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## Iowa's Avifauna: Changes in the Past and Prospects for the Future

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# Iowa's Avifauna: Changes in the Past and Prospects for the Future<sup>1,2</sup>

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Since the time of settlement, at least 17 species (9%) of birds have disappeared as nesters in Iowa. Nine species were lost before 1900, another two before 1950, and six since 1950. Five species have been successfully introduced into Iowa, and four of these now are abundant in the state. A number of other species have benefited from human development and have increased in numbers since settlement. An additional 29 species have populations that seem endangered or threatened and may disappear before the end of this century.

INDEX DESCRIPTORS: birds, endangered species, habitat changes, introduced species.

The birds are perhaps the most conspicuous of all vertebrates, and a few species probably are familiar to nearly all Iowans. As early as the late 1800's scientists were studying Iowa's avifauna, and at least one (Bartsch 1895) pointed out that some species had disappeared or were in danger of disappearing from the state. The first thorough summary of Iowa's avifauna (Anderson 1907) listed 354 forms, which is reduced to 329 species when subspecies are combined. DuMont (1933a) relegated some species claimed by Anderson to hypothetical status, and when these and subspecies are removed, DuMont's list of 364 is reduced to 327 species. Brown (1971) said the state list totaled 369 species, 7 of which were of hypothetical occurrence. The most recent list by the Iowa Ornithologists' Union (Brown et al. 1977) has 378 species, and 2 have been added to the list since then. Thus, the state list of birds has gradually grown, and indeed, about one species per year has been added since 1950. The entire list, current through 1980, is listed in the Appendix. Of these 380, 193 (51%) have been recorded nesting in Iowa at least once (Table 1). The rest are known only as migrants or occasional visitors (to be expected to occur less than yearly) to Iowa. Of the nesting species, most nest regularly in the state, but 27 have nested here only occasionally (less than yearly) and 17 evidently no longer nest in Iowa.

This increase in the state list points out the increased interest in birds in recent years. Also, as a group, birds are very mobile, and sightings of species far out of their normal range no longer are considered unusual. Although the number of species reported from Iowa continues to grow, the Iowa breeding populations of some species have declined. In

1977, the seriousness of these declines was recognized, and eight endangered and seven threatened species were given special protection in Iowa (Roosa 1977).

This paper will consider only those species that have been recorded nesting in Iowa. It will attempt to identify what species no longer nest in the state, when they disappeared, and why they disappeared. It will also identify species that have been introduced to Iowa or that have increased in numbers since the time of settlement. Finally, it will attempt to identify species that currently seem to be undergoing long-term declines in numbers and possible reasons for these declines. Information has been gathered from a number of sources, especially from Anderson (1907), DuMont (1933a), and Brown (1971) and from past issues of *Iowa Bird Life*, the publication of the Iowa Ornithologists' Union. In some instances, it has not been feasible to cite all the references pertaining to a specific species, but most major summaries of information are cited.

## EXTIRPATED NESTERS

Since the time of settlement, 17 species of birds have disappeared as nesters in Iowa (Table 2). I will discuss these losses in their approximate chronological order.

Table 2. Chronological listing of extirpated nesting birds of Iowa with date of last reported nesting.

Table 1. Summary of avifauna of Iowa through 1980.

|                                  |     |     |
|----------------------------------|-----|-----|
| Nesting in the state             |     | 193 |
| Regular nesters                  | 149 |     |
| Occasional nesters               | 27  |     |
| Extirpated nesters               | 17  |     |
| Migrants only                    |     | 96  |
| Occasional or accidental species |     | 91  |
| Total species reported in Iowa   |     | 380 |

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|                          |             |
|--------------------------|-------------|
| Carolina Parakeet        | Before 1870 |
| Swallow-tailed Kite      | ca. 1877    |
| Passenger Pigeon         | 1879        |
| Trumpeter Swan           | 1883        |
| Marbled Godwit           | 1880's      |
| Long-billed Curlew       | 1880's      |
| Common Loon              | 1893        |
| Sandhill Crane           | 1894        |
| Whooping Crane           | 1894        |
| Merlin                   | 1908        |
| Sharp-tailed Grouse      | Before 1934 |
| Greater Prairie Chicken  | 1952        |
| Short-eared Owl          | 1964        |
| Double-crested Cormorant | 1966        |
| Peregrine Falcon         | 1967        |
| Piping Plover            | 1973        |
| Least Tern               | 1973        |

*Before 1900*

At the time of settlement, Iowa was largely a prairie state. Woodlands covered parts of eastern and southern Iowa and also followed the major river valleys. The glaciated north-central and northwestern portions of the state had many small wetlands. With settlement, trees were cut, marshes drained, and the soil was tilled. By 1850 or 1860, some bird species already had declined in numbers. Iowa's first loss probably was the Carolina Parakeet, which seemingly had disappeared by 1870 (McKinley 1965). The early records are unclear on whether this species actually nested in Iowa, but since they did nest in Nebraska just south of the Iowa border, they probably also nested in Iowa. In the 1870's, 2 more species disappeared. The Swallow-tailed Kite formerly nested locally but probably in small numbers along some of the major river valleys in Iowa (Bailey 1918). The Passenger Pigeon was a common migrant in Iowa and nested sparingly, especially in the northeastern quarter of the state. The last nest reported in Iowa was near Charles City in 1879 (DuMont 1933a), although some may have nested in Allamakee County into the 1890's (Orr 1936). By the early 1900's, the species was extinct.

In the 1880's, 3 more species, all found in the glaciated prairie and pothole region of north-central and northwestern Iowa disappeared. The Trumpeter Swan formerly bred sparingly in northern Iowa, the last nest reported being in Hancock County in 1883 (Anderson 1907). Little has been recorded on the status of the Long-billed Curlew and the Marbled Godwit other than that they nested in the prairie region of north-central and northwestern Iowa and disappeared soon after these areas were settled. Finally, in the 1890's, 3 more species were last reported nesting in the state. The Common Loon, which formerly nested in northern Iowa, was last seen nesting in 1893 at Rice Lake in Wiinebago County. The last nesting records for both the Sandhill and Whooping Crane were from Hancock County in 1894. A Whooping Crane nest found near Eagle Lake was the last reported for this species in Iowa. Nesting grounds were rediscovered in Canada in the 1950's.

In all, 9 nesting species had disappeared from Iowa by 1900. In general, those species extirpated before 1900 were 1 of 3 general types (Table 3). The one raptor species probably never had a very large breeding population in the state. Two (Passenger Pigeon and Trumpeter Swan) were game species, and the Carolina Parakeet commonly was shot because it was considered a pest. The other 5 (Common Loon, Marbled Godwit, Long-billed Curlew, and both cranes) were wetland species that required large blocks of habitat. The last 4 also were hunted for food. Species that disappeared before 1900 had a range somewhat peripheral to Iowa (Common Loon, Carolina Parakeet, Swallow-tailed Kite, Marbled Godwit, Long-billed Curlew) or were intolerant of human disturbance (Common Loon, Trumpeter Swan, both cranes). This combination of characteristics made these species very prone to population declines, and they disappeared early in the settlement of Iowa.

*1900-1950*

During this 50-year period, farming in Iowa gradually shifted to more reliance on a few crops, especially row crops. In the early decades of the century, pastures were abundant, but gradually the acreage in pastureland declined. In these 50 years, 4 species disappeared as nesters in Iowa, although two have since been reintroduced. One raptor, the Merlin, probably never was abundant in Iowa and was last reported nesting near Marion, Linn County, in 1908 (Bailey 1918). Three game species also disappeared. Both the Wild Turkey and the Canada Goose disappeared by about 1910, only to be reintroduced in the 1960's (Little 1976, Bishop 1978). With the settlement of the prairie states, the range of the Greater Prairie Chicken evidently expanded westward, and the eastern extent of the range of the Sharp-tailed Grouse retracted to the west. Iowa had populations of both of these prairie grouse, but the Sharp-tail gradually declined in numbers until it

Table 3. *Time of extirpation of nesting birds of Iowa.*

| Group                     | Before 1900    | 1900-1950      | After 1950 | Total |
|---------------------------|----------------|----------------|------------|-------|
| Raptors                   | 1              | 1              | 2          | 4     |
| Birds that<br>were hunted | 3              | 1 <sup>1</sup> | 1          | 5     |
| Aquatic birds             | 5 <sup>2</sup> | 0              | 3          | 8     |
|                           | 9              | 2              | 6          | 17    |

<sup>1</sup>Does not include Wild Turkey and Canada Goose, both of which were extirpated about 1910 and were successfully reintroduced in the 1960's.

