

SUMMARY OF THE IOWA BREEDING BIRD ATLAS
AND HIGHLIGHTS OF THE FEDERAL SPECIES
OF MANAGEMENT CONCERN

MARCH 1, 1992



Iowa Department of Natural Resources
Larry J. Wilson, Director
March 1992

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ACKNOWLEDGMENTS

The Iowa Breeding Bird Atlas (BBA) Project was sponsored by the Iowa Department of Natural Resources' (IDNR) Nongame Program and the Iowa Ornithologists' Union (IOU). However, the success of the project was dependent on the hundreds of individuals and numerous groups that participated in collecting data. Bird by bird, hour by hour, block by block, the effort and dedication by each individual culminated in the most comprehensive understanding to date, of Iowa's breeding birds.

The original BBA project was designed by Dave Newhouse, Mike Newlon, Dean Roosa and Robert Howe. Once field work commenced, regional coordinators played an essential role in the completion of this project. Throughout the project Bob Cecil, Jim Dinsmore, Bruce Ehresman, John Fleckenstein, Jim Hansen, Darwin Koenig, Douglas Reeves, Carol Thompson and Barbara Wilson served as regional coordinators. Susan White and James Kienzler of the IDNR performed the arduous task of computerizing and programming the immense data set. The hundreds of maps needed by the project were graciously produced by Kevin Kane of the IDNR's Geological Information Systems section.

The United States Fish and Wildlife Service partially funded this project through a grant. The grant allowed us to hire seasonal staff and keypunch the data. The citizens of Iowa also supported this project through their donations to the Chickadee Checkoff which funds the Nongame Program. We are grateful to all of the people who during the last 7 years have allocated their time, money and expertise to the completion of Iowa's first Breeding Bird Atlas.

IOWA'S BREEDING BIRD ATLAS

INTRODUCTION

In 1984 plans were begun to initiate a Breeding Bird Atlas (BBA) in Iowa. The project was sponsored by the Iowa Department of Natural Resources' Nongame Program and the Iowa Ornithologists' Union with partial funding from the U.S. Fish and Wildlife Service. Breeding Bird Atlases have been used in other states, provinces and countries to monitor bird populations. Breeding Bird Atlases are multi-year studies of the breeding birds within a geographical area. The atlases can be repeated at regular intervals (10 - 25 years) to identify changes in a species' distribution, and in some cases, a species' population.

The goal of the BBA in Iowa was to document the distribution of birds breeding in the state from 1985 to 1990. Future habitat overlays should provide insight on the relationship between species, their distribution and use of various habitat types. The atlas will serve as a foundation for managing various species and their required habitats. The data will also identify species of concern which have limited distribution or special needs. Species lists will be developed from the data so that parks, management units, counties and other entities can recognize part of the biodiversity within their area. In turn, these entities can better educate nearby human populations about the local avifauna and their associated needs.

Two types of sample units, standard and priority blocks, were used to document the distribution of Iowa's breeding birds. Standard blocks were chosen with a systematic sampling scheme. Most of the standard blocks were dominated by agricultural land with "natural" areas being confined to road ditches, waterways, fencerows, farmsteads, or acres enrolled in the Conservation Reserve Program (CRP). However, some standard blocks did include public property or privately owned natural areas.

Priority blocks were non-randomly chosen and included state parks, preserves, wildlife management areas, county parks and other "islands" of natural habitat. Of Iowa's 36 million acres, 33.5 million acres were in farm ownership with 75 percent (27 million acres) devoted to row crops, primarily corn and soybeans in 1987 (U.S. Department of Agriculture, pers. comm.). Only 1.3 million acres (3.6%) were wooded or non-pastured grasslands and 2.5 to 3.5 million acres were in pasture (U.S. Department of Agriculture, pers. comm.). Less than 2 percent of the land was in public ownership (Iowa Department of Natural Resources). Natural habitats in Iowa are extremely fragmented and uncommon, and therefore could not be satisfactorily sampled by a systematic design.

To document species representative of all habitats available in a given county, we strove to complete each of the priority blocks and at least two standard blocks in each of Iowa's 99 counties. This criteria allowed us to document breeding birds on natural areas and areas representative of the state's overall landscape.

This report summarizes the methods and initial results of Iowa's Breeding Bird Atlas. The report highlights 10 federal species of management concern. Ultimately a book will be published that will provide an account for each species documented by the study and more detailed results on regional and habitat associations.

METHODS

BLOCKS

The grid system used to select standard blocks in Iowa was based on the state's original township - range land survey. Each township was subdivided into four quarters. The southeast quarter section of every other township was designated as a standard block. Using this systematic sampling scheme, 522 standard blocks were identified. Each block was 3 x 3 miles (4.8 km) square. Using a grid based on townships allowed better access to the blocks since Iowa's road system was based on the same system. The blocks are also comparable to similar quarter sections and 5-km blocks used in other states.

Since natural areas and public lands compose a very small percentage of Iowa's landscape, we recognized that a systematic sampling scheme would represent Iowa's predominately agricultural landscape, but would not adequately sample fragmented natural areas where many species find refuge. Consequently, non-randomly selected "priority" blocks were added. Priority blocks were selected on the basis of their unique or representative natural features (e.g. remnant native prairies, wetlands and forests). Most of the priority blocks selected included state or county-owned natural areas such as parks, wildlife areas, state forests or natural preserves. These areas, while fragmented and isolated, provide habitat vital to the survival of many species in Iowa.

To adequately sample Iowa's remaining natural areas, 339 priority blocks were selected. These blocks were spread throughout the state with every county having at least one priority block. Priority blocks were the same size as standard blocks. Although priority blocks were selected to highlight natural communities, many priority blocks also contained agricultural areas within their bounds, since many natural areas were only a few hundred acres. Combining standard and priority areas, 861 blocks were designated as sampling units for Iowa's Breeding Bird Atlas project.

CODES

Iowa's Breeding Bird Atlas field sheet is similar to those used in other states (Appendix 1). There are, however, a few differences between Iowa's codes and codes recommended by The North American Ornithological Atlas Committee (1990), whose recommendations were published after Iowa's project was completed. Iowa combined the "permanent territory presumed through song at the same location on at least two occasions seven or more days apart" with the "permanent territory presumed through defense of the territory" under one code (T), within the "probable" section. We

also accepted "seven or more singing males in suitable nesting habitat during the breeding season" as an indication of "probable" breeding (M). This code was particularly useful for documenting the probable breeding of ground nesting grassland species which sing from conspicuous perches, but have nests that are very difficult to find.

Under the "confirmed" category, "carrying nest material" and "nest building" were combined under one code (NB). "Flightless young of precocial species" and "recently fledged young incapable of sustained flight" were also combined under one code (FL). The final difference was the combining of "adults carrying food, fecal sacs or feeding recently fledged young" into one code of attending young (AY).

The safe dates used to determine the nesting season for each species were generated by the steering committee prior to the start of the project. This list of dates was reviewed by a variety of Iowa's best birders before final acceptance. The safe dates were then included in each breeding bird atlas instruction package to help atlasers determine acceptable times for recording the breeding status of the various species.

COLLECTION OF DATA

Field surveying was conducted by volunteers, IDNR wildlife personnel, personnel from various county conservation boards and some of Iowa's best birders. Additional information was gathered by contacting landowners, graduate students, USFWS personnel, state parks personnel, state foresters, and county conservation boards. Typical species noted by landowners and other agency personnel included Ring-necked Pheasant, Northern Bobwhite, Wild Turkey, Ruffed Grouse, Whip-poor-will, owls, hawks, and waterfowl. These sources were also good for confirming common "backyard" species such as the Northern Cardinal, Black-capped Chickadee, Purple Martin, American Goldfinch, American Robin, and House Wren. Quality control was maintained by asking a variety of questions to assess an individual's knowledge of local birds.

Information was also gathered from quarterly publications such as the IDNR's Wildlife Notes and the IOU's Iowa Bird Life. Annual surveys such as the nest box survey and Breeding Bird Survey (BBS), were also used. Published information was used only if the species was located in a BBA block during the 1985 to 1990 time frame.

Several block-busting weekends were held with varying success. These weekends involved trying to gather a large number of volunteers to do several blocks in an area during one weekend. A few blocks were completed by block-busting, however, most blocks were completed by repeated visits by individuals during the project. Regional coordinators or Nongame staff reviewed the species documented in each block and, when necessary, requested additional visitation of the block or contacted other agency personnel/landowners to inquire about potentially overlooked species.

COVERAGE STANDARDS

Iowa's method of determining when a block had been adequately sampled was flexible and similar to that used in Ohio (Peterjohn and Rice 1991). Sampling of a block was considered sufficient based on the regional coordinator's professional opinion. Normally more than 65 species were recorded in priority blocks with 50 percent of the species being documented in the "probable" or "confirmed" categories. In agricultural standard blocks, 40 to 50 species were usually documented. If 50 percent of the documented species were in the "probable" or "confirmed" category, the block was considered sufficiently sampled.

QUALITY CONTROL AND DATA PROCESSING

Regional coordinators reviewed all field cards for accuracy and completeness. Cards were then sent to the Nongame office where they were double-checked, edited and coded. Once the field forms were coded, they were keypunched by the statistics department at Iowa State University and error-checked by keypunching the data twice.

Once the data were computerized, species printouts were sent to each author responsible for a species. Authors checked for incompatible codes or species located outside of their normal range or habitat. Incompatible code changes were approved by the steering committee. Species located outside of their normal range or habitat were verified by contacting the regional coordinator or birder.

The computer data base is maintained by the IDNR Nongame Program. All changes in the data are done by the IDNR.

BIASES AND LIMITATIONS OF THE DATA

BBA projects do not record every species that is present in each block. The failure to record every species is caused by a variety of factors. Species which nest early or late in the nesting season or are nocturnal were regularly under-sampled because of the extra effort it took to document such species. Birds that are inconspicuous, secretive or have very localized habitat needs were also regularly under-sampled. Because of changing environmental conditions (drought, floods, changing farm practices), certain species might have occurred irregularly in a block and may not have been present during when a block was surveyed.

