song is a piercing whistle, and the loudest song of the wood warblers.

A key feature of this species' social behavior is extra-pair matings. DNA fingerprinting studies have revealed that about one-third of the females produce offspring fathered by a neighboring male. Such a mating system is typical of most long-distance migratory passerines (perching birds) and may have implications for habitat selection if individuals avoid small woodlots where there are few opportunities for extra-pair matings.

Adult male Hooded Warblers have a distinctive plumage, most notably a conspicuous black hood contrasting with yellow cheeks and forehead. Females vary greatly in the extent of their black hood, and early reports were mistaken in identifying dark females as sub-adult males. Adults retain their plumage coloration year-round, and there is no noted geographic variation in appearance.

LINK TO IOWA IBA: HOODED WARBLER

Habitat Preferences

Hooded Warblers are found in moist leafy woodlands where they usually stay low in the shadowy understory, foraging actively in bushes and nesting close to the ground. But males move up into trees to sing and defend the territory.

Breeding takes place in the interiors of mixed hardwood woodlands. Territories usually include small clearings where a shrub understory is available for nesting. Deciduous forests that are occupied are usually dominated by maple, beech, or oak.

This species typically inhabits mature forests where trees are large enough to create significant gaps after trees blow down or topple. It commonly invades selectively logged deciduous forests 1 to 5 years after harvesting, and remains as long as there are suitable understory shrubs for nesting. In some cases, local populations have declined dramatically as shrub layers disappeared.

Feeding Habits

Foraging is mainly accomplished by hopping on the ground, on low branches, or on tree trunks. This warbler gleans insects from leaf surfaces and bark, and short flights are also made to capture flying insects in the understory.

The primary food items are a wide variety of insects and other small arthropods. These include: caterpillars, moths, grasshoppers, beetles, flies, and many others; and also many small spiders.

Breeding Biology

Hooded Warblers arrive in Iowa during the second half of April, with the male preceding the female by a few days and usually returning to occupy the same breeding territory as in previous years. However, females usually move to a different territory.

Females choose the nest site in patches of deciduous shrubs, and often place nests in a shrub at the forest edge. The female usually does most or all of the nest construction, taking 1 to 4 days. The nest is most often only 1 to 4 feet above ground.

Usually 4 eggs are laid. Incubation takes 12 days, and usually is by the female only. Brown-headed Cowbirds may parasitize up to 75% of nests in some areas, causing serious losses of reproductive potential. The young are fed by both parents, and leave the nest 8 to 9 days after hatching. The young can fly 2 to 3 days later. Hooded Warbler fledglings are divided by the parents, with each parent caring for half of the brood for up to 5 weeks. Two broods are often produced in the same nesting season.

Concerns and Limiting Factors

Hooded Warblers are “area-sensitive,” meaning that they are generally found only in larger tracts of mature forest on breeding grounds. Like many other area-sensitive woodland songbirds, this species is threatened on breeding grounds primarily by habitat fragmentation, which reduces availability of nesting habitat, and may have additional negative effects by increasing parasitism by Brown-headed Cowbirds, and predation rates.

Females sometimes abandon a nest site if disturbed while building, but do not abandon the site once eggs are laid. Video cameras reveal that nesting activities usually resume within 10 minutes of disturbances.

Future research should try to integrate previous studies of behavior and ecology with the conservation of this warbler, particularly habitat management to restore and enhance populations where numbers have declined.

Like other woodland dependent, high conservation priority species in Iowa, such as Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Prothonotary, Worm-eating Warbler, and Kentucky Warbler, the Hooded Warbler is seriously impacted by the loss, fragmentation and degradation of the woodlands where annual breeding must take place.

Alteration of the habitat that is essential to Hooded Warblers should always be the first and primary concern that is considered by owners and managers of IBAs as well as non-IBA woodlands that these important species depend upon.