<sup>2</sup>Includes Sandhill Crane, Whooping Crane, Marbled Godwit, and Long-billed Curlew, all of which were also hunted.

disappeared from northeastern Iowa around 1934. Thus, the rate of loss during these 50 years was low, but Iowa still lost several species.

*1950-present*

During the past 30 years, farming in Iowa has been increasingly intensive. In addition, cities have grown, and there has been greater demand for recreational use of Iowa's remaining natural areas. With these changes, nearly all the remaining privately owned marshes in the state have been drained, and nearly one third of the forest land was lost (Thomson 1980). Hedgerows and fencerows have been removed, and pastureland has been converted to other uses. Various chemicals used to increase crop production have had a variety of side effects on wildlife. Rivers have been channelized, resulting in shorter streams that lack sandbars, islands, and backwater areas. These changes in Iowa, and especially the loss of habitat, have had a profound effect on populations of some bird species.

Since 1950, 6 species have disappeared as nesting species in Iowa. The first loss was the Greater Prairie Chicken. Originally found throughout the state, prairie chickens found the mixture of small-grain fields, pasture, and prairie present during the early settlement of Iowa ideal habitat and thrived in the state. Their numbers probably peaked around 1880 and then gradually declined until the last nesting was reported in Appanoose County in 1952 (Stempel and Rodgers 1961). Since then, only a few stragglers have been seen in Iowa. Although hunting probably was a factor early in their decline, the last hunting season was 1915, and after that, habitat loss was the major factor in their decline.

After the loss of prairie chickens, a series of species disappeared during the 1960s. The Short-eared Owl, another grassland species, was last reported nesting near Dysart, Benton County, in 1964. The last nest of the Double-crested Cormorant was one at Coralville Reservoir in 1966, although a small colony near Sabula on the Illinois side of the Mississippi River still is active. Probably never abundant in Iowa, Peregrine Falcons formerly nested on bluffs along the Mississippi River (Berger and Mueller 1969). They last nested in northeastern Iowa in 1967. The effects of pesticides on peregrines and the loss of this species throughout the eastern United States have been well documented (Hickey 1969).

Finally, the Piping Plover and the Least Tern, both species that nested on sandbars along the Missouri River, were last reported nesting in Iowa at DeSoto National Wildlife Refuge in Harrison County in 1973. Channelization of the Missouri River destroyed the sandbars upon which both these species nested.

As before, the species that disappeared were either raptors, game

birds, or aquatic birds (Table 3). Only 2 of the species that disappeared (Greater Prairie Chicken and Short-eared Owl) could have been considered widespread nesters in the state. The increased pace of extirpation since 1950 (2/decade) approximates that found before 1900 and is much greater than that occurring from 1900-1950 (0.8/decade). This rate is conservative, because several other species (e.g., Marsh Hawk, Eared Grebe, Sharp-shinned Hawk) may also be extirpated as nesters but are not listed because their true status has not been determined (it is much easier to say that a species is still present than to say that it is not present). These last 3 species certainly have been reduced to the point that they no longer are a major part of Iowa's avifauna.

Thus, since the time of settlement, at least 17 species have disappeared as nesters in Iowa, and this number may actually be larger. One interesting point is that there are no songbirds (passerines) among those 17. This is surprising because songbirds comprise 50% of the nesting bird species of Iowa.

### ADDITIONS TO IOWA'S AVIFAUNA

#### Introductions

In addition to losses in the avifauna, several species have been successfully introduced or reintroduced into Iowa.

*Native species*—Two game species native to Iowa have been successfully reintroduced. Canada Geese formerly nested in much of northern Iowa but had disappeared by about 1910. In 1966, a captive breeding flock was established near Estherville and, by 1977, free-flying flocks had been established successfully near Spirit Lake, Estherville, Ruthven, and Lake Mills (Bishop 1978). Similarly, the Wild Turkey, which originally was found across much of eastern and southern Iowa, had disappeared by about 1910. After several unsuccessful stocking attempts, turkeys were successfully introduced in Yellow River Forest in northeastern Iowa in 1960 and in Shimek State Forest and Stephens State Forest in southern Iowa in 1966 and 1968, respectively (Little 1976). Currently, turkeys are found over much of their original range in Iowa. A third native species, the Greater Prairie Chicken, which disappeared in the 1950's (Stempel and Rodgers 1961), was reintroduced in Monona County in February 1980; but as of this writing, it is too early to evaluate the success of this stocking.

*Exotic species*—Two game species not native to Iowa have been successfully introduced. The Ring-necked Pheasant was introduced about 1901 when some escaped from a game farm near Cedar Falls (Farris et al. 1977). Numerous other releases have been made, and the species is established throughout Iowa. Gray Partridge were released in Osceola County in 1913 (Spiker 1929) and now are established throughout much of northern Iowa. Other exotic game species such as the Reeve's Pheasant (*Symaticus reevesii*) and the Chukar (*Alectoris graeca*) have been stocked in Iowa, but these releases have not been successful.

Three other exotic species occur widely in Iowa, and 2 more have been seen here. The House Sparrow reached Iowa about 1869 and spread rapidly; by 1886 it was found over much of eastern and southern Iowa (Barrows 1889). By 1900, it was found throughout the state. The Rock Dove also occurs throughout the state, although there seems to be no good documentation of its arrival or spread. Starlings first appeared in Decatur County in 1922 and by 1936 had been reported in all 99 counties (DuMont 1945). Mute Swans have been reported several times in recent years, and a Monk Parakeet (*Myiopsetta monachus*) was seen at Davenport in 1973 (Petersen 1974).

Four of these exotic species have become very abundant in Iowa. In Table 4 are listed the 20 bird species having the highest average number of individuals recorded per survey route for 329 U.S. Fish and Wildlife Service Breeding Bird Survey routes run in Iowa from 1968-1978. These surveys have some biases in that those species seen along roads

or edge habitat and those detectable at great distances tend to be overrepresented. Thus, there is danger in comparing between species. Because no other data are available for the breeding season, I use them here to point out that 4 exotic species are among the most commonly reported species on these routes, including 2 of the 3 most commonly reported species. These probably are close to the true picture for bird populations in Iowa. Thus, besides the 2 native species that have been successfully reintroduced, 5 other non-native species are now well established in Iowa, and 4 of them are quite abundant. Undoubtedly, these 5 occupied the habitat of some native species and have replaced them to some extent.

#### Population increases

Not all changes in Iowa bird populations have involved decreases. Some species such as the Cardinal undoubtedly have increased since the early 1900's. Although no comparative population data are available for Iowa, transect survey data from Illinois comparing numbers seen in 1906-1909 with similar counts made in 1956-1958 (Graber and Graber 1963) probably show trends similar to those found in Iowa. The Grabers found that species such as the Horned Lark, Dickcissel, Red-winged Blackbird, and Barn Swallow, all common species now (Table 4), have increased in that 50-year interval. The Horned Lark has tripled its population in Illinois. All 4 of these species are among the 20 species listed in Table 4, and it seems reasonable to assume that they and others have increased in Iowa too. Other species such as the Cattle Egret have been reported with increasing frequency in recent years but, as yet, have not nested in Iowa (Dinsmore 1978).

### FUTURE TRENDS

In addition to species that have disappeared as nesters, at least 29 species have declined in numbers to the point that their future as breeding species in Iowa may be in jeopardy (Table 5). These 29 include 12 species that Roosa (1977) listed as endangered or threatened in Iowa, 20 that are included on the National Audubon Society's Blue List of birds that potentially are in trouble (Arbib 1979), and others that I personally believe may be in some trouble. This list is subjective to the extent that other individuals might add or delete species. Still, I believe it is a reasonably complete list of species that may be in danger in Iowa.

The list includes some species for which we have fairly good information. Bednarz (1979), in an extensive search of the Iowa breeding range of Red-shouldered Hawks, could locate only 7 pairs in 1978. Thompson and Landin (1978) located only 50 pairs of Great Egrets and 470 pairs of Great Blue Herons in three colonies along the Mississippi River in 1977. Marsh Hawks have been reported nesting in Iowa only twice in the last 10 years. Bald Eagles were last reported nesting in Iowa in 1892 until a single pair was found nesting along the Mississippi River in the late 1970's. Eastern Bluebirds show a definite decline in numbers reported on the U.S. Fish and Wildlife Service Breeding Bird Surveys between 1968 and 1978 ( $x=1.15/\text{route}$  in 1968-1970;  $x=0.22/\text{route}$  in 1976-1978). For other species, the information is much more tenuous. For example, King Rails and Bewick's Wrens have been reported very rarely in recent years, and nesting records are lacking for several years.