Habitats within a block might also have received unequal sampling effort. An individual might have concentrated on a block's woodlands and neglected agricultural fields. Likewise, one person might have only surveyed areas near roads, while another spent more time in the interior portion of a block. Additionally, birding expertise varied between individuals. All of these biases were present regardless of whether an observer was a state employee, volunteer or paid birder.

Since such biases exist, it must be recognized that the breeding distribution of some species is only partially

represented. It must also be recognized that changing environmental conditions, dynamic bird populations and variable observer ability are inherent in all atlases. Despite these limitations, atlases are a valuable tool for describing the breeding distribution and habitat associations of a majority of a state's avian species.

RESULTS

Of the 861 BBA blocks, 87 percent ($n = 753$) received at least some sampling effort. Seventy percent ($n = 609$) of the blocks received enough coverage to be classified as "completed" (Fig. 1). The locations of the standard and priority blocks are illustrated in figure 2. Of the 522 standard blocks, 275 were completed and an additional 145 blocks received some sampling effort. Only 6 of the 339 priority blocks were not completed. Our goal of completing at least two standard and all priority blocks in each county was met in 76 of Iowa's 99 counties.

At least 200 species of birds were recorded, and 166 species were confirmed as breeding during the atlas project. The most frequently recorded species were the House Sparrow, Red-winged Blackbird, American Robin and Mourning Dove; while 14 species were only observed once (Appendix B). A total of 195 species were recorded within priority blocks and 181 species were found within standard blocks. The highest number of birds found on any one priority block was 117, while overall, priority blocks averaged 71 species. The average number of species documented within a standard block was 49, while the highest number documented on a single block was 113.

All ten species of special management concern were documented at least once. The Loggerhead Shrike was the most frequently found species of management concern and was recorded in 184 blocks while the Golden-winged Warbler was only found in one block. Confirmation levels, distribution and habitat generalizations will be discussed more fully under the individual account for each species of management concern.

DISCUSSION

IOWA'S AVIFAUNA AND CHANGES IN HABITAT

Iowa has a dynamic bird population which has been strongly affected by large-scale changes in its landscape. Dinsmore (1981) surmised there were 149 regular nesting species in Iowa, 27 occasional nesters and 17 extirpated nesters. Of the extirpated species, nine were extirpated prior to 1900, two were extirpated between 1900 and 1949 and five were extirpated since 1950 (Dinsmore 1981). Since Dinsmore's summary, three extirpated species (Least Tern, Piping Plover, Double-crested Cormorant) have resumed nesting in the state and two other species (Greater Prairie Chicken and Peregrine Falcon) are currently being reintroduced and have recently attempted to nest. Additionally, two other species

BLOCK STATUS

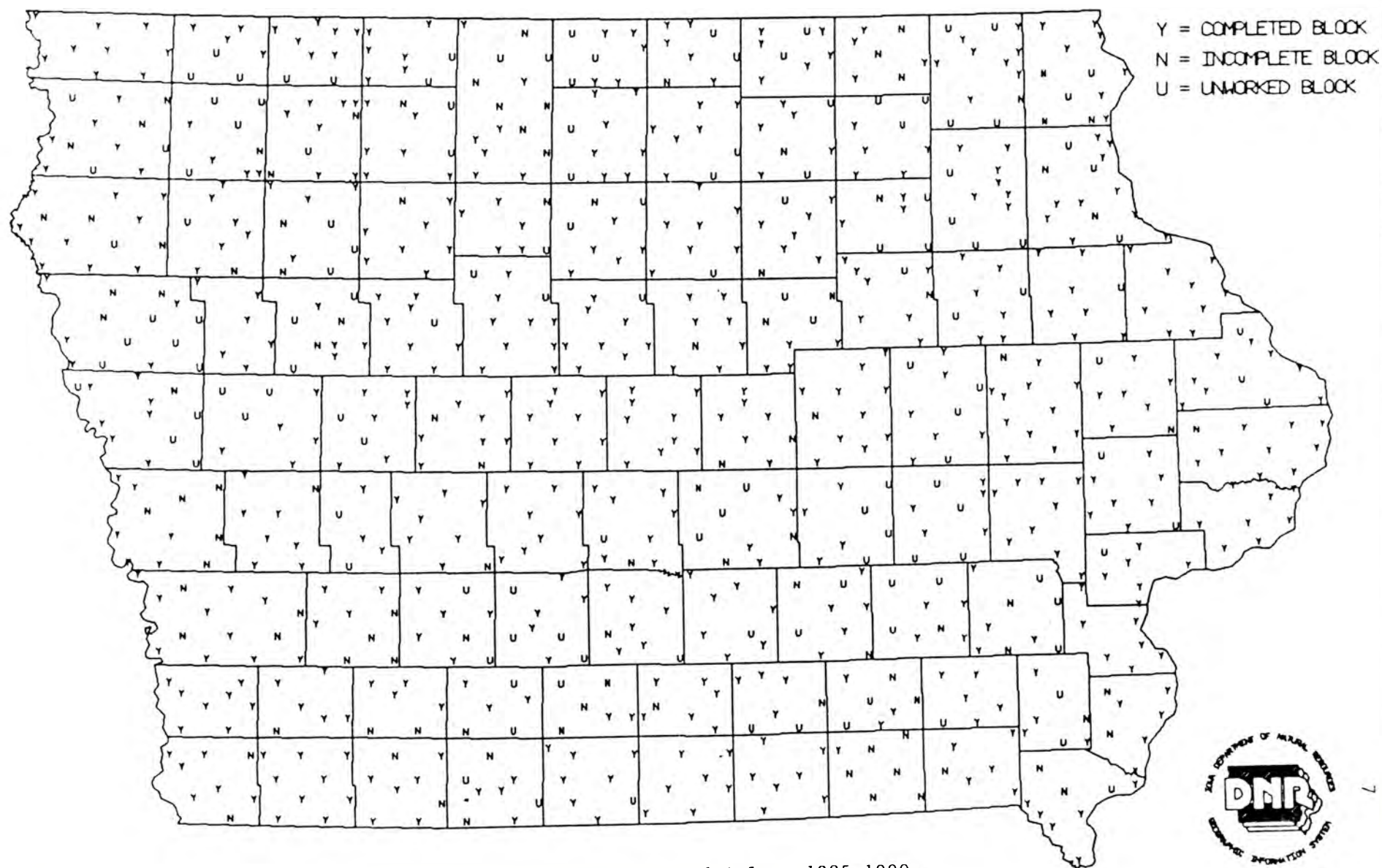


Figure 1. Blocks completed during Iowa's Breeding Bird Atlas, 1985-1990.



BLOCK TYPE

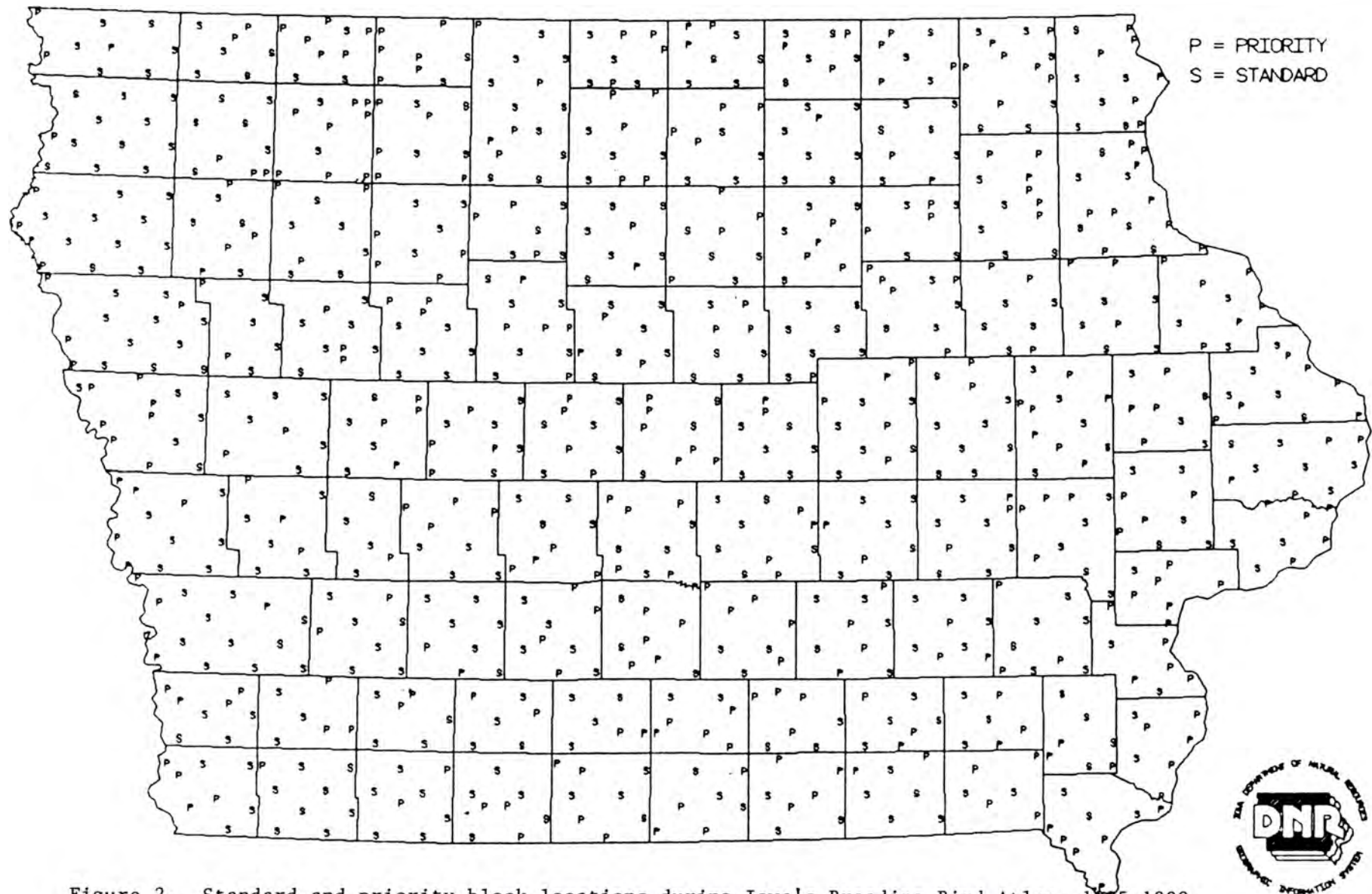


Figure 2. Standard and priority block locations during Iowa's Breeding Bird Atlas, 1985-1990.

recently began breeding in the state. The Great-Tailed Grackle started breeding in Iowa in 1980 (J. Dinsmore pers. comm.), and the House Finch was confirmed nesting in 1986 (Dinsmore and Petersen 1986). The newest breeding list for Iowa reports that 192 species have been documented nesting in the state and 5 species have probably nested (Kent and Bendorf 1991).