Habitat Management Recommendations

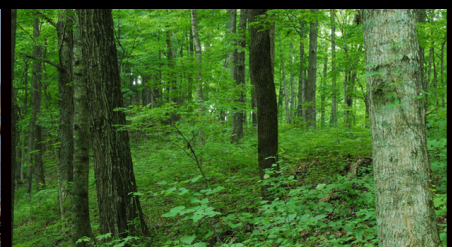
Ironically, for localized populations in fragmented forests, selective logging can be beneficial to Hooded Warblers in that it can help maintain the shrub layer for nesting. Systematic removal of adult cowbirds from a local population can reduce cowbird parasitism rates dramatically, but due to nest predation, population productivity is not usually increased substantially by this practice.

In past years, and because of its rarity and dependence on large woodland tracts, the Hooded Warbler was considered to be one of Iowa's highest priority species. Sustaining Hooded Warbler populations in Iowa today will require maintenance of large woodland stands and complexes where this species is found. These will serve as source populations for new breeders. New breeders can then disperse from source populations to less suitable and smaller sites and help maintain regional populations.

The same general prescription holds true for other woodland dependent species such as Broad-winged Hawk, Black-billed Cuckoo, Chuck-will's-widow, Pileated Woodpecker, Veery, Wood Thrush, Cerulean Warbler, Prothonotary Warbler, Worm-eating Warbler, and Kentucky Warbler. Each of these is a species of high conservation priority for the IBA Program in Iowa, and for each, quality habitat for nesting and feeding is the greatest need.

Species on this list of fairly resilient birds appear to respond favorably where Iowans protect and maintain large blocks of woodland, and where those essential habitats receive appropriate woodland management.

For general information about habitat management for the Hooded Warbler, as well as for the other declining species listed above, see the sections on Woodland Management for Birds and Recommended Woodland Management Practices – both are found in Part 3.


STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Yellow-breasted Chat

Icteria virens

Introduction

The Yellow-breasted Chat is a Neotropical migrant, and the largest wood-warbler. Their presence in Iowa during the breeding season is often announced by a bizarre series of hoots, whistles, and clucks coming from a tangle of briars and thick vegetation. Often difficult to see, during courtship this species may sometimes launch into the air to sing its odd song in an equally odd flight above the habitat it prefers.

The chat population appears to have undergone a major decline since settlement of the state and the near continuous detrimental changes to native vegetation and natural landscapes. Although Yellow-breasted Chats have a broad geographical range across nearly all of the lower 48-sates, there are few detailed studies of its biology.

Although its geographic range is broad, this bird is frequently overlooked and seldom seen. Contributing to this elusiveness is the structure of its brushy habitat. The most important factor, however, is its skulking, secretive nature. Nonetheless, the chat's extensive vocal repertoire – makes the male's presence easy to document early in the breeding season. Late in the breeding season, during migration, and on the wintering grounds, the non-singing birds are difficult to detect.

Breeding populations in the eastern U.S. probably increased following extensive logging and fragmentation of forests during the late nineteenth and early twentieth centuries and abandonment of marginal cropland in the middle third of the twentieth century. But at this time the Yellow-breasted Chat is a species of high conservation priority in the Iowa IBA Program, and unless corrective conservation actions are taken there is a possibility that it could at some point slide into a category of being threatened or an endangered.

LINK TO IOWA IBA: YELLOW-BREASTED CHAT

Habitat Preferences

Over its extensive range, the Yellow-breasted Chat is found in low, dense vegetation without a closed tree canopy, including shrubby habitat along streams, swamps, and pond margins; forest edges, regenerated logged over areas; and fencerows and upland thickets of recently abandoned farmland.

It prefers brushy tangles, briers, thickets and other habitats that are often described as being impenetrable and unattractive.

Feeding Habits

The Yellow-breasted Chat forages by searching among foliage in the dense low tangled habitats that it prefers, or by perching to eat berries. Unlike any other warbler, this species will hold its food with one foot while it feeds. It forages alone during migration and winter, rather than joining feeding flocks.