By habitat, these 29 species are split fairly evenly between those found in aquatic, woodland, and edge habitats (Table 5). Edge here includes shrublands and second-growth areas as well as the ecotone areas. It is surprising that only 3 species are grassland birds, because prairie is the most "endangered" of all the native habitats of Iowa (Smith, this volume). Evidently, grassland birds native to Iowa either already have disappeared or can survive in pasture, hayfields, roadside ditches, and other similar habitat in Iowa.

I believe that direct habitat loss is by far the most important problem affecting these 29 species. However, a number of other factors also

Table 4. The 20 bird species most commonly recorded on U.S. Fish and Wildlife Service Breeding Bird Surveys in Iowa, 1967-78. Numbers are the average number of each species recorded per 24.5 mile route.

|                       |       |
|-----------------------|-------|
| *House Sparrow        | 176.4 |
| Red-winged Blackbird  | 172.0 |
| Western Meadowlark    | 69.2  |
| Dickcissel            | 62.0  |
| *Starling             | 60.2  |
| Common Grackle        | 57.0  |
| *Ring-necked Pheasant | 38.2  |
| Mourning Dove         | 33.5  |
| Barn Swallow          | 32.2  |
| American Robin        | 31.5  |
| Common Yellowthroat   | 24.7  |
| Common Crow           | 22.6  |
| Brown-headed Cowbird  | 20.5  |
| *Rock Dove (Pigeon)   | 18.2  |
| Song Sparrow          | 17.6  |
| Eastern Meadowlark    | 15.6  |
| Horned Lark           | 14.7  |
| House Wren            | 14.6  |
| Vesper Sparrow        | 12.8  |
| American Goldfinch    | 11.6  |

\*Introduced Species

have affected some of them, as described below.

*On periphery of range*

At least 8 of the 29 species (Eared Grebe, Sharp-shinned Hawk, Burrowing Owl, Say's Phoebe, both wrens, Black-and white Warbler, Worm-eating Warbler) have distributions that extend just into part of Iowa, usually across a corner of the state. Since most species are less numerous at the periphery of their ranges, these 8 probably never were abundant in the state, and their current populations could easily be depleted by habitat loss or other perturbations.

*Colonial species*

Five species (Eared Grebe, Great Blue Heron, Great Egret, Black-crowned Night Heron, Forster's Tern) are colonial nesters. Colonial species generally use the same limited nesting sites year after year, and disturbance at or alteration to these few nesting sites could rapidly deplete their breeding populations in Iowa. For instance, Great Egrets nested at only 3 colonies in Iowa in 1977, and Forster's Terns had only 5 or 6 colonies in Iowa in 1979.

*Lack of nest sites*

For a few species, especially cavity-nesting ones, lack of suitable nest sites may be a factor in their decline. The long-term decline of the Eastern Bluebird has been partially blamed on the loss of suitable hollow trees for nesting sites and competition between bluebirds and the introduced Starling for those nest sites remaining. Perhaps the change in recent years from barns with haylofts suitable for nesting to machine sheds without such nesting areas has adversely affected the population of Barn Owls in Iowa.

Table 5. Status and habitat of 29 species of birds whose survival in Iowa may be in jeopardy.

| Species                   | Habitat <sup>1</sup> | Blue Listed (Arbib 1979) | Status according to Roosa (1977) |
|---------------------------|----------------------|--------------------------|----------------------------------|
| Eared Grebe               | A ✓                  |                          | Threatened                       |
| Great Blue Heron          | A ✓                  | x                        |                                  |
| Great Egret               | A ✓                  |                          |                                  |
| Black-crowned Night Heron | A ✓                  | x                        |                                  |
| American Bittern          | A ✓                  | x                        |                                  |
| Sharp-shinned Hawk        | W                    | x                        | Extirpated                       |
| Cooper's Hawk             | W                    | x                        | Threatened                       |
| Red-shouldered Hawk       | W                    | x                        | Endangered                       |
| Broad-winged Hawk         | W                    |                          | Threatened                       |
| Bald Eagle                | A ✓                  |                          | Extirpated                       |
| Marsh Hawk                | A ✓                  | x                        | Endangered                       |
| King Rail                 | A ✓                  | x                        |                                  |
| Upland Sandpiper          | G                    | x                        | Endangered                       |
| Forster's Tern            | A                    |                          |                                  |
| Barn Owl                  | E                    | x                        | Endangered                       |
| Burrowing Owl             | G                    | x                        | Endangered                       |
| Long-eared Owl            | W                    | x                        | Threatened                       |
| Say's Phoebe              | E                    |                          | Threatened                       |
| Winter Wren               | W                    | x                        |                                  |
| Bewick's Wren             | E                    | x                        |                                  |
| Eastern Bluebird          | E                    | x                        |                                  |
| Loggerhead Shrike         | E                    | x                        | Threatened                       |
| Bell's Vireo              | E                    | x                        | Undetermined                     |
| Black-and-white Warbler   | W                    |                          |                                  |
| Worm-eating Warbler       | W                    |                          |                                  |
| Blue-winged Warbler       | E                    |                          | Threatened                       |
| Yellow Warbler            | E                    | x                        | Undetermined                     |
| Yellow-breasted Chat      | E                    | x                        |                                  |
| Henslow's Sparrow         | G                    | x                        |                                  |

<sup>1</sup>A=aquatic, E=edge, G=grassland, W=woodland

*Cowbird parasitism*

The number of Brown-headed Cowbirds in Iowa has increased in recent years, the average number seen on U.S. Fish and Wildlife Service Breeding Bird Surveys increasing from 15.9/route in 1968-1970 to 25.9/route in 1976-1978. Direct evidence is not available, but species such as Say's Phoebe, Bell's Vireo, and Yellow Warbler may have been adversely affected by increased cowbird parasitism.

*Environmental contaminants*

A wide variety of environmental contaminants (pesticides, heavy metals, PCBs, etc.) has been blamed for the decline of various avian species, often with little scientific evidence. For at least 6 of the species in Table 5 (Great Blue Heron, Black-crowned Night Heron, Cooper's Hawk, Bald Eagle, Barn Owl, Loggerhead Shrike), there is evidence that these contaminants have had a detrimental effect on their populations. The evidence for the Great Blue Heron (Konerman et al. 1978) and the Black-crowned Night Heron (Ohlendorf et al. 1979) comes

from Iowa and the Upper Midwest, while the other species have been studied in other areas.

#### Hunting

The King Rail is the only game species listed, and it is doubtful that hunting has had a major effect on the numbers of this species in Iowa. Some of the raptors undoubtedly are shot occasionally, but this probably has little effect on their numbers in Iowa.

#### High trophic level

Nine species (the 6 hawks and 3 owls) are all near the top of their respective food chains. Thus, one would expect that the numbers of these species found in any given area never would be very high and that it would be easy for them to disappear from an area. Top trophic levels also are more susceptible to biological magnification of any pollutants acquired by their prey items.

#### Habitat fragmentation

A problem that is being recognized is that of habitat fragmentation. Studies of woodland birds in the eastern United States suggest that many species require minimum-sized blocks of suitable habitat before they will nest in these areas (Robbins 1979). In some instances, these minimum sizes are quite small and pose no real problems, but in others, they may be sizable and place real limits on the areas that the species will be able to inhabit (Table 6). If the 6550-acre minimum for Ovenbirds is correct, few areas in Iowa will be able to support breeding populations of that species if we continue to cut forests.

Weller (1979) already has noted that, although numerous "islands" of aquatic habitat have been preserved or restored in northwestern Iowa, a number of aquatic species, especially those large in body size, have not reestablished breeding populations there. Because aquatic habitats go through fairly regular cycles of high water and then drought, these bird species seem to require very large blocks of habitat in which they can shift between wetlands as the habitat changes from year to year. Seemingly, such blocks of habitat are not yet available in Iowa.