Prior to European settlement, 85 percent of Iowa's landscape was dominated by prairie (Howe et al. 1984). The north-central area included the prairie pothole region, which contained thousands of grassy wetlands and marsh complexes. Forests in the state followed the main river valleys (Prior 1976). The largest contiguous forest was in the northeast corner (Prior 1976). Since settlement, 95 percent of Iowa's 7.6-million acre prairie pothole wetlands have been drained (Bishop 1981). Additionally, only 20 percent of Iowa's original 7-million acre forest cover remains and most of these tracts have been logged or grazed (Howe et al. 1984). Only 0.1 percent of the state's native prairie remains (Howe et al. 1984).

Most of Iowa's landscape was developed for agriculture by 1900 (Howe et al. 1984). Farming practices intensified even more in Iowa since 1950 with the enlargement of field sizes, removal of fencerows, channelization of waterways, drainage of wetlands and increased use of farm chemicals (Dinsmore 1981). Corn and soybean production increased and pasture areas decreased from 4-million acres in 1969 to 2.5-million acres in 1982 (U.S. Dept. Commerce 1984). Although no historic quantitative data exists, Dinsmore (1981) considers Iowa's avifauna greatly impoverished since settlement. Population changes for various species have been noted during the last 20 years (Dinsmore et al. 1984, Zaletel and Dinsmore 1985, and Droege and Sauer 1990).

Despite the historic loss of habitat, a few positive changes in land use did occur during the study. With the passage of the Farm Security Act in 1985, 2 million acres of land were set aside in the Conservation Reserve Program from 1986 to 1990 (L. Gladfelter pers. comm.). Additionally, from 1987 to 1991, 3,970 acres of wetlands were restored in the state (L. Gladfelter pers. comm.). Although it is unknown how long these practices will continue, they did provide more habitat for the state's avifauna during the course of the BBA project. Both Delphey (1991) and Hemesath (1991) documented the colonization of restored wetlands by a variety of marsh birds but, they also found, newly restored wetlands, because of the lack of well developed vegetation, appeared to have lower species richness. As the emergent and floating vegetation increases, species richness should also increase (Hemesath 1991).

GEOGRAPHIC REGIONS

To more fully understand the distribution and general habitat associations of the species of management concern, a brief description of Iowa's major geographic regions is presented. The distribution of several of the species of special concern seemed to follow these geographic associations. However, broad physiographic regions may not influence the bulk of Iowa's breeding birds.

Zaletel and Dinsmore (1985) found that 58 percent of the bird species recorded during the BBS survey were found in all 5 regions of the state and the regional range of species only varied from 92 to 107 species.

Prior (1976) describes Iowa's basic landform regions (Fig. 3). To combine agricultural practices with geological factors, the state's game bird survey regions were used (Fig. 4). Counties are shown in Appendix C.

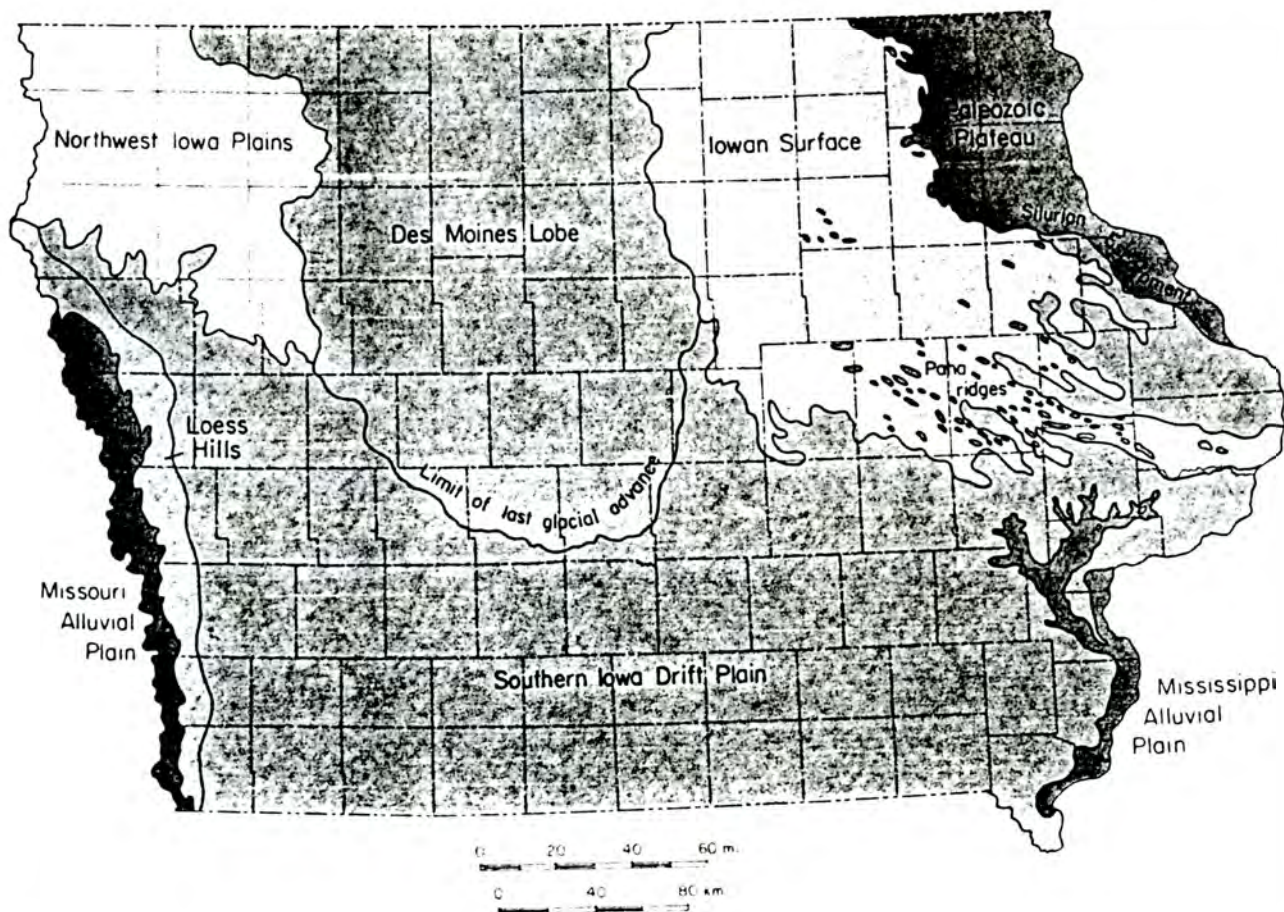
Northeast Dairy Region--Part of the Paleozoic Plateau, this area is characterized by deeply cut, V-shaped streams draining to the Mississippi River, exposed limestone outcroppings and karst geology which creates sinkholes, springs and caves. The largest contiguous forest in the state is in this region. Agricultural fields tend to be smaller here, and dairy farms and pastures are common.

Cash Grain Region--This region contains the Des Moines Lobe which is a poorly drained glaciated area. The land surface is flat to irregular as a result of glacial deposits. The poor drainage resulted in the creation of thousands of wetlands. Nearly all of Iowa's natural lakes are in this area. The area is commonly known as Iowa's prairie pothole region. A few large rivers have eroded deep valleys which are now forested. Historically, most of this area was nearly treeless. Now patches of trees occur around farmsteads and in urban areas, as well as some of the river corridors. This area has been intensely drained and cultivated. Field sizes are large, and road ditches provide a major semi-natural habitat (Zaletel and Dinsmore 1985).

Eastern Livestock Region--Geologically, this area contains portions of the Iowan Surface, Southern Drift Plain and Alluvial Plain. The area is characterized by rolling hills interspersed with level uplands. Drainages have been well established and contain wooded valleys. Some areas contain forested backwaters and old oxbows. Row crops are common but are more restricted in size because of the rolling topography.

Southern Pasture Region--This area is composed of the Southern Drift Plain. Again, the area is characterized by rolling hills that are more forested in the east than the west. Several large, rivers with forested borders flow through the region. Row cropping occurs in this area, but it is limited by topography and tends to be less intensive than the Cash Grain or Eastern Livestock regions. Numerous pastures occur in this area.

Western Livestock Region--The major landform in this area is the loess hills which have very steep relief and are highly erodible. Most of the trees are confined to the river valleys, farmsteads, cities and some sections of the loess hills. Row cropping is common throughout the area. Because of channelization, the Missouri River area contains fewer backwater and oxbow areas than the Mississippi River in the alluvial plains.



Landform Regions of Iowa

Figure 3. Geologic land form map for Iowa from prior 1976.

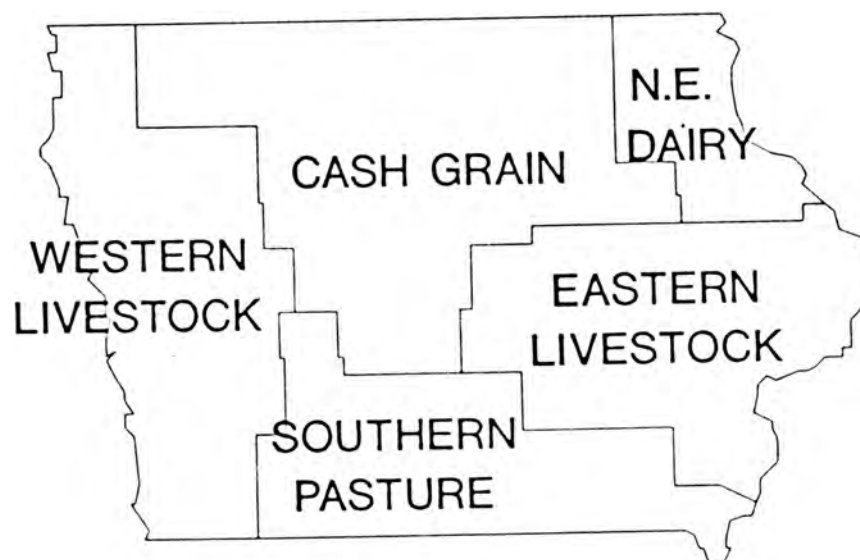


Figure 4. Game survey regions in Iowa.