Foods taken include a wide variety of insects such as moths, beetles, ants, bees, wasps, mayflies, grasshoppers, katydids, caterpillars, praying mantises, and spiders. Berries make up more than half of the diet, especially during fall; and the berries are from wild fruit such as blackberries, elderberries, wild grapes and others.

Breeding Biology

The male Yellow-breasted Chat usually arrives in Iowa in early to mid-May and immediately establishes a territory and begins to sing. The female arrives approximately one week later.

During courtship the male displays to the female by pointing its bill upward and swaying from side to side. Flight song displays find the male flying upward singing, hovering, and dropping slowly with wings flapping over its back and legs dangling loosely before it returns to a perch.

Well-concealed nests are constructed in dense vegetation by the female, located anywhere from 1 to 8 feet above the ground. This species occasionally will nest in loose colonies.

From 3 to 4 eggs are usually laid, but up to 6 eggs are possible. Incubation is by the female only, and lasts 11 days. Nests are commonly parasitized by Brown-headed Cowbirds, which reduce annual productivity considerably. The young are fed by both parents, and leave the nest about 8 days after hatching. Two broods are normally raised each breeding season.

Concerns and Limiting Factors

Several studies have indicated that some Yellow-breasted Chats are killed during both spring and autumn nocturnal migrations as a result of collisions with man-made objects such as communication towers, tall buildings where lights are left on all night, and the abundant windows which dominate many urban areas.

Although this species tolerates open grassy areas, any activity such as grazing that leads to disappearance of dense shrubby areas, will be detrimental. Some researchers suggest that heavy grazing will lead to a decline in chat populations.

Local breeding populations decline if secondary succession is not controlled before the canopy closes in regenerating wooded areas. In addition, this species is prone to desert eggs and nestlings after even slight disturbances around its nest.

For management purposes, further data on the relationship between breeding habitat–patch size and population density, and on the effect of patch size on nest depredation rates and rates of Brown-headed Cowbird brood parasitism, would be useful. Data on the overall effect of cowbirds on reproductive success would also aid habitat management.

Habitat Management Recommendations

Yellow-breasted Chats are adapted to exploiting patchy, short-lived shrubby and tangled habitats. In Iowa, agricultural set-aside programs that allow succession to occur over several years will create habitat for this species. The characteristics of high turnover of breeding individuals in natural populations, and rapid replacement of experimentally removed birds tell wildlife managers that creatively developing and maintaining suitable habitat can pay significant dividends.

Wherever marginal cropland is abandoned, the species will benefit from early woody stem growth until canopy closure takes place. If trees are regularly removed from power-line corridors, suitable habitat can be maintained indefinitely. The species' ability to colonize new habitat allows managers to create favorable habitat conditions following commercial harvesting of timber in Iowa and across the Midwest.

In an experiment comparing numbers in relation to 4 timber-harvesting techniques (clear-cut, shelterwood, group selection, and single-tree selection) in Missouri, numbers of chats were highest in clear-cuts. In other states higher breeding densities occurred 4 to 5 years after clear-cutting.

Despite these insights, there is little evidence of intentional management specifically to benefit this species. But this chat continues to benefit from certain unintentional land use changes such as clear-cuts and power-line clearing.

As more attention is given to IBA Criteria Species, and more and better management practices are planned and implemented across our state, the Yellow-breasted Chat will hopefully be able to sustain its population, and perhaps expand into areas where it has not been able to exist in the past.

Managing habitat for Yellow-breasted Chat is also likely to also benefit Loggerhead Shrikes, White-eyed Vireo, and Bell's Vireo – each with the same species of high conservation priority status – in Iowa. Consequently, special attention ought to be given to protecting and maintaining habitat for this entire suite of savanna/shrub species.