Another example of the effect of habitat alteration on Iowa bird populations comes from the work of Stauffer and Best (1980) on birds found in riparian habitat. They found that species such as the Ovenbird, Scarlet Tanager, Wood Thrush, and Rufous-sided Towhee are relatively intolerant of changes involving thinning or removing woody vegetation from along streams. Their study is a good place to start if one wishes to predict what effects various forest management practices will have on Iowa's avifauna. Several species listed in Table 5 (e.g., Red-shouldered Hawk, Say's Phoebe, Bell's Vireo) commonly occur in riparian habitat, and fragmentation and loss of habitat probably has been a major factor in their decline in Iowa.

Table 6. *Estimated minimum forest area required to maintain breeding populations of selected bird species. Data from Robbins (1979).*

|                         |            |
|-------------------------|------------|
| Red-shouldered Hawk     | 250 acres  |
| Hairy Woodpecker        | 10 acres   |
| Blue Jay                | 10 acres   |
| Wood Thrush             | 250 acres  |
| Black-and-white Warbler | 750 acres  |
| Ovenbird                | 6550 acres |
| Scarlet Tanager         | 250 acres  |

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APPENDIX  
 A CHECK LIST OF BIRDS OF IOWA

Gaviiformes

Gaviidae - loons

|   |        |
|---|--------|
| <i>Gavia immer</i> (Brunnich) - Common Loon             | NE-M ✓ |
| <i>Gavia arctica</i> (Linnaeus) - Arctic Loon           | O      |
| <i>Gavia stellata</i> (Pontoppidan) - Red-throated Loon | O      |

Podicipediformes

Podicipedidae - grebes

|   |        |
|---|--------|
| <i>Podiceps grisegena</i> (Boddaert) - Red-necked Grebe     | O      |
| <i>Podiceps auritus</i> (Linnaeus) - Horned Grebe           | M      |
| * <i>Podiceps nigricollis</i> Brehm - Eared Grebe           | NO-M ✓ |
| <i>Aechmophorus occidentalis</i> (Lawrence) - Western Grebe | M      |
| <i>Podilymbus podiceps</i> (Linnaeus) - Pied-billed Grebe   | NR ✓   |

Pelecaniformes

Pelecanidae - pelicans

|   |   |
|---|---|
| <i>Pelecanus erythrorhynchos</i> Gmelin - White Pelican | M |
| <i>Pelecanus occidentalis</i> Linnaeus - Brown Pelican  | O |

Phalacrocoracidae - cormorants

|  |        |
|--|--------|
| <i>Phalacrocorax auritus</i> (Lesson) - Double-crested Cormorant | NE-M ✓ |
|--|--------|

Anhingidae - anhingas

|   |   |
|---|---|
| <i>Anhinga anhinga</i> (Linnaeus) - Anhinga | O |
|---|---|

Fregatidae - frigatebirds

|   |   |
|---|---|
| <i>Fregata magnificens</i> Matthews - Magnificent Frigatebird | O |
|---|---|

Ciconiiformes

Ardeidae - herons and bitterns

|   |      |
|---|------|
| <i>Ardea herodias</i> Linnaeus - Great Blue Heron                   | NR ✓ |
| <i>Butorides striatus</i> (Linnaeus) - Green Heron                  | NR   |
| <i>Florida caerulea</i> (Linnaeus) - Little Blue Heron              | M    |
| <i>Bubulcus ibis</i> (Linnaeus) - Cattle Egret                      | M    |
| <i>Casmerodius albus</i> (Linnaeus) - Great Egret                   | NR   |
| <i>Egretta thula</i> (Molina) - Snowy Egret                         | O    |
| <i>Nycticorax nycticorax</i> (Linnaeus) - Black crowned Night Heron | NR ✓ |
| <i>Nyctanassa violacea</i> (Linnaeus) - Yellow-crowned Night Heron  | NR   |
| <i>Ixobrychus exilis</i> (Gmelin) - Least Bittern                   | NR ✓ |
| <i>Botaurus lentiginosus</i> (Rackett) - American Bittern           | NR ✓ |

Ciconiidae - storks

|   |   |
|---|---|
| <i>Mycteria americana</i> Linnaeus - Wood Stork | O |
|---|---|

Threskiornithidae - ibises and spoonbills

|  |   |
|--|---|
| <i>Plegadis falcinellus</i> (Linnaeus) - Glossy Ibis | O |
| <i>Plegadis chihi</i> (Vieillot) - White-faced Ibis  | O |
| <i>Ajaia ajaja</i> (Linnaeus) - Roseate Spoonbill    | O |

Anseriformes

Anatidae - ducks, geese, and swans

|   |        |
|---|--------|
| <i>Dendrocygna autumnalis</i> (Linnaeus) - Black-bellied Whistling Duck | O      |
| <i>Dendrocygna bicolor</i> (Vieillot) - Fulvous Whistling Duck          | O      |
| <i>Cygnus olor</i> (Gmelin) - Mute Swan                                 | O      |
| <i>Olor columbianus</i> (Ord) - Whistling Swan                          | M      |
| <i>Olor buccinator</i> (Richardson) - Trumpeter Swan                    | NE ✓   |
| <i>Branta canadensis</i> (Linnaeus) - Canada Goose                      | NR     |
| <i>Anser albifrons</i> (Scopoli) - White-fronted Goose                  | M      |
| <i>Chen caerulescens</i> (Linnaeus) - Snow Goose                        | M      |
| <i>Chen rossii</i> (Cassin) - Ross' Goose                               | M      |
| <i>Aix sponsa</i> (Linnaeus) - Wood Duck                                | NR     |
| <i>Anas platyrhynchos</i> Linnaeus - Mallard                            | NR ✓   |
| <i>Anas rubripes</i> Brewster - Black Duck                              | NO-M   |
| <i>Anas strepera</i> Linnaeus - Gadwall                                 | NR     |
| <i>Anas acuta</i> Linnaeus - Pintail                                    | NR     |
| <i>Anas crecca</i> Linnaeus - Green-winged Teal                         | NR ✓   |
| <i>Anas discors</i> Linnaeus - Blue-winged Teal                         | NR ✓   |
| <i>Anas cyanoptera</i> Vieillot - Cinnamon Teal                         | O      |
| <i>Anas penelope</i> Linnaeus - European Wigeon                         | O      |
| <i>Anas americana</i> Gmelin - American Wigeon                          | NO-M   |
| <i>Anas clypeata</i> Linnaeus - Northern Shoveler                       | NR ✓   |
| <i>Aythya americana</i> (Eyton) - Redhead                               | NR ✓   |
| <i>Aythya collaris</i> (Donovan) - Ring-necked Duck                     | NO-M ✓ |
| <i>Aythya valisineria</i> (Wilson) - Canvasback                         | NO-M ✓ |
| <i>Aythya marila</i> (Linnaeus) - Greater Scaup                         | M      |
| <i>Aythya affinis</i> (Eyton) - Lesser Scaup                            | NO-M   |
| <i>Bucephala clangula</i> (Linnaeus) - Common Goldeneye                 | M      |
| <i>Bucephala albeola</i> (Linnaeus) - Bufflehead                        | NO-M   |
| <i>Clangula hyemalis</i> (Linnaeus) - Oldsquaw                          | O      |
| <i>Histrionicus histrionicus</i> (Linnaeus) - Harlequin Duck            | O      |
| <i>Somateria mollissima</i> (Linnaeus) - Common Eider                   | O      |
| <i>Somateria spectabilis</i> (Linnaeus) - King Eider                    | O      |
| <i>Melanitta deglandi</i> (Bonaparte) - White-winged Scoter             | M      |
| <i>Melanitta perspicillata</i> (Linnaeus) - Surf Scoter                 | M      |
| <i>Melanitta nigra</i> (Linnaeus) - Black Scoter                        | O      |
| <i>Lophodytes cucullatus</i> (Linnaeus) - Hooded Merganser              | NR ✓   |
| <i>Mergus merganser</i> Linnaeus - Common Merganser                     | M      |
| <i>Mergus serrator</i> Linnaeus - Red-breasted Merganser                | M      |
| <i>Oxyura jamaicensis</i> (Gmelin) - Ruddy Duck                         | NR ✓   |

Falconiformes

Cathartidae - vultures

|   |    |
|---|----|
| <i>Cathartes aura</i> (Linnaeus) - Turkey Vulture   | NR |
| <i>Coragyps atratus</i> (Bechstein) - Black Vulture | O  |