SPECIES OF SPECIAL MANAGEMENT CONCERN

AMERICAN BITTERN (Botaurus lentiginosus)

	PRIORITY	STANDARD
Observed	5	-
Possible	12	2
Probable	5	1
Confirmed	1	1

Dinsmore et al. (1984) classified the American Bittern as a regular species (seen each year in the state), but rare nester (0 to 4 per season). Dinsmore et al. (1984) also noted the loss of wetlands and hayfields probably reduced the abundance of American Bitterns in Iowa, although they still nest in a few marshes in the northwest and north-central part of the state. The state of Iowa does not list the species as endangered, threatened or a species of special concern.

The BBA project documented the American Bittern in 21 counties. Most of the observations were within the Des Moines lobe of the Cash Grain Region (Figure 5). The bittern was also documented in several counties in the eastern half of the state, particularly in counties adjacent to the Mississippi River. Two observations of the bittern occurred in western Iowa in Woodbury County.

Twenty-three of the observations were made in priority blocks while four records occurred in standard blocks. All of the probable and confirmed sightings were within blocks with wetlands between 100 and 1,260 acres. The areas included many of Iowa's largest and best wetland complexes (Dewey's Pasture, Green Island Wildlife Area, Cone Marsh Wildlife Area, Lost Island Lake, Otter Creek Wildlife Area, Big Wall Lake Marsh, Ingham Wildlife Area and Union Slough National Wildlife Refuge). Union Slough National Wildlife Refuge (standard) and Ingham Wildlife Area (priority) were the two blocks where bittern nesting was confirmed. Both of these areas are within the prairie pothole region in Kossuth and Emmet counties, respectively. All of the probable and confirmed sites contained large areas of emergent vegetation and associated grassy uplands.

Documentation of probable and confirmed American Bittern nesting in large wetlands is similar to an earlier Iowa study by Brown and Dinsmore (1986) that found bitterns only nested in wetlands 27 to 49 acres. Brown and Dinsmore (1986) suggested that the American Bittern might be area-dependent, and the lack of large wetlands could limit nesting. Bent (1926) noted that American Bitterns used areas with dense emergent vegetation and uplands. Although exact site descriptions were not given for each sighting,

American Bittern

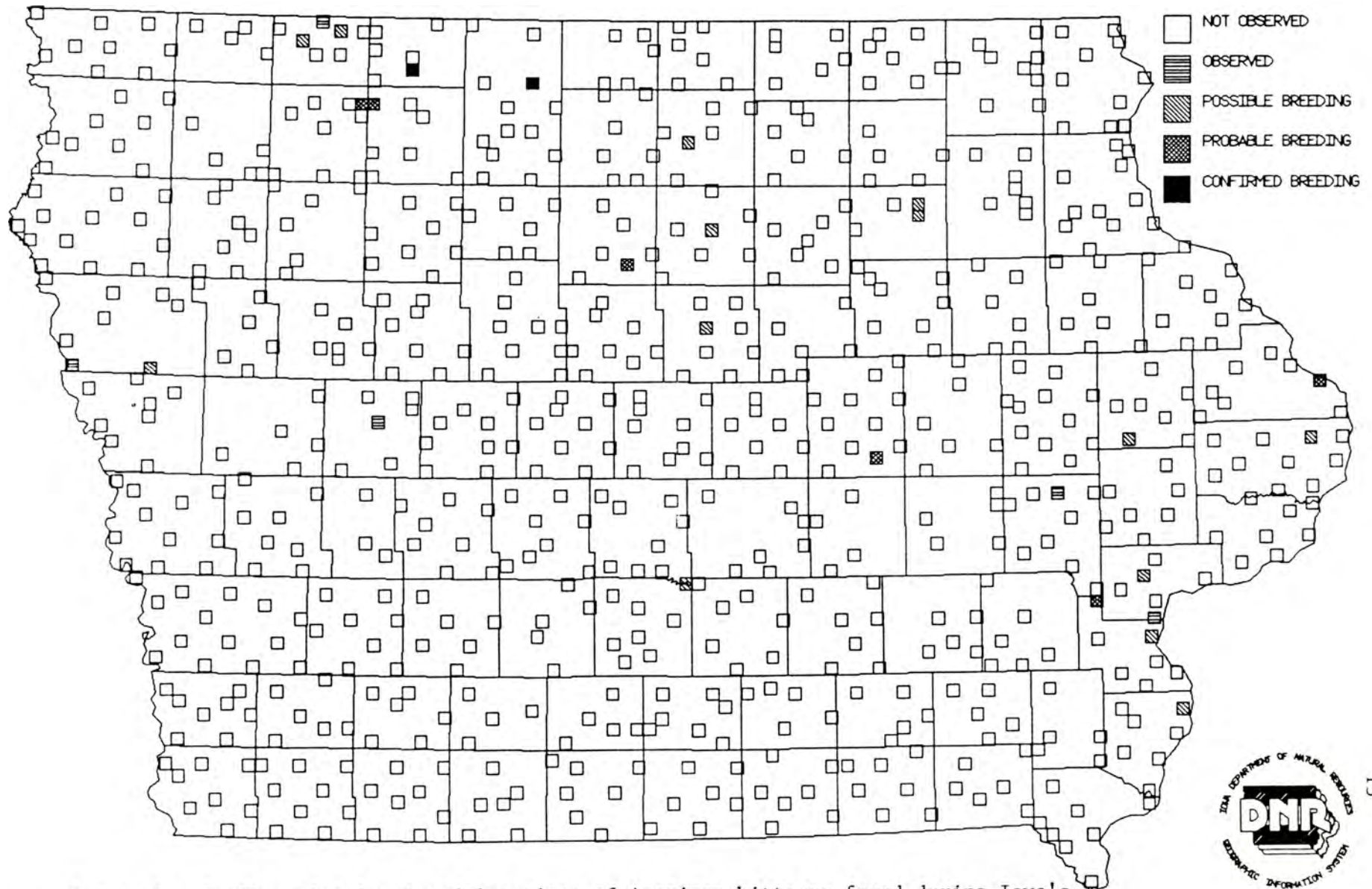


Figure 5. Confirmation level and locations of American bitterns found during Iowa's Breeding Bird Atlas, 1985-1990.

all of the sightings were within blocks with wetlands which contained dense stands of emergent vegetation.

All 27 American Bittern sightings occurred within blocks which contained public wetlands. Although the bittern is secretive and was likely under-sampled, it is unlikely that it occurred in a large number of other areas because of the lack of large wetlands elsewhere in the state. The scattered distribution of the American Bittern will help protect Iowa's statewide bittern population from extirpation due to localized habitat changes, climatic or catastrophic conditions. Likewise, the occurrence of the bittern on public lands will help ensure its future in Iowa as long as these areas continue to be managed as wetlands. Conversely, breeding populations at individual sites may be vulnerable to local extirpation because of climatic conditions, catastrophes, fragmentation and changes in habitat.

The lack of other large wetlands will probably continue to restrict American Bittern distribution and nesting. Although numerous wetlands have been restored recently, most are less than 3.5 acres (L. Gladfelter, pers. comm.). Little is known about American Bittern nesting success or population trends in Iowa. Consequently, the presence of American Bitterns in a variety of areas does not guarantee adequate reproduction or a stable population. More research is needed to document the population trends of this species.

Maintaining large wetlands, particularly wetland complexes that contain grassy uplands will be vital to the survival of this species in Iowa. Research should also be conducted on nesting success and population trends in the state.

LEAST BITTERN (Ixobrychus exilis)

	PRIORITY	STANDARD
Observed	2	-
Possible	12	1
Probable	8	1
Confirmed	4	2

The Least Bittern is a regular but uncommon, nester (5 to 24 per season) in Iowa (Dinsmore et al. 1984). Where it does nest in western and northwestern Iowa in cattail and bulrush marshes, it can be fairly common (Dinsmore et al. 1984). The Least Bittern is not a threatened, endangered, or species of special concern in Iowa.

The Least Bittern was recorded in 28 counties by the BBA project (Fig. 6). Compared to a 1960 to 1982 nesting map by Dinsmore et al. (1984), nests of the Least Bittern were confirmed in 3 additional counties (Woodbury, Franklin, Madison) and were noted as probably breeding in 7 other counties (Winnebago, Allamakee, Tama, Jones Jackson, Clinton, Kossuth). This expansion in breeding distribution is supported by BBS data which showed a 2.7 percent annual increase in Least Bitterns from 1966 to 1987 in this region (Hands et al. 1989). Unfortunately, there was not enough usable data from Iowa to measure Iowa-specific trends (Hands

