



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.

Section I: 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

interspersed 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 least 100 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 one's 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 than 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.