Accipitridae - hawks, kites, and harriers

|  |      |
|--|------|
| <i>Elanoides forficatus</i> (Linnaeus) - Swallow-tailed Kite | NE   |
| <i>Ictinia mississippiensis</i> (Wilson) - Mississippi Kite  | O    |
| <i>Accipiter gentilis</i> (Linnaeus) - Goshawk               | O    |
| <i>Accipiter striatus</i> Vieillot - Sharp-shinned Hawk      | NO-M |
| * <i>Accipiter cooperi</i> (Bonaparte) - Cooper's Hawk       | NR   |
| <i>Buteo jamaicensis</i> (Gmelin) - Red-tailed Hawk          | NR   |
| ** <i>Buteo lineatus</i> (Gmelin) - Red-shouldered Hawk      | NR   |
| * <i>Buteo platypterus</i> (Vieillot) - Broad-winged Hawk    | NR   |
| <i>Buteo swainsoni</i> Bonaparte - Swainson's Hawk           | NR   |
| <i>Buteo lagopus</i> (Pontoppidan) - Rough-legged Hawk       | M    |

|  |        |   |        |
|--|--------|---|--------|
| <i>Buteo regalis</i> (Gray) - Ferruginous Hawk                   | O      | ** <i>Bartramia longicauda</i> (Bechstein) - Upland Sandpiper       | NR     |
| <i>Parabuteo unicinctus</i> (Temminck) - Harris' Hawk            | O      | <i>Actitis macularia</i> (Linnaeus) - Spotted Sandpiper             | NR     |
| <i>Aquila chrysaetos</i> (Linnaeus) - Golden Eagle               | M      | <i>Tringa solitaria</i> Wilson - Solitary Sandpiper                 | M      |
| <i>Haliaeetus leucocephalis</i> (Linnaeus) - Bald Eagle          | NO-M   | <i>Tringa melanoleucus</i> (Gmelin) - Greater Yellowlegs            | M      |
| ** <i>Circus cyaneus</i> (Linnaeus) - Marsh Hawk                 | NO-M ✓ | <i>Tringa flavipes</i> (Gmelin) - Lesser Yellowlegs                 | M      |
| Pandionidae - osprey   |        | <i>Catoptrophorus semipalmatus</i> (Gmelin) - Willet                | M      |
| <i>Pandion haliaetus</i> (Linnaeus) - Osprey                     | M      | <i>Calidris canutus</i> (Linnaeus) - Red Knot                       | O      |
| Falconidae - falcons   |        | <i>Calidris maritima</i> (Brunnich) - Purple Sandpiper              | O      |
| <i>Falco rusticolus</i> Linnaeus - Gyrfalcon                     | O      | <i>Calidris acuminata</i> (Horsfield) - Sharp-tailed Sandpiper      | O      |
| <i>Falco mexicanus</i> Schlegel - Prairie Falcon                 | O      | <i>Calidris melanotos</i> (Vieillot) - Pectoral Sandpiper           | M      |
| ** <i>Falco peregrinus</i> Tunstall - Peregrine Falcon           | NE-M   | <i>Calidris fuscicollis</i> (Vieillot) - White-rumped Sandpiper     | M      |
| <i>Falco columbarius</i> Linnaeus - Merlin                       | NE-M   | <i>Calidris bairdii</i> (Coes) - Baird's Sandpiper                  | M      |
| <i>Falco sparverius</i> Linnaeus - American Kestrel              | NR     | <i>Calidris minutilla</i> (Vieillot) - Least Sandpiper              | M      |
| Galliformes  |        | <i>Calidris alpina</i> (Linnaeus) - Dunlin                          | M      |
| Tetraonidae - grouse   |        | <i>Calidris pusillus</i> (Linnaeus) - Semipalmated Sandpiper        | M      |
| <i>Bonasa umbellus</i> (Linnaeus) - Ruffed Grouse                | NR     | <i>Calidris mauri</i> (Cabanis) - Western Sandpiper                 | M      |
| <i>Tympanuchus cupido</i> (Linnaeus) - Greater Prairie Chicken   | NE-O   | <i>Calidris alba</i> (Pallas) - Sanderling                          | M      |
| <i>Pedioecetes phasianellus</i> (Linnaeus) - Sharp-tailed Grouse | NE-O   | <i>Limnodromus griseus</i> (Gmelin) - Short-billed Dowitcher        | M      |
| Phasianidae - quail and pheasants                                |        | <i>Limnodromus scolopaceus</i> (Say) - Long-billed Dowitcher        | M      |
| <i>Colinus virginianus</i> (Linnaeus) - Bobwhite                 | NR     | <i>Micropalama himantopus</i> (Bonaparte) - Stilt Sandpiper         | M      |
| <i>Phasianus colchicus</i> Linnaeus - Ring-necked Pheasant       | NR     | <i>Tryngites subruficollis</i> (Vieillot) - Buff-breasted Sandpiper | M      |
| <i>Perdix perdix</i> (Linnaeus) - Gray Partridge                 | NR     | <i>Limosa fedoa</i> (Linnaeus) - Marbled Godwit                     | NE-M ✓ |
| Meleagrididae - turkeys  |        | <i>Limosa haemastica</i> (Linnaeus) - Hudsonian Godwit              | M      |
| <i>Meleagris gallopavo</i> Linnaeus - Turkey                     | NR     | <i>Philomachus pugnax</i> (Linnaeus) - Ruff                         | O      |
| Gruiformes   |        | Recurvirostridae - avocets and stilts                               |        |
| Gruidae - cranes   |        | <i>Recurvirostra americana</i> Gmelin - American Avocet             | NO-M   |
| <i>Grus americana</i> (Linnaeus) - Whooping Crane                | NE-O ✓ | <i>Himantopus mexicanus</i> (Muller) - Black-necked Stilt           | O      |
| <i>Grus canadensis</i> (Linnaeus) - Sandhill Crane               | NE-M ✓ | Phalaropodidae - phalaropes   |        |
| Rallidae - rails, gallinules, and coots                          |        | <i>Phalaropus fulicarius</i> (Linnaeus) - Red Phalarope             | O      |
| <i>Rallus elegans</i> Audubon - King Rail                        | NR ✓   | <i>Steganopus tricolor</i> Vieillot - Wilson's Phalarope            | NO-M   |
| <i>Rallus limicola</i> Vieillot - Virginia Rail                  | NR ✓   | <i>Lobipes lobatus</i> (Linnaeus) - Northern Phalarope              | M      |
| <i>Porzana carolina</i> (Linnaeus) - Sora                        | NR ✓   | Stercorariidae - jaegers and skuas                                  |        |
| <i>Coturnicops noveboracensis</i> (Gmelin) - Yellow Rail         | M      | <i>Stercorarius parasiticus</i> (Linnaeus) - Parasitic Jaeger       | O      |
| <i>Laterallus jamaicensis</i> (Gmelin) - Black Rail              | O      | <i>Stercorarius longicaudus</i> Vieillot - Long-tailed Jaeger       | O      |
| <i>Porphyryla martinica</i> (Linnaeus) - Purple Gallinule        | O      | Laridae - gulls and terns   |        |
| <i>Gallinula chloropus</i> (Linnaeus) - Common Gallinule         | NR     | <i>Larus hyperboreus</i> Gunnerus - Glaucous Gull                   | M      |
| <i>Fulica americana</i> Gmelin - American Coot                   | NR     | <i>Larus glaucoides</i> Meyer - Iceland Gull                        | O      |
| Charadriiformes  |        | <i>Larus marinus</i> Linnaeus - Great Black-backed Gull             | O      |
| Charadriidae - plovers   |        | <i>Larus argentatus</i> Pontoppidan - Herring Gull                  | M      |
| <i>Charadrius semipalmatus</i> Bonaparte - Semipalmated Plover   | M      | <i>Larus delawarensis</i> Ord - Ring-billed Gull                    | M      |
| ** <i>Charadrius melodus</i> Ord - Piping Plover                 | NE-M   | <i>Larus atricilla</i> Linnaeus - Laughing Gull                     | O      |
| <i>Charadrius vociferus</i> Linnaeus - Killdeer                  | NR     | <i>Larus pipixcan</i> Wagler - Franklin's Gull                      | NO-M ✓ |
| <i>Charadrius montanus</i> Townsend - Mountain Plover            | O      | <i>Larus philadelphia</i> (Ord) - Bonaparte's Gull                  | M      |
| <i>Pluvialis dominica</i> (Muller) - American Golden Plover      | M      | <i>Pagophila eburnea</i> (Phipps) - Ivory Gull                      | O      |
| <i>Pluvialis squatarola</i> (Linnaeus) - Black-bellied Plover    | M      | <i>Rissa tridactyla</i> (Linnaeus) - Black-legged Kittiwake         | O      |
| Scolopacidae - sandpipers  |        | <i>Xema sabini</i> (Sabine) - Sabine's Gull                         | O      |
| <i>Arenaria interpres</i> (Linnaeus) - Ruddy Turnstone           | M      | <i>Sterna forsteri</i> Nuttall - Forster's Tern                     | NR ✓   |
| <i>Philohela minor</i> (Gmelin) - American Woodcock              | NR     | <i>Sterna hirundo</i> Linnaeus - Common Tern                        | M      |
| <i>Capella gallinago</i> (Linnaeus) - Common Snipe               | NO-M   | ** <i>Sterna albifrons</i> Pallas - Least Tern                      | NE-M   |
| <i>Numenius americanus</i> Bechstein - Long-billed Curlew        | NE-O ✓ | <i>Sterna caspia</i> Pallas - Caspian Tern                          | M      |
| <i>Numenius phaeopus</i> (Linnaeus) - Whimbrel                   | O      | <i>Chlidonias niger</i> (Linnaeus) - Black Tern                     | NR ✓   |
| <i>Numenius borealis</i> (Forster) - Eskimo Curlew               | O      | Alcidae - auks, murrees and puffins                                 |        |
|  |        | <i>Uria lomvia</i> (Linnaeus) - Thick-billed Murre                  | O      |
|  |        | Columbiformes   |        |
|  |        | Columbidae - doves and pigeons                                      |        |
|  |        | <i>Columba fasciata</i> Say - Band-tailed Pigeon                    | O      |
|  |        | <i>Columba livia</i> Gmelin - Rock Dove                             | NR     |