Least Bittern

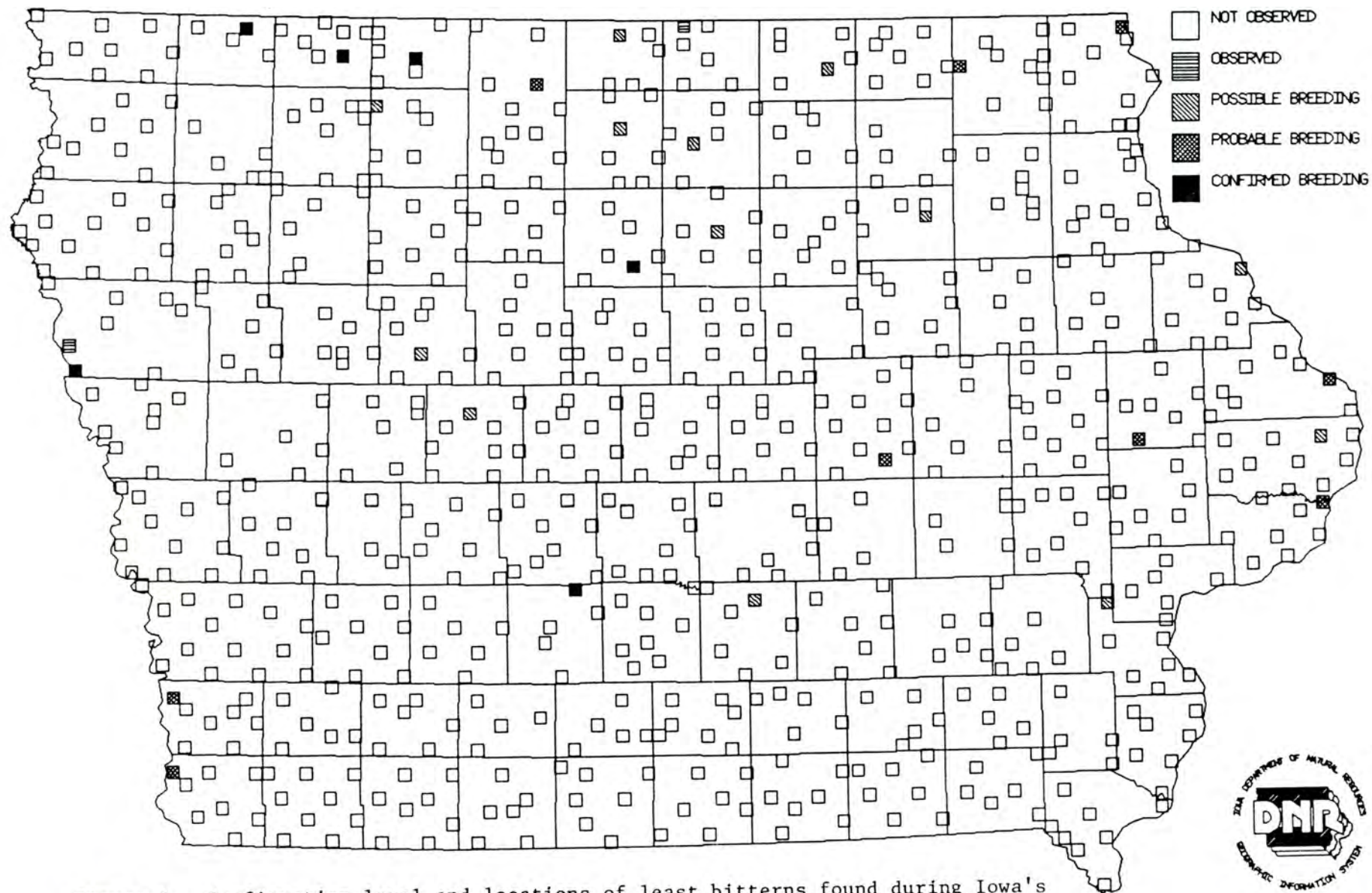


Figure 6. Confirmation level and locations of least bitterns found during Iowa's Breeding Bird Atlas, 1985-1990.



et al. 1989).

Most of the BBA observations for the Least Bittern were in the Des Moines lobe area of the Cash Grain Region and counties adjacent to the Mississippi River. The western Iowa sightings were in blocks which contained public wetlands: Brown's Lake, Snyder and Winnebago Wildlife Area (Woodbury county), Folsom Lake (Mills county) and Forney Lake Wildlife Area (Fremont county). Twelve of the 30 blocks which had Least Bitterns also recorded American Bitterns.

Most of the sightings in the 26 priority blocks and 4 standard blocks were on public property. Like the American Bittern, probable and confirmed records for the Least Bittern were on larger wetland areas (40 to 1,040 acres). Brown and Dinsmore (1986) also documented nesting Least Bitterns most frequently on larger wetlands (12 acres to >49 acres). The Least Bittern appeared to have an area-dependant distribution (Brown and Dinsmore 1986) similar to the American Bittern, but in all marsh size classes, the Least Bittern was more frequently observed. Delphey (1991) also noted Least Bitterns more frequently than American Bitterns in Iowa marshes. Both bitterns were observed on newly restored wetlands, but they were not believed to be nesting (Delphey 1991). Hemesath (1991) found Least Bitterns only nested on the largest restored wetland.

The scattered breeding distribution and use of public wetlands will help ensure the continuance of a statewide breeding population of Least Bitterns in Iowa. Individual sites however, will be vulnerable to climatic, catastrophic or habitat changes which could render a site unsuitable. The distribution of Least Bitterns is probably somewhat under-represented by the BBA project because of the bittern's secretive nature and use of densely vegetated wetlands. However, the finite number of large wetlands in Iowa probably limits the breeding distribution of Least Bitterns in the state and would likely restrict additional expansion. Maintaining large wetlands and wetland complexes with well developed emergent vegetation will be important to the survival of Least Bitterns in Iowa. More research is needed on the population trends of this species. Research is also needed to determine if these pockets of breeding sites are maintaining viable populations.

BLACK TERN (Chlidonias niger)

	PRIORITY	STANDARD
Observed	18	2
Possible	23	5
Probable	9	2
Confirmed	6	1

The Black Tern is a regular, locally common nester in the northern half of Iowa and an uncommon nester elsewhere (Dinsmore et al. 1984). Dinsmore et al. (1984) noted that some observers felt there was a lack of large concentrations of Black Terns in recent years. The Black Tern is a species of special concern in Iowa (Appendix D). Nationally, BBS data have shown a significant 5.4

Black Tern

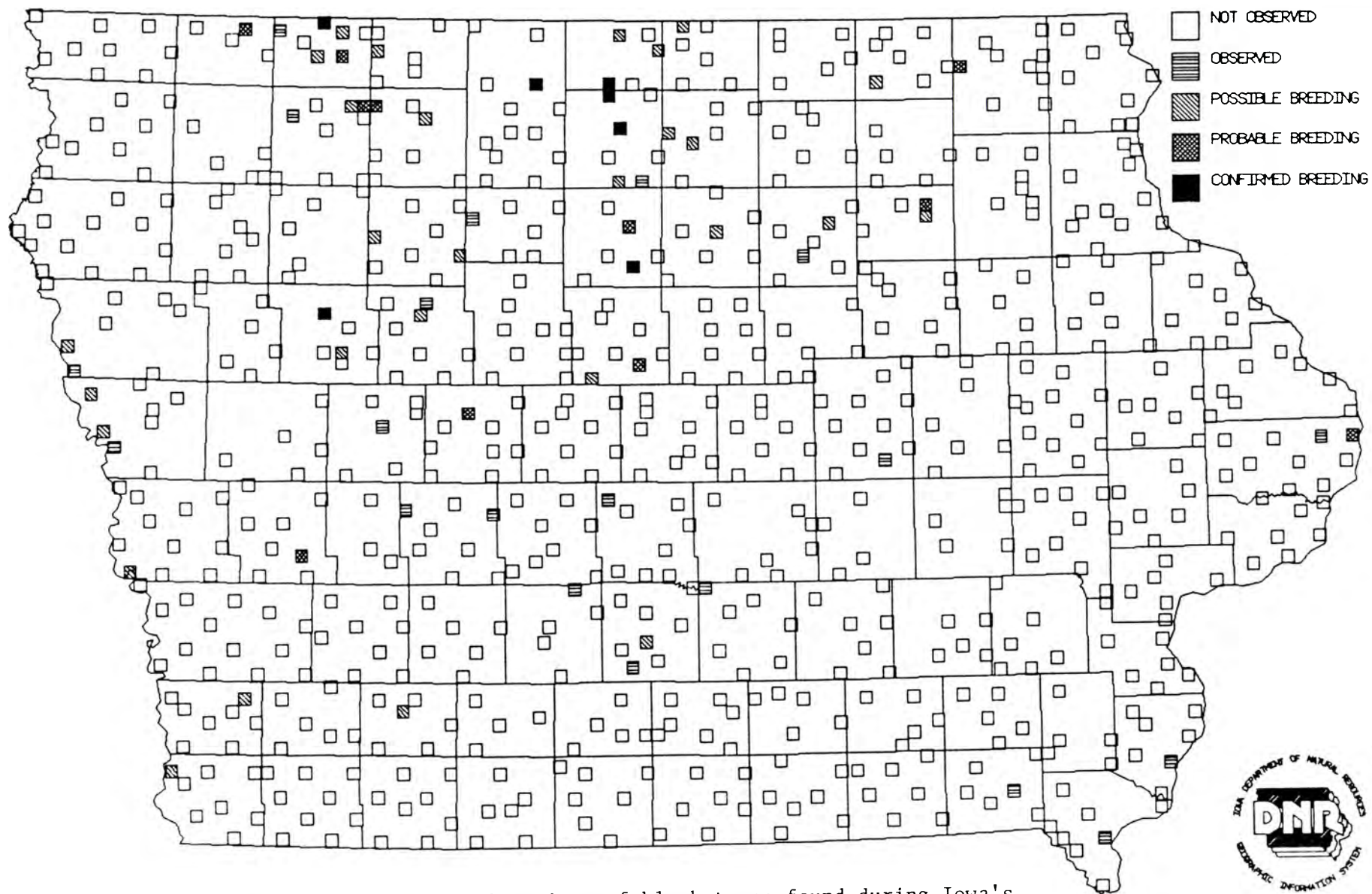


Figure 7. Confirmation level and locations of black terns found during Iowa's Breeding Bird Atlas, 1985-1990.

percent annual decline in Black Terns (Droege and Sauer 1990). Unfortunately, there is not enough Iowa-specific BBS data to determine population trends in the state. Bernstein (1988) compared Black Tern populations during 1966 - 1968 in two areas to populations in 1988 and noted a large decline in nesting between the two time periods. Some of the change might have been caused by differences in the glacial marsh cycle between the two time periods (Hands et al. 1989).

Weller and Spatcher (1965) documented 0 - 36 nests at Little Wall Lake and 10 - 42 nests at Anderson Lake from 1958 to 1962. Weller and Fredrickson (1973) also followed tern nesting at Rush Lake which varied from 0 to more than 200 nests between 1962 and 1971 due to the glacial marsh cycle. Based on these estimates, Dinsmore (pers. comm.) believes Black Tern populations have decreased in the last 20 to 30 years.