For general information about habitat management for the chat, see the sections on Woodland Management for Birds and Grassland Management for Birds. For more specific information, see Recommended Woodland Management Practices and Recommended Grassland Management Practices. Each of these sections is found in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Grasshopper Sparrow

Ammodramus savannarum

Introduction

A small, inconspicuous grassland bird, the Grasshopper Sparrow is named for its insect-like buzzy song, and due to its elusive habits and ability to hide in grasses, it is easily overlooked, even in its preferred habitat. Interestingly, this is one of the few North American sparrows that will sing two completely different songs.

In the breeding season this flat-headed, short-tailed sparrow is often found in the same habitats as the Savannah Sparrow, but generally selects more open sites with greater amounts of bare ground. This is probably because it forages exclusively on the ground.

Grasshopper Sparrows are distributed all across Iowa, and because of long-term population declines, it is listed as a species of high conservation priority by the Iowa IBA Program, and is the only sparrow so listed.

Although the Grasshopper Sparrow appears to have a wide distribution across much of temperate North America, it is often locally distributed and even uncommon to rare throughout parts of its range. Many populations in the U.S. have experienced long-term declines since the early part of the 20th century, owing mostly to loss and conversion of prairies and grasslands to row-crops and other land uses that are incompatible with populations of wild birds.

LINK TO IOWA IBA: GRASSHOPPER SPARROW

Habitat Preferences

Grasshopper Sparrows generally occupy intermediate grassland habitat, preferring drier, sparser sites in lush tallgrass prairies and eastern grasslands, and thicker, brushier sites in shortgrass prairies in more western grasslands.

In Iowa, it tends to prefer moderately open grasslands and pastures with patchy bare ground; and selects different components of vegetation, depending on the type of grassland or pasture. This species tends to avoid areas with extensive shrub cover.

Henslow's Sparrow (a threatened species on the Iowa IBA list), and the Bobolink (a species of high conservation priority on the Iowa IBA list) usually occupy sites with thicker vegetation and more litter than Grasshopper Sparrows.

Feeding Habits

Foraging is done while hopping or running on the ground, picking up items from the soil or from plant stems; and unlike some sparrows, this species almost always forages individually.

The diet of Grasshopper Sparrows consists mostly of insects and seeds. During the summer breeding season it mostly feeds on insects, including many grasshoppers, but also beetles, caterpillars, ants, true bugs, and many others. This species also feeds on spiders, snails, centipedes and earthworms.

Seeds are also an important component of the diet, and probably more so in fall and winter, and includes weeds and grasses as well as waste grains.

Breeding Biology

Most Grasshopper Sparrows return to Iowa from wintering areas in the southern and southeastern portions of the U.S. by early May. And a fair amount of site fidelity has been noted. Iowa data from a few decades ago indicates that nesting takes place in pastures, fallow fields, grassed waterways, and grasslands, alfalfa field and clover fields when the cover is low in height.

Male Grasshopper Sparrows sing from a low perch, and sometimes sing at night, to defend their territory. In courtship, males sometimes sing in flight. This species may nest in small colonies, and numbers in a given area often change dramatically from one year to the next.

Nests are probably built by the female, and are well hidden at the base of weeds, small shrubs, or clumps of grass, and are often placed in a slight depression. The eggs are usually 4 to 5 in number, but may range from 3 to 6. Incubation is by the female only, and lasts for about 11 to 12 days. Both parents feed the nestlings, and the young leave the nest at about 9 days of age.

In general, the breeding season is protracted; and depending on favorable weather, this species can produce 2 or more broods annually.

Concerns and Limiting Factors

Habitat loss, fragmentation, and degradation are the primary reasons for Grasshopper Sparrow declines across the U.S. and in Iowa. The reason is quite simple: since the beginning of the twentieth century, more than 99% of native prairie has been converted to intensive agriculture.

Most research on Grasshopper Sparrows is conducted during the breeding season and suggests that reproductive success is low and that populations are not self-sustaining. Meaningful conservation requires better information about populations that function as sources versus sinks; and understanding the underlying reasons for differences in reproductive success is critical to effective habitat management in the future.