IOWA'S AVIFAUNA

|  |      |   |      |
|--|------|---|------|
| <i>Zenaida macroura</i> (Linnaeus) - Mourning Dove                       | NR   | <i>Picoides tridactylus</i> (Linnaeus) - Northern Three-toed Woodpecker     | O    |
| <i>Ectopistes migratorius</i> (Linnaeus) - Passenger Pigeon              | NE   |   |      |
| Psittaciformes   |      |   |      |
| Psittacidae - Parrots  |      |   |      |
| <i>Conuropsis carolinensis</i> (Linnaeus) - Carolina Parakeet            | NE   | Passeriformes   |      |
| Cuculiformes   |      |   |      |
| Cuculidae - cuckoos and anis   |      |   |      |
| <i>Coccyzus americanus</i> (Linnaeus) - Yellow-billed Cuckoo             | NR   | Tyrannidae - flycatchers  |      |
| <i>Coccyzus erythrophthalmus</i> (Wilson) - Black-billed Cuckoo          | NR   | <i>Tyrannus tyrannus</i> (Linnaeus) - Eastern Kingbird                      | NR   |
| <i>Crotophaga ani</i> Linnaeus - Smooth-billed Ani                       | O    | <i>Tyrannus verticalis</i> Say - Western Kingbird                           | NR   |
| <i>Crotophaga sulcirostris</i> Swainson - Groove-billed Ani              | O    | <i>Muscivora forficata</i> (Gmelin) - Scissor-tailed Flycatcher             | NO-O |
| Strigiformes   |      |   |      |
| Tytonidae - barn owls  |      |   |      |
| <b>**Tyto alba</b> (Scopoli) - Barn Owl                                  | NR   | <i>Myiarchus crinitus</i> (Linnaeus) - Great Crested Flycatcher             | NR   |
| Strigidae - typical owls   |      |   |      |
| <i>Otus asio</i> (Linnaeus) - Screech Owl                                | NR   | <i>Sayornis phoebe</i> (Latham) - Eastern Phoebe                            | NR   |
| <i>Bubo virginianus</i> (Gmelin) - Great Horned Owl                      | NR   | <b>*Sayornis saya</b> (Bonaparte) - Say's Phoebe                            | NR   |
| <i>Nyctea scandiaca</i> (Linnaeus) - Snowy Owl                           | M    | <i>Empidonax flaviventris</i> (Baird and Baird) - Yellow-bellied Flycatcher | M    |
| <b>*Athene cunicularia</b> (Molina) - Burrowing Owl                      | NR   | <i>Empidonax virescens</i> (Vieillot) - Acadian Flycatcher                  | NR   |
| <i>Strix varia</i> Barton - Barred Owl                                   | NR   | <i>Empidonax trailli</i> (Aububon) - Willow Flycatcher                      | NR   |
| <i>Strix nebulosa</i> Forster - Great Gray Owl                           | O    | <i>Empidonax alnorum</i> Brewster - Alder Flycatcher                        | NR   |
| <b>*Asio otus</b> (Linnaeus) - Long-eared Owl                            | NR   | <i>Empidonax minimus</i> (Baird and Baird) - Least Flycatcher               | NR   |
| <i>Asio flammeus</i> (Pontoppidan) Short-eared Owl                       | NE-M | <i>Contopus virens</i> (Linnaeus) - Eastern Wood Pewee                      | NR   |
| <i>Aegolius acadicus</i> (Gmelin) - Saw-whet Owl                         | M    | <i>Contopus sordidulus</i> Sclater - Western Wood Pewee                     | O    |
| Caprimulgiformes   |      |   |      |
| Caprimulgidae - goatsuckers  |      |   |      |
| <i>Caprimulgus carolinensis</i> Gmelin - Chuck-will's-widow              | NR   | <i>Nuttallornis borealis</i> (Swainson) - Olive-sided Flycatcher            | M    |
| <i>Caprimulgus vociferus</i> Wilson - Whip-poor-will                     | NR   | Alaudidae - larks   |      |
| <i>Phalaenoptilus nuttallii</i> (Audubon) - Poor-will                    | O    | <i>Eremophila alpestris</i> (Linnaeus) - Horned Lark                        | NR   |
| <i>Chordeiles minor</i> (Forster) - Common Nighthawk                     | NR   | Hirundinidae - swallows   |      |
| Apodiformes  |      |   |      |
| Apodidae - swifts  |      |   |      |
| <i>Chaetura pelagica</i> (Linnaeus) - Chimney Swift                      | NR   | <i>Iridoprocne bicolor</i> (Vieillot) - Tree Swallow                        | NR   |
| Trochilidae - hummingbirds   |      |   |      |
| <i>Archilochus colubris</i> (Linnaeus) - Ruby-throated Hummingbird       | NR   | <i>Riparia riparia</i> (Linnaeus) - Bank Swallow                            | NR   |
| Coraciiformes  |      |   |      |
| Alcedinidae - kingfishers  |      |   |      |
| <i>Megasceryle alcyon</i> (Linnaeus) - Belted Kingfisher                 | NR   | <i>Stelgidopteryx ruficollis</i> (Vieillot) - Rough-winged Swallow          | NR   |
| Piciformes   |      |   |      |
| Picidae - woodpeckers  |      |   |      |
| <i>Colaptes auratus</i> (Linnaeus) - Common Flicker                      | NR   | <i>Hirundo rustica</i> Linnaeus - Barn Swallow                              | NR   |
| <i>Dryocopus pileatus</i> (Linnaeus) - Pileated Woodpecker               | NR   | <i>Petrochelidon pyrrhonota</i> (Vieillot) - Cliff Swallow                  | NR   |
| <i>Melanerpes carolinus</i> (Linnaeus) - Red-bellied Woodpecker          | NR   | <i>Progne subis</i> (Linnaeus) - Purple Martin                              | NR   |
| <i>Melanerpes erythrocephalus</i> (Linnaeus) - Red-headed Woodpecker     | NR   | Corvidae - jays, magpies and crows  |      |
| <i>Melanerpes lewis</i> (Gray) - Lewis' Woodpecker                       | O    | <i>Perisoreus canadensis</i> (Linnaeus) - Gray Jay                          | O    |
| <i>Sphyrapicus varius</i> (Linnaeus) - Yellow-bellied Sapsucker          | NR   | <i>Cyanocitta cristata</i> (Linnaeus) - Blue Jay                            | NR   |
| <i>Picoides villosus</i> (Linnaeus) - Hairy Woodpecker                   | NR   | <i>Pica pica</i> (Linnaeus) - Black-billed Magpie                           | NO-O |
| <i>Picoides pubescens</i> (Linnaeus) - Downy Woodpecker                  | NR   | <i>Corvus corax</i> Linnaeus - Common Raven                                 | O    |
| <i>Picoides arcticus</i> (Swainson) - Black-backed Three-toed Woodpecker | O    | <i>Corvus brachyrhynchos</i> Brehm - Common Crow                            | NR ✓ |
|  |      | <i>Gymnorhinus cyanocephalus</i> Wied-Pinyon Jay                            | O    |
|  |      | <i>Nucifraga columbiana</i> (Wilson) - Clark's Nutcracker                   | O    |
|  |      | Paridae - titmice and chickadees  |      |
|  |      | <i>Parus atricapillus</i> Linnaeus - Black-capped Chickadee                 | NR   |
|  |      | <i>Parus carolinensis</i> Audubon - Carolina Chickadee                      | O    |
|  |      | <i>Parus hudsonicus</i> Forster - Boreal Chickadee                          | O    |
|  |      | <i>Parus bicolor</i> Linnaeus - Tufted Titmouse                             | NR   |
|  |      | Sittidae - nuthatches   |      |
|  |      | <i>Sitta carolinensis</i> Latham - White-breasted Nuthatch                  | NR   |
|  |      | <i>Sitta canadensis</i> Linnaeus - Red-breasted Nuthatch                    | NO-M |
|  |      | <i>Sitta pusilla</i> Latham - Brown-headed Nuthatch                         | O    |
|  |      | <i>Sitta pygmaea</i> Vigors - Pygmy Nuthatch                                | O    |
|  |      | Certhiidae - creepers   |      |
|  |      | <i>Certhia familiaris</i> Linnaeus - Brown Creeper                          | NR   |
|  |      | Cinclidae - dippers   |      |
|  |      | <i>Cinclus mexicanus</i> Swainson - Dipper                                  | O    |
|  |      | Troglodytidae - wrens   |      |
|  |      | <i>Troglodytes aedon</i> Vieillot - House Wren                              | NR   |
|  |      | <i>Troglodytes troglodytes</i> (Linnaeus) - Winter Wren                     | NO-M |
|  |      | <i>Thryomanes bewickii</i> (Audubon) - Bewick's Wren                        | NR   |