Black Terns were recorded in 39 counties by the BBA project (Fig. 7). The Black Tern was most frequently observed in the wetlands of the Des Moines lobe and in the alluvial plains bordering the Missouri River in the Western Livestock Region. Only four sightings outside of the prairie pothole region were probable, none were confirmed and the rest were either observed or possible.

Most of the 56 priority block and 10 standard block records of terns were in areas which contained public wetlands. Like the bitterns, the probable and confirmed records of Black Terns occurred on some of Iowa's largest wetlands and best wetland complexes (46 to 1,260 acres). Six of the 18 probable and confirmed observations of terns occurred in blocks which also documented probable or confirmed breeding of bitterns (Dewey's Pasture, Spring Run, Lost Lake Island, Cardinal Marsh, Union Slough National Wildlife Refuge and Big Wall Lake Marsh).

Brown and Dinsmore (1986) found a significant linear relationship between increasing marsh size and Black Tern frequency of occurrence. The Black Tern was area-dependent and only occurred in marshes greater than 12 acres (Brown and Dinsmore 1986). The terns also had a higher frequency of occurrence in wetland complexes than isolated wetlands for all size classes (Brown and Dinsmore 1986). Hemesath (1991) also found terns nesting only on two of the larger restored wetlands (15 and 22 acres).

The scattered breeding distribution and use of public wetlands should help sustain statewide Black Tern populations in Iowa. Individual breeding sites however may be vulnerable to local conditions and changes which could make the site unsuitable. The lack of additional large wetlands or marsh complexes will limit tern distribution in the state. Restoring or enhancing wetland complexes and large marshes will benefit Black Terns. Nest platforms have also been successfully used in other states but have not been used in Iowa. More research is needed on population trends of Black Terns to determine the status of this species.

NORTHERN HARRIER (Circus cyaneus)

	PRIORITY	STANDARD
Observed	4	4
Possible	18	8
Probable	1	3
Confirmed	8	1

The Northern Harrier is a regular, common migrant and rare nester (Dinsmore et al. 1984). Once a common nester in Iowa, it is now one of the state's rarest breeding birds (Dinsmore et al. 1984). The Northern Harrier is a state endangered species (Appendix D). The decline of the Northern Harrier is attributed to the loss of moist prairies and other grasslands where it nests. Harrier populations have declined 0.9 percent annually nationally (Droege and Sauer 1990).

Prior to the BBA project, the harrier had only been documented nesting in Johnson, Sioux, Appanoose, Howard and Emmet counties from 1950 until the early 1980s (Dinsmore et al. 1984). The BBA project documented the presence of Northern Harriers in 29 counties (Fig. 8) and confirmed breeding in 7 (Dickensen, Emmet, Guthrie, Howard, Johnson, Kossuth and Story). The harrier was most frequently reported in the Des Moines lobe of the Cash Grain region. Six of nine confirmed breeding reports were in the prairie pothole region. All of the confirmed nests were on areas that contained 30 to 800 acres of prairie, marsh or grassland. Confirmed nesting occurred on some of the state's best prairies such as Cayler Prairie (160 acres), Anderson Prairie (200 acres), Hayden Prairie (240 acres) and Williams Prairie (30 acres). Other confirmed nests were on public wetland areas which contained grassy uplands such as Bays Branch Wildlife Area, Hendrickson Marsh Wildlife Area and Union Slough National Wildlife Refuge. Probable nesting reports were from public areas that had large grassland areas.

Based on recommendations from F. Hamerstrom, Sweet (1991) recommended that a minimum management unit of 323 acres would be necessary to maintain a viable population of three to five nesting pairs of harriers. Most of Iowa's grasslands are not large enough to support multiple nesting pairs of harriers. Consequently, harrier reproduction and replacement at most given sites will be particularly sensitive to nest losses and habitat changes.

The lack of large prairie, grassy marshlands and other grassland areas will continue to limit the distribution of harriers in the state. Wetland restorations and CRP programs probably aided harrier populations in the state during the BBA project. It is unknown how much nesting habitat might have been added through these programs, but it is likely that they provided additional foraging and wintering areas. Restoring, enhancing and enlarging prairie or wetland complexes with grassy uplands should benefit Northern Harriers. More research is needed on the viability and population trends of harriers in Iowa.

Northern Harrier

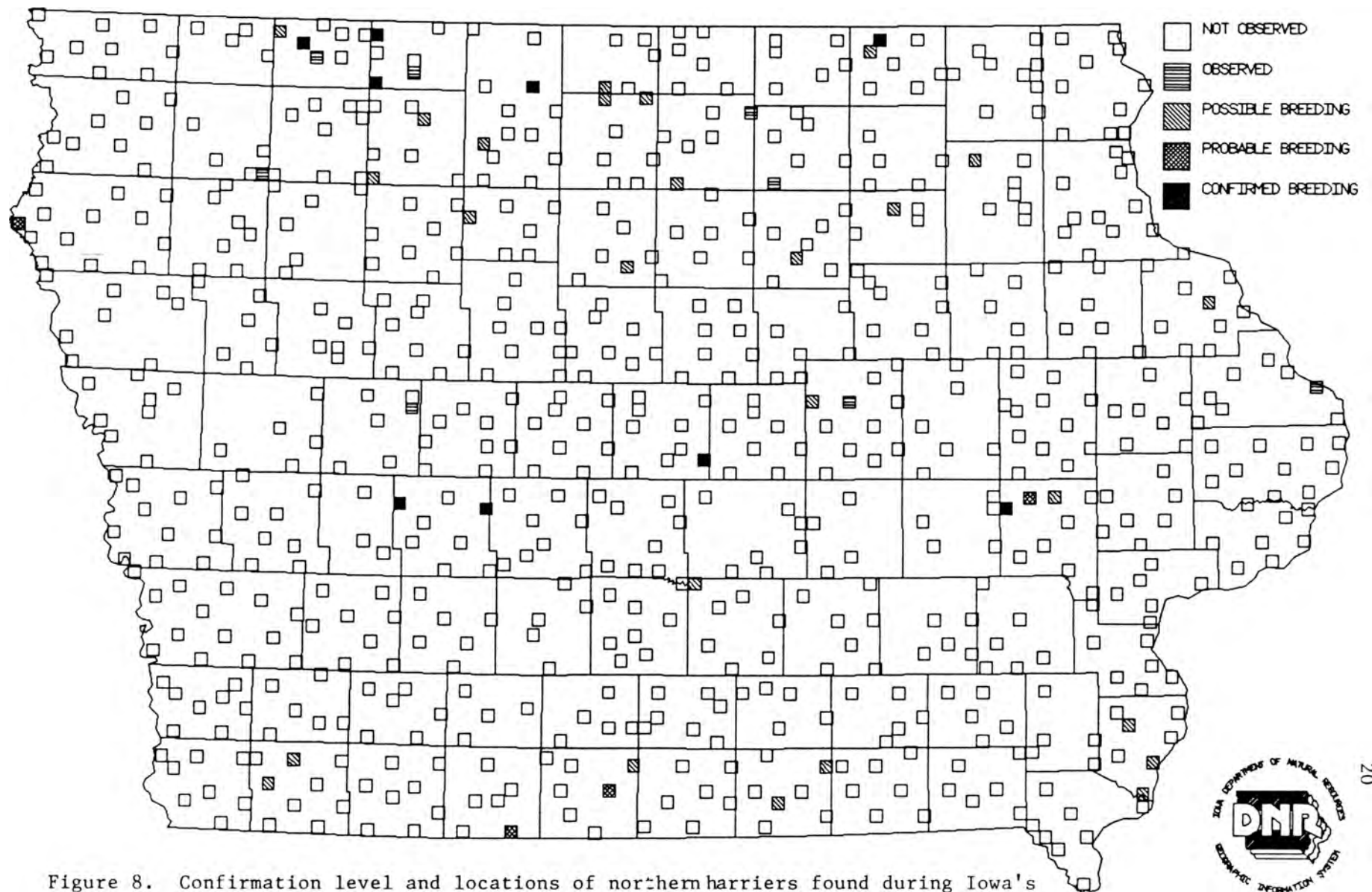


Figure 8. Confirmation level and locations of northern harriers found during Iowa's Breeding Bird Atlas, 1985-1990.

RED-SHOULDERED HAWK (Buteo lineatus)

	PRIORITY	STANDARD
Observed	1	1
Possible	6	1
Probable	3	1
Confirmed	6	1

The Red-Shouldered Hawk (RSH) is a regular, rare nester and permanent resident in Iowa (Dinsmore et al. 1984). The RSH formerly nested throughout Iowa, but by 1980, the bird was confined to a few territories along the Mississippi River in the northeastern part of the state (Bednarz and Dinsmore 1982). The decline of the RSH in Iowa began in the mid-1950s (Brown 1964) and the downward trend continued nationally until 1964 (Brown 1971). In Iowa, the RSH is a state endangered species (Appendix D). Although there is insufficient Iowa-specific data, national BBS data indicates a significant 2.3 percent annual increase in RSH populations from 1966 to 1989 (Droege and Sauer 1990).

During the BBA project, the RSH was found in 13 counties (Fig. 9). Most of the observations were in the Northeast Dairy Region of the state, particularly along the Mississippi River. This area contains the state's largest contiguous forest and some of the largest floodplain forests. The RSH was also found in southern Iowa along the Mississippi River and some interior sites with large riparian forests. Bednarz and Dinsmore (1982) noted most RSH nests were in large floodplain forests. As relative cropland areas increased, RSH nesting decreased and Red-Tailed Hawk nesting increased (Bednarz and Dinsmore 1982). Forest-clearing and the drainage/channelization of riparian wetlands have reduced the amount of nesting habitat available for the RSH (Bednarz 1979).

RSH breeding was confirmed in large public woodlands such as Yellow River State Forest, Effigy Mounds National Monument, Pike's Peak State Park, Dudgeon Lake and Sweet Marsh Wildlife Management Area. Stravers (1989) found 8 nests in the state, all of which were on public lands. Several of the nest sites documented by Stravers were within BBA blocks.