Habitat Management Recommendations

Three primary management techniques have been used and are recommended for this species: prescribed burning, grazing, and mowing. Each has different impacts depending on the type of grassland ecosystem it is used in. In Iowa's agricultural areas, roadsides and grassed waterways provide breeding habitat for Grasshopper Sparrows and numerous other grassland birds, although reproductive success in these landscapes is generally low.

Early-season mowing of hayfields and other agricultural lands is generally responsible for major nest failure of grassland birds, including Grasshopper Sparrows. In general, contemporary farming practices mean cutting hayfields more frequently, and the first cuttings occur 1 to 3 weeks earlier in spring than they did 50 years ago. These practices have had significant negative impacts on the nesting success of many, if not all, grassland birds. Deferred mowing on publicly owned lands would provide improved breeding opportunities. In addition, incentives to encourage farmers to defer mowing should be developed.

In tallgrass prairie and eastern hayfields, light to moderate grazing is generally beneficial to Grasshopper Sparrow, whereas grazing on drier grasslands or shortgrass prairie is detrimental, even though intensive grazing has been an important disturbance factor for building and sustaining the shortgrass-prairie ecosystem.

Population declines of Grasshopper Sparrow and many other grassland birds have been recognized as a national, regional and state conservation priority.

The primary conservation strategies being used in Iowa are 1) establishment of larger grassland Bird Conservation Areas (BCAs) along with smaller IBAs; and, 2) following the recommended grassland management practices described in Part 3 of this writing. If widely implemented, such practices have potential to benefit Grasshopper Sparrows, which appear to be habitat-limited.

While CRP initiatives were not specifically intended to benefit this species, CRP has provided relatively large acreages of undisturbed grassland habitat, and Grasshopper Sparrows have colonized these fields. In other cases, four-to-six-year rotations of mowing, pasturing, and burning, when done correctly, may be beneficial.

For small acreages, one needs to understand and follow the sections on Grassland Management for Birds, and Recommended Grassland Management Practices, as provided in Part 3.



STATUS: HIGH CONSERVATION PRIORITY IN IOWA

Bobolink

Dolichonyx oryzivorus

Introduction

The Bobolink is a species that has long been familiar to many Iowa landowners, and it is one of the most distinctive birds of Iowa grasslands. During spring and summer the brightly colored male is easily recognized with overall black appearance, large patches of white on wings and down middle of back, and tawny yellow nape, or back of neck. Males are especially conspicuous during the nesting season as they perch high on plant stems and sing a long bubbly song during aerial displays – in helicopter-like flight – over the grassland. Females are duller colored and more secretive.

Bobolinks have one of the longest migration journeys of any Iowa songbird, wintering on grasslands in southern South America. One female known to be at least nine years old presumably made this trip annually, a total distance equal to traveling 4.5 times around the earth at the equator!

Bobolinks have been shot as agricultural pests in the southern United States, trapped and sold as pets in Argentina, and collected as food in Jamaica. The species is not as abundant as it was several decades ago, primarily because of changing land-use practices here where it reproduces, especially detrimental are the decline of meadows and hay fields. The combination of losses on the wintering grounds and destruction of many of the grasslands in Iowa has led to an overall decline in their numbers in Iowa.

LINK TO IOWA IBA: BOBOLINK

Habitat Preferences

The Bobolink is a species of the Tallgrass Prairie Ecosystem. It prefers habitat with moderate to tall vegetation, moderate to dense vegetation, and moderately deep litter without the presence of woody vegetation. Bobolinks originally nested in tall-grass or mixed-grass prairie. Most of this habitat came under intense agricultural pressure more than a century ago.

Presently in Iowa this species is found in old fields, pastures, wet meadows, and prairie. It seems to especially use old hayfields that are comprised of a mixture of grasses and broad-leaved forbs. Population density is significantly higher in fields with relatively low amounts of total vegetative cover, low alfalfa cover, and low total legume cover but with high litter cover and high grass-to-legume ratios relative to other nearby fields.