|   |      |  |      |
|---|------|--|------|
| <i>Thryothorus ludovicianus</i> (Latham) - Carolina Wren        | NR   | <i>Parula americana</i> (Linnaeus) - Northern Parula                       | NO-M |
| <i>Cistothorus palustris</i> (Wilson) - Long-billed Marsh Wren  | NR   | <i>Dendroica petechia</i> (Linnaeus) - Yellow Warbler                      | NR   |
| <i>Cistothorus platensis</i> (Latham) - Short-billed Marsh Wren | NR   | <i>Dendroica magnolia</i> (Wilson) - Magnolia Warbler                      | M    |
| <i>Salpinctes obsoletus</i> (Say) - Rock Wren                   | NO-O | <i>Dendroica tigrina</i> (Gmelin) - Cape May Warbler                       | M    |
| <b>Mimidae - mockingbirds and thrashers</b>                     |      | <i>Dendroica caerulescens</i> (Gmelin) - Black-throated Blue Warbler       | M    |
| <i>Mimus polyglottos</i> (Linnaeus) - Mockingbird               | NR   | <i>Dendroica coronata</i> (Linnaeus) - Yellow-rumped Warbler               | M    |
| <i>Dumetella carolinensis</i> (Linnaeus) - Gray Catbird         | NR   | <i>Dendroica nigrescens</i> (Townsend) - Black-throated Gray Warbler       | O    |
| <i>Toxostoma rufum</i> (Linnaeus) - Brown Thrasher              | NR   | <i>Dendroica townsendi</i> (Townsend) - Townsend's Warbler                 | O    |
| <i>Toxostoma curvirostre</i> (Swainson) - Curve-billed Thrasher | O    | <i>Dendroica virens</i> (Gmelin) - Black-throated Green Warbler            | M    |
| <i>Oreoscoptes montanus</i> (Townsend) - Sage Thrasher          | O    | <i>Dendroica cerulea</i> (Wilson) - Cerulean Warbler                       | NR   |
| <b>Turdidae - thrushes and bluebirds</b>                        |      | <i>Dendroica fusca</i> (Muller) - Blackburnian Warbler                     | M    |
| <i>Turdus migratorius</i> Linnaeus - American Robin             | NR   | <i>Dendroica dominica</i> (Linnaeus), - Yellow-throated Warbler            | NR   |
| <i>Ixoreus naevius</i> (Gmelin) - Varied Thrush                 | O    | <i>Dendroica pensylvanica</i> (Linnaeus) - Chestnut-sided Warbler          | NO-M |
| <i>Hylocichla mustelina</i> (Gmelin) - Wood Thrush              | NR   | <i>Dendroica castanea</i> (Wilson) - Bay-breasted Warbler                  | M    |
| <i>Catharus guttata</i> (Pallas) - Hermit Thrush                | M    | <i>Dendroica striata</i> (Forster) - Blackpoll Warbler                     | M    |
| <i>Catharus ustulata</i> (Nuttall) - Swainson's Thrush          | M    | <i>Dendroica pinus</i> (Wilson) - Pine Warbler                             | M    |
| <i>Catharus minima</i> (Lafresnaye) - Gray-cheeked Thrush       | M    | <i>Dendroica discolor</i> (Vieillot) - Prairie Warbler                     | O    |
| <i>Catharus fuscescens</i> (Stephens) - Veery                   | NR   | <i>Dendroica palmarum</i> (Gmelin) - Palm Warbler                          | M    |
| <i>Sialia sialis</i> (Linnaeus) - Eastern Bluebird              | NR   | <i>Seiurus aurocapillus</i> (Linnaeus) - Ovenbird                          | NR   |
| <i>Sialia currucoides</i> (Bechstein) - Mountain Bluebird       | O    | <i>Seiurus noveboracensis</i> (Gmelin) - Northern Waterthrush              | M    |
| <i>Myadestes townsendi</i> (Audubon) - Townsend's Solitaire     | O    | <i>Seiurus motacilla</i> (Vieillot) - Louisiana Waterthrush                | NR   |
| <b>Sylviidae - gnatcatchers and kinglets</b>                    |      | <i>Oporornis formosus</i> (Wilson) - Kentucky Warbler                      | NR   |
| <i>Polioptila caerulea</i> (Linnaeus) - Blue-gray Gnatcatcher   | NR   | <i>Oporornis agilis</i> (Wilson) - Connecticut Warbler                     | M    |
| <i>Regulus satrapa</i> Lichenstein - Golden-crowned Kinglet     | M    | <i>Oporornis philadelphia</i> (Wilson) - Mourning Warbler                  | M    |
| <i>Regulus calendula</i> (Linnaeus) - Ruby-crowned Kinglet      | M    | <i>Oporornis tolmiei</i> (Townsend) - MacGillivray's Warbler               | O    |
| <b>Motacillidae - pipits</b>                                    |      | <i>Geothlypis trichas</i> (Linnaeus) - Common Yellowthroat                 | NR   |
| <i>Anthus spinoletta</i> (Linnaeus) - Water Pipit               | M    | <i>Icteria virens</i> (Linnaeus) - Yellow-breasted Chat                    | NR   |
| <i>Anthus spragueii</i> (Audubon) - Sprague's Pipit             | O    | <i>Wilsonia citrina</i> (Boddaert) - Hooded Warbler                        | NO-M |
| <b>Bombycillidae - waxwings</b>                                 |      | <i>Wilsonia pusilla</i> (Wilson) - Wilson's Warbler                        | M    |
| <i>Bombycilla garrulus</i> (Linnaeus) - Bohemian Waxwing        | M    | <i>Wilsonia canadensis</i> (Linnaeus) - Canada Warbler                     | M    |
| <i>Bombycilla cedrorum</i> Vieillot - Cedar Waxwing             | NR   | <i>Setophaga ruticilla</i> (Linnaeus) - American Redstart                  | NR   |
| <b>Laniidae - shrikes</b>                                       |      | <b>Ploceidae - weaver finches</b>  |      |
| <i>Lanius excubitor</i> Linnaeus - Northern Shrike              | M    | <i>Passer domesticus</i> (Linnaeus) - House Sparrow                        | NR   |
| * <i>Lanius ludovicianus</i> Linnaeus - Loggerhead Shrike       | NR   | <b>Icteridae - meadowlarks, blackbirds, and orioles</b>                    |      |
| <b>Sturnidae - starlings</b>                                    |      | <i>Dolichonyx oryzivorus</i> (Linnaeus) - Bobolink                         | NR   |
| <i>Sturnus vulgaris</i> Linnaeus - Starling                     | NR   | <i>Sturnella magna</i> (Linnaeus) - Eastern Meadowlark                     | NR   |
| <b>Vireonidae - vireos</b>                                      |      | <i>Sturnella neglecta</i> Audubon - Western Meadowlark                     | NR   |
| <i>Vireo griseus</i> (Boddaert) - White-eyed Vireo              | NR   | <i>Xanthocephalus xanthocephalus</i> (Bonaparte) - Yellow-headed Blackbird | NR   |
| <i>Vireo bellii</i> Audubon - Bell's vireo                      | NR   | <i>Agelaius phoeniceus</i> (Linnaeus) - Red-winged Blackbird               | NR   |
| <i>Vireo flavifrons</i> Vieillot - Yellow-throated Vireo        | NR   | <i>Icterus spurius</i> (Linnaeus) - Orchard Oriole                         | NR   |
| <i>Vireo solitarius</i> (Wilson) - Solitary Vireo               | M    | <i>Icterus galbula</i> (Linnaeus) - Northern Oriole                        | NR   |
| <i>Vireo olivaceus</i> (Linnaeus) - Red-eyed Vireo              | NR   | <i>Euphagus carolinus</i> (Muller) - Rusty Blackbird                       | M    |
| <i>Vireo philadelphicus</i> (Cassin) - Philadelphia Vireo       | M    | <i>Euphagus cyanocephalus</i> (Wagler) - Brewer's Blackbird                | M    |
| <i>Vireo gilvus</i> (Vieillot) - Warbling Vireo                 | NR   | <i>Quiscalus mexicanus</i> (Gmelin) - Great-tailed Grackle                 | O    |
| <b>Parulidae - wood warblers</b>                                |      | <i>Quiscalus quiscula</i> (Linnaeus) - Common Grackle                      | NR   |
| <i>Mniotilta varia</i> (Linnaeus) - Black-and-white Warbler     | NO-M | <i>Molothrus ater</i> (Boddaert) - Brown-headed Cowbird                    | NR   |
| <i>Protonotaria citrea</i> (Boddaert) - Prothonotary Warbler    | NR   | <b>Thraupidae - tanagers</b>   |      |
| <i>Helmitheros vermivorus</i> (Gmelin) - Worm-eating Warbler    | NR   | <i>Piranga ludoviciana</i> (Wilson) - Western Tanager                      | O    |
| <i>Vermivora chrysoptera</i> (Linnaeus) - Golden-winged Warbler | NO-M | <i>Piranga olivacea</i> (Gmelin) - Scarlet Tanager                         | NR   |
| * <i>Vermivora pinus</i> (Linnaeus) - Blue-winged Warbler       | NR   | <i>Piranga rubra</i> (Linnaeus) - Summer Tanager                           | NR   |
| <i>Vermivora peregrina</i> (Wilson) - Tennessee Warbler         | M    | <b>Fringillidae - grosbeaks, finches, sparrows, and buntings</b>           |      |
| <i>Vermivora celata</i> (Say) - Orange-crowned Warbler          | M    | <i>Cardinalis cardinalis</i> (Linnaeus) - Cardinal                         | NR   |
| <i>Vermivora ruficapilla</i> (Wilson) - Nashville Warbler       | M    | <i>Pheucticus ludovicianus</i> (Linnaeus) - Rose-breasted Grosbeak         | NR   |