Stravers (1989) noted that the RSH nested in late successional floodplain forest which contained a well developed canopy, open understory and had not been logged within the last 30 years. The average woodland size where the nests were located was 96 acres. The sites also had adjacent wetlands and upland forests (Stravers 1989). Most of the nests tended to be more than 500 m from disturbances such as roads, croplands or houses (Stravers 1989). Bednarz and Dinsmore (1982) estimated that a minimum of 304 acres of floodplain forest would be necessary for RSH nesting. Stravers (1989) estimated that 250 to 300 acres would be necessary. All authors noted the importance of interspersed marshes, sloughs, backwaters and flooding.

The number of documented RSH nests in Iowa has increased very little during the last 20 years. Bednarz (1979) found 7 pairs in 1978, while Stravers (1991) found 8 in 1989 and 9 in 1990 and 1991. Stravers (1991) suggests that there may be a small but

Red-Shouldered Hawk

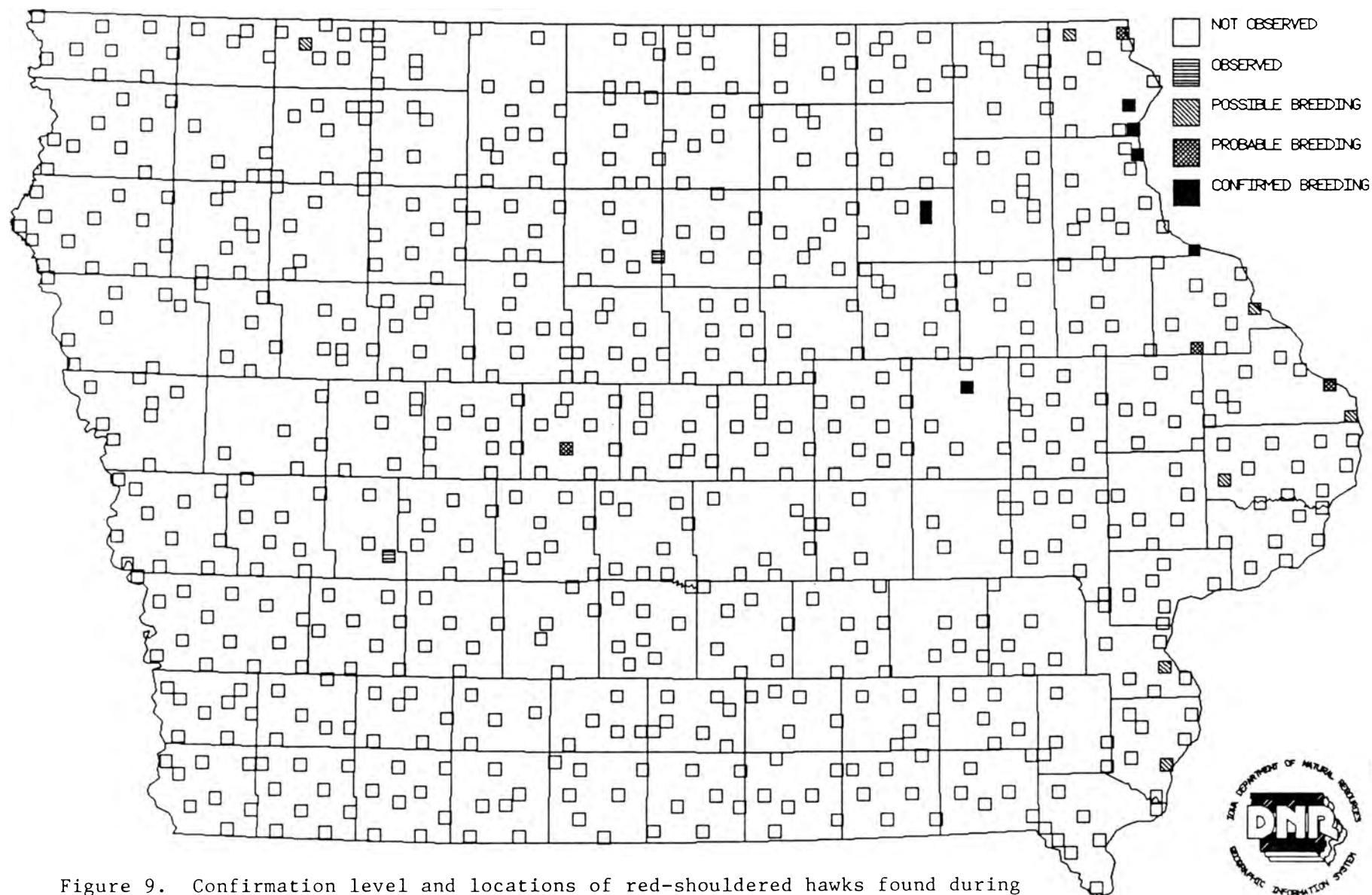


Figure 9. Confirmation level and locations of red-shouldered hawks found during Iowa's Breeding Bird Atlas, 1985-1990.



stable breeding population of RSHs in Iowa with very strong nest site fidelity. Reproductive rates between 1983 and 1990 averaged 2.4 fledglings per successful nest which should be adequate for replacement (Stravers 1991).

RSH populations are unlikely to increase in Iowa unless more floodplain forest habitat is restored or the RSH becomes more tolerant of nesting in fragmented habitats near human disturbance. Stravers (1991) felt crow populations might also be limiting RSH populations, particularly in southeast Iowa. The few nest sites that remain in Iowa will be susceptible to local disturbances or changes in habitat. These areas should be managed to maximize floodplain forest area and the interspersed of foraging areas. Future research projects should quantify RSH nest site preferences to help managers recognize or create potentially suitable nesting areas.

BARN OWL (Tyto alba)

	PRIORITY	STANDARD
Observed	5	4
Possible	15	12
Probable	6	3
Confirmed	1	-

The Barn Owl is a rare, permanent resident (Dinsmore et al. 1984) that is listed as endangered in Iowa (Appendix D). Between 1950 and 1982, only 7 nests were reported in Iowa (Dinsmore et al. 1984). The loss of grassland habitat is probably the major reason for the decline of Barn Owls in the state (Ehresman et al. 1988).

The Barn Owl was observed in 30 counties during the BBA (Fig. 10) and was most frequently seen in the southern half of the state. Only one nest was confirmed in an atlas block, but from 1983 to 1991, 2 nests were located in Sac and Wayne counties and single nests were found in Adair, Montgomery, Clark and Taylor counties (Ehresman pers. comm.). It is unknown whether the slight increase in Barn Owl nest records during the past decade was a result of more grassland habitat via the CRP program, an increase in public awareness, or both.

To augment the low Barn Owl population documented from 1950 to 1982, 427 owls were released in the state at 44 different sites from 1983 to 1987 (Ehresman et al. 1988). No released birds were found nesting, so in 1985 and 1986 a radio telemetry project was initiated to determine the fate of released owls. Twenty-four of 36 released birds died before radio contact was lost (Ehresman et al. 1988). Great Horned Owls were responsible for 9 of 13 avian mortalities, vehicle collisions accounted for 4 mortalities, mammals caused 2, and 5 owls died of unknown causes (Ehresman et al. 1988). Since the release program did not seem to contribute to the breeding population of the state, releases were discontinued. In 1990 a survey was conducted on known Barn Owl nest boxes. None of the 89 boxes had a nest, although two contained Barn Owl pellets (Ehresman 1990).

Common Barn-Owl

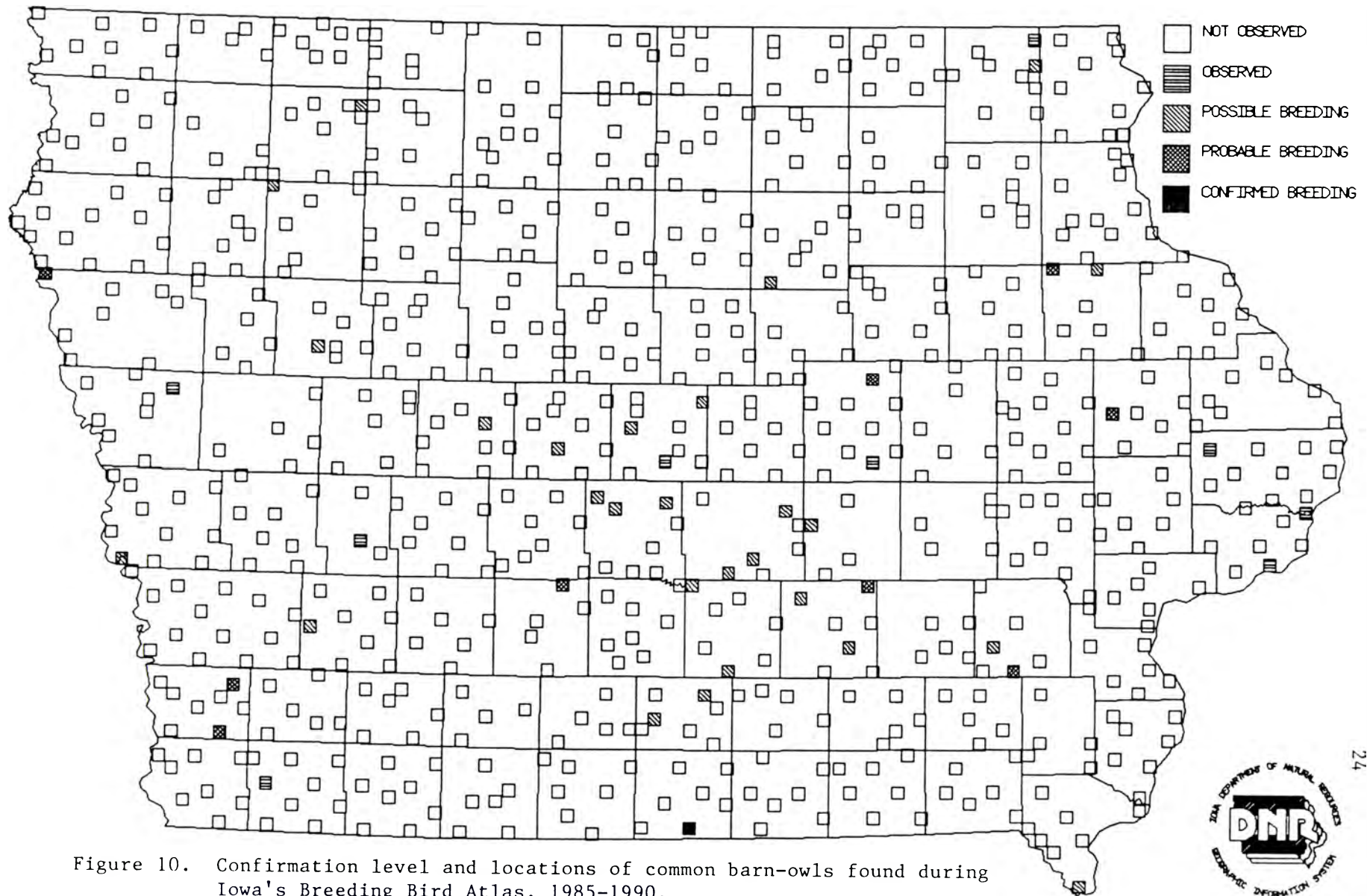


Figure 10. Confirmation level and locations of common barn-owls found during Iowa's Breeding Bird Atlas, 1985-1990.