Bobolinks also breed in habitats similar to grass-sedge fields along river bottomland habitat, and sometimes in irrigated meadows.

Feeding Habits

In Iowa, during nesting, adult Bobolink feed on weed seeds, a variety of larval and adult insects, spiders, and harvestmen. The young are fed exclusively invertebrates. In migration this species feeds on wild and domesticated rice, oats, other small grains, weed seeds, and occasionally on insects.

Bobolinks forage on seeds at the tops of forbs interspersed within expanses of grasses or sedges. They glean insects and spiders from mid-growth and bases of forbs, grasses, and sedges. The preferred foraging height is 2 to 6 inches above ground. Occasionally foraging is for invertebrates in trees and shrubs adjacent to or within nesting sites. Providing grassland habitats for feeding is recommended.

Bobolinks feed primarily as they walk slowly on the ground or as they ascend into lower levels of vegetation. When foraging on seeds, they often perch near the top of vegetation to extract and ingest seeds. Foraging occurs throughout daylight hours. During the breeding season, they are solitary foragers. In post-fledging groups on nesting fields and during migration and winter, Bobolinks join intra-specific flocks, which have highly social feeding behavior.

Breeding Biology

In three well-studied populations, the majority of males that establish initial territories normally arrive suddenly on breeding grounds in early May, and depart slowly from July to early September. Older males generally precede yearlings by several days in spring. Females normally begin arriving 4 to 8 days after the initial group of territorial males. Earliest returning females also tend to be the oldest.

This species tends to return to areas where it has nested successfully before, and both sexes exhibit high breeding-site fidelity. Bobolinks are widespread and fairly evenly distributed in Iowa, and tend to occur wherever suitable grassland habitat is provided.

Females returning to the same breeding habitat often settle with a male within hours of returning, occasionally re-pairing with same male of a previous year. During early courtship phases, males devote complete courtship attention to the female. After a second day of courtship, and always by first day of the copulation period, males attempts to attract unpaired females. This species is polygynous with the males forming pair bonds with more than one female. Polygynous males often pair with second mates 3 to 8 days after initial pairing occurs. Pair formation within a population is highly synchronous, with most males that are successful in becoming

paired, attracting their first females within a few days.

Nest construction takes place in the second or third week of May and is completed in 1 to 2 days. Food abundance may influence timing of nesting events. One egg is laid each day, starting within 1 to 2 days of nest completion. There are usually 5 to 6 eggs laid, but the number may vary from 3 to 7. Incubation is by the female only. An average incubation period is approximately 12 days. Undisturbed young fledge 10 to 11 days after hatching.

The norm is one brood per season. Bobolink nests tend to be located in wet habitats, transitional between drier soils and areas providing poor drainage. Nests are always on the ground, and often at base of a large forb. Shading and temperature modulation at the nest appear to be important to nesting females.

Nest construction activity is often intensive. It is important to note that nests discovered early in construction are often immediately abandoned. For this reason, great care should be taken when walking through grasslands that support Bobolinks from mid to late-May, and perhaps later. Surveys for IBA purposes can usually be accomplished effectively from a distance, and this is partly because singing males are so obvious during this time of year.

After approximately 12 days of incubation and 4 days of brooding after hatching, brooding frequency declines markedly and temperature regulation probably commences about this time. Young have left the nest and running capability develops by 7 days after hatching.

Feeding begins within 1 hour after first nestling hatches; and continues until fledglings become independent. Nestlings are fed exclusively invertebrates. Brood parasitism by Brown-headed Cowbirds is known to occur, but is evidently not frequent.

Undisturbed Bobolink young leave the nest on day 10 or 11. They move as much as 200 feet the first day out of nest, thus the size of overall grassland habitats is important. Adults divide labor of feeding, each parent concentrating on specific fledglings.