IOWA'S AVIFAUNA

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|---|------|--|------|
| <i>Pheucticus melanocephalus</i> (Swainson) - Black-headed Grosbeak | O    | <i>Spizella arborea</i> (Wilson) - Tree Sparrow                  | M    |
| <i>Guiraca caerulea</i> (Linnaeus) - Blue Grosbeak                  | NR   | <i>Spizella passerina</i> (Bechstein) - Chipping Sparrow         | NR   |
| <i>Passerina cyanea</i> (Linnaeus) - Indigo Bunting                 | NR   | <i>Spizella pallida</i> (Swainson) - Clay-colored Sparrow        | NO-M |
| <i>Passerina amoena</i> (Say) - Lazuli Bunting                      | O    | <i>Spizella pusilla</i> (Wilson) - Field Sparrow                 | NR   |
| <i>Passerina ciris</i> (Linnaeus) - Painted Bunting                 | O    | <i>Zonotrichia querula</i> (Nuttall) - Harris Sparrow            | M    |
| <i>Spiza americana</i> (Gmelin) - Dickcissel                        | NR   | <i>Zonotrichia leucophrys</i> (Forster) - White-crowned Sparrow  | M    |
| <i>Hesperiphona vespertina</i> (Cooper) - Evening Grosbeak          | M    | <i>Zonotrichia atricapilla</i> (Gmelin) - Golden-crowned Sparrow | O    |
| <i>Carpodacus purpureus</i> (Gmelin) - Purple Finch                 | NO-M | <i>Zonotrichia albicollis</i> (Gmelin) - White-crowned Sparrow   | M    |
| <i>Pinicola enucleator</i> (Linnaeus) - Pine Grosbeak               | O    | <i>Passerella iliaca</i> (Merrem) - Fox Sparrow                  | M    |
| <i>Leucosticte tephrocotis</i> (Swainson) - Gray-crowned Rosy Finch | O    | <i>Melospiza lincolni</i> (Audubon) - Lincoln's Sparrow          | M    |
| <i>Carduelis hornemanni</i> (Holboell) - Hoary Redpoll              | O    | <i>Melospiza georgiana</i> (Latham) - Swamp Sparrow              | NR   |
| <i>Carduelis flammea</i> (Linnaeus) - Common Redpoll                | M    | <i>Melospiza melodia</i> (Wilson) - Song Sparrow                 | NR   |
| <i>Carduelis pinus</i> (Wilson) - Pine Siskin                       | NO-M | <i>Calcarius mccownii</i> (Lawrence) - McCown's Longspur         | O    |
| <i>Carduelis tristis</i> (Linnaeus) - American Goldfinch            | NR   | <i>Calcarius lapponicus</i> (Linnaeus) - Lapland Longspur        | M    |
| <i>Loxia curvirostra</i> (Linnaeus) - Red Crossbill                 | M    | <i>Calcarius pictus</i> (Swainson) - Smith's Longspur            | O    |
| <i>Loxia leucoptera</i> (Gmelin) - White-winged Crossbill           | M    | <i>Calcarius ornatus</i> (Townsend) - Chestnut-collared Longspur | O    |
| <i>Pipilo chlorurus</i> (Audubon) - Green-tailed Towhee             | O    | <i>Plectrophenax nivalis</i> (Linnaeus) - Snow Bunting           | M    |
| <i>Pipilo erythrophthalmus</i> (Linnaeus) - Rufous-sided Towhee     | NR   |  |      |
| <i>Calamospiza melanocorys</i> Stejneger - Lark Bunting             | O    |  |      |
| <i>Passerculus sandwichensis</i> (Gmelin) - Savannah Sparrow        | NR   |  |      |
| <i>Ammodramus savannarum</i> (Gmelin) - Grasshopper Sparrow         | NR   |  |      |
| <i>Ammodramus bairdii</i> (Audubon) - Baird's Sparrow               | O    |  |      |
| <i>Ammodramus henslowii</i> (Audubon) - Henslow's Sparrow           | NR   |  |      |
| <i>Ammospiza leconteii</i> (Audubon) - Le Conte's Sparrow           | M    |  |      |
| <i>Ammospiza caudacuta</i> (Gmelin) - Sharp-tailed Sparrow          | M    |  |      |
| <i>Poocetes gramineus</i> (Gmelin) - Vesper Sparrow                 | NR   |  |      |
| <i>Chondestes grammacus</i> (Say) - Lark Sparrow                    | NR   |  |      |
| <i>Junco hyemalis</i> (Linnaeus) - Dark-eyed Junco                  | M    |  |      |

Key to symbols used:

\* - threatened, \*\* - endangered, as listed by Roosa, 1977

M - migrant, O - occasional, NR - nests regularly, NO - nests occasionally, NE - nested, extirpated.

For those listed NO or NE, the symbol after the hyphen indicates their usual present status in Iowa, e.g. M or O. For some NE species, the lack of an additional symbol indicates the species no longer occurs in Iowa.