Unlike the other species of special concern, which occurred primarily on public lands, most of the Barn Owl sightings were on private lands. The owls were typically found on farmsteads which contained large grassland areas and relatively little timber (Ehresman pers. comm.).

The expansion of the barn owl population in Iowa will be limited by the amount of grassland habitat, nest sites in buildings or trees and competition from Great Horned Owls. If the CRP program continues or is expanded, more grassland habitat would be available for the owls, but they must also escape predation. Grasslands near timbered areas which host Great Horned Owls and other predators may not be suitable. Although more nests were found between 1983 and 1991 than during 1950 to 1982, most of the nests were only documented during a single year. Only the nest in Taylor county has been used in successive years. Thus, although Barn Owls occur in the state, there is no known, firmly established nesting population. Nest sites have been erratic and short-lived, with no persistent population source.

Habitat characteristics of Barn Owl nests and observations from the BBA project should be quantified. This would provide more insight on the habitat needs of barn owls and potential areas to search for nests.

LOGGERHEAD SHRIKE (Lanius ludovicianus)

	PRIORITY	STANDARD
Observed	2	3
Possible	46	47
Probable	9	18
Confirmed	31	28

The Loggerhead Shrike is a regular, uncommon resident of southern Iowa and rare in northern Iowa (Dinsmore et al. 1984). Most of the shrike nesting is in the southern 4 tiers of counties (Dinsmore et al. 1984). The Loggerhead Shrike is a species of special concern in Iowa (Appendix D). Best et al. (1991) noted that statewide BBS data indicated that shrike populations tended to decline in southwestern Iowa and increase in the eastcentral. Other regions in the state had no change, or erratic changes that showed no measurable trend (Best et al. 1991). Nationally, Droege and Sauer (1990) found a 3.7 percent annual decline in shrike populations from 1966 to 1989.

During the BBA, 184 occurrences of shrikes were documented throughout 65 counties (Fig. 11). Most of the reports were from the Southern Pasture Region and the southwestern portion of the Western Livestock Region. The southern half of Iowa (particularly in the west) contains more grassland areas than other portions of the state. These grasslands include pasture, old field, and CRP areas. The shrike was found in 96 standard blocks and 88 priority blocks. Thus, like the Barn Owl, private lands provide much of the area used by shrikes in the state.

DeGeus (1990) found an average of 0.13 pairs of loggerheads per km along gravel roads in southwestern Iowa. Seventy-eight

Loggerhead Shrike

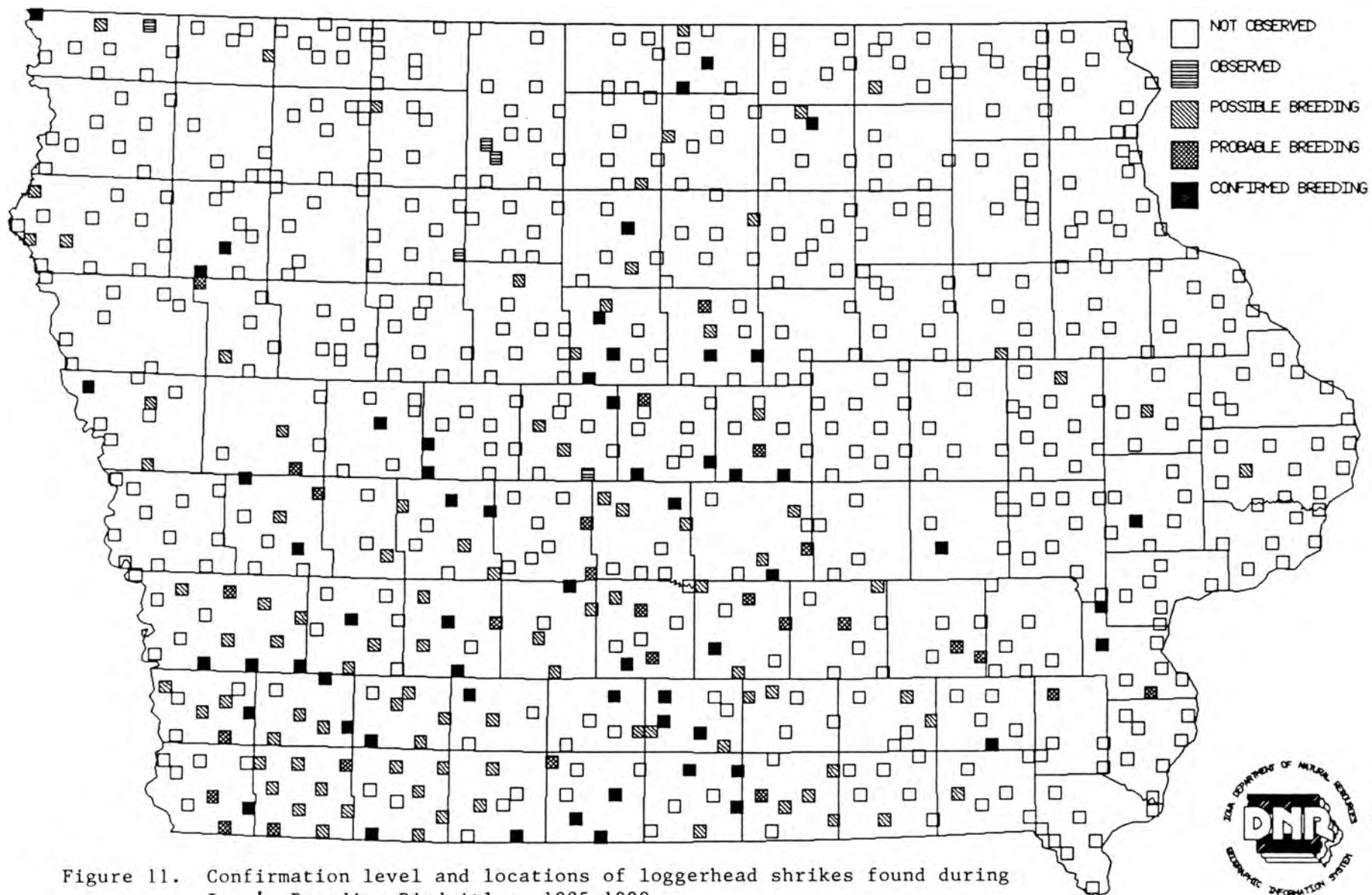


Figure 11. Confirmation level and locations of loggerhead shrikes found during Iowa's Breeding Bird Atlas, 1985-1990.

percent of the roadside nest sites were bordered on at least one side by grasslands (DeGeus 1990). Only 35 percent of the nests were successful, however, and predation accounted for 86 percent of the nest losses (DeGeus 1990). DeGeus (1990) suggested that although roadsides provide the structural components necessary for nesting, they might be an ecological trap because of their vulnerability to predation. The nest success of 2.2 young/pair in Iowa roadsides was below the 5.5 young/pair that Brooks and Temple (1990) estimated was necessary to offset mortality losses.

Despite the large number of shrike observations during the BBA, DeGues' results suggest that the use of roadside habitats might actually be contributing to the decline of the shrike population due to high predation rates. Use of other linear habitats such as fencerows might also be vulnerable to high predation losses since these areas serve as travel corridors to predators such as raccoons (Glueck et al. 1988). Consequently, much of the nesting habitat in Iowa might be highly susceptible to predation. Additional research should be initiated to determine nest success in other habitats and the viability of Iowa's shrike population.

GOLDEN-WINGED WARBLER (Vermivora chrysoptera)

	PRIORITY	STANDARD
Observed	-	-
Possible	-	-
Probable	-	-
Confirmed	-	1

Dinsmore et al. (1984) considered the Golden-winged Warbler a regular but uncommon migrant and noted there were no recent nests recorded in Iowa. The Golden-Winged may have been replaced by Blue-winged Warblers which can be locally common in good habitat (Dinsmore et al. 1984). Both the Brewster's and Lawrence's hybrid forms of the Blue-Winged and Golden-Winged Warblers have been observed in Iowa. The Golden-Winged Warbler is not listed as threatened, endangered, or a species of special concern in Iowa.

Only a small portion of Iowa along the Mississippi River is in the current breeding range of this warbler (Hands et al. 1989). The only observation of the Golden-Winged Warbler during the atlas was a confirmed nesting in the south-eastern most county (Fig. 12). The standard block included the Croton Unit of Shimek State Forest. This unit contains one of the largest contiguous woodlands in southern Iowa. The area also includes some clearcuts of various ages and old fields.

This recent confirmed breeding is the only nesting record since 1898 (Anderson 1907). Golden-winged Warblers are not part of Iowa's regular breeding avifauna. It is interesting that more of these warblers haven't used abandoned pastures or bottomland timber cuts, however, many of the bottomland timber cuts are quickly converted to agricultural fields. Iowa appears to play a very minor role in the breeding ecology of this species.

Golden-winged Warbler