Until flight capability is developed at approximately 13 days of age, birds generally remain in thick vegetation, relying on cryptic coloration for concealment. By 16 days of age, the young are capable of sustained flights of over 500 feet. Within flocks, adults continue feeding their own young, for at least 28 days after birds leave the nest. Flocks leave breeding vicinities soon after immatures gain independence.

Concerns and Limiting Factors

Breeding Bird Survey data for 1966-2004 show a significant decreasing trend of –1.7%/year over the Bobolink's range and –4.1%/year within Iowa during that same period. In the Midwest, the primary reason for this population decline is habitat loss.

Bobolinks appear to be area specific, preferring large grassland areas over smaller habitats. One researcher reported that the minimum area on which Bobolinks were found was 25 to 75 acres in prairie fragments, and Bobolink abundance in these fragments was positively related to the size of the area.

Research has shown that Bobolinks prefer hayfields with high grass-to-forb ratios and avoid hayfields with high legume-to-grass ratios. A serious downside for Bobolinks nesting in hayfields is that mowing accounted for significant nest losses.

The presence of woody vegetation within and along the edge of grasslands can have a negative impact on Bobolinks. Nest depredation and Brown-headed Cowbird brood parasitism increase near woody edges, and nest depredation rates were

lower in larger (325-1215 acre) grasslands, than on smaller (40-80 acre) grasslands.

Lower rates of nest depredation on Bobolink nests occurred in areas burned within the last three years, where woody vegetation and deep litter were reduced by fire. Nest productivity was highest and the probability of encountering Bobolinks was also highest one year after burning.

Habitat Management Recommendations

The combination of destruction, fragmentation, and degradation of grassland nesting habitats in the state has led to an overall decline in Bobolink numbers over several decades of time.

The keys to Bobolink management are providing large areas of suitable habitat (native and tame grasslands of moderate height and density, with high grass to forb ratios and adequate litter), controlling succession, and protecting nesting habitat from disturbance during the breeding season. Avoid disturbing (e.g., haying, burning, moderately or heavily grazing) nesting habitat during the breeding season, early May to early August. Treatments can be done in early spring, several weeks prior to the arrival of adults on the breeding grounds in early May, or in the fall after the breeding season.

It is also recommended that habitat be managed in patches larger than 25 to 75 acres, and woody edges are minimized whenever possible to decrease Brown-headed Cowbird brood parasitism.

When managing prairie or old fields for Bobolinks, a rotating treatment schedule on several adjacent grassland fragments should be used to make a variety of successional stages available. Burn within areas that are at least 200 acres in total size. A rotational burning system with subunits of at least 75 acres in size, or about 20 to 30% of the total area, can be treated each year. In small, isolated grassland fragments, burning less than 50 to 60% of the total area at a time is recommended. Mow or burn patches every two to three years to prevent excessive encroachment of woody vegetation.

To create Bobolink nesting habitat where grazing occurs, grazing should be at moderate levels to provide diverse grass heights and densities in areas where the average height of vegetation is 6 to 12 inches. Also, graze using a rotational system of two or more grazing units. This will increase the variation in grass heights and densities within and between units. To maintain plant vigor, do not graze warm-season grasses in tallgrass prairie to a height of less than 10 inches during the growing season.

Nest disturbances during early stages of incubation present serious problems for this species. Females may abandon nests during early incubation if nest is visited; but rarely abandons nest after day 3 of incubation.

The primary disturbance to nesting sites is hay-cropping. In one study, 100% of nests with eggs or young nestlings affected by mowing were abandoned or destroyed. However, the proportion of young that were lost declined with increasing age of nestlings.

Fields should be mowed annually to maintain breeding habitat, but mowing should be delayed until at least late July or early August in order to minimize negative impacts on fledglings. Later mowing would be better, especially when re-nesting attempts are being made.

For general information about habitat management for Bobolink, see the sections on Grassland Management for Birds. For more specific details see Recommended Grassland Management Practices. Each of these sections is found in Part 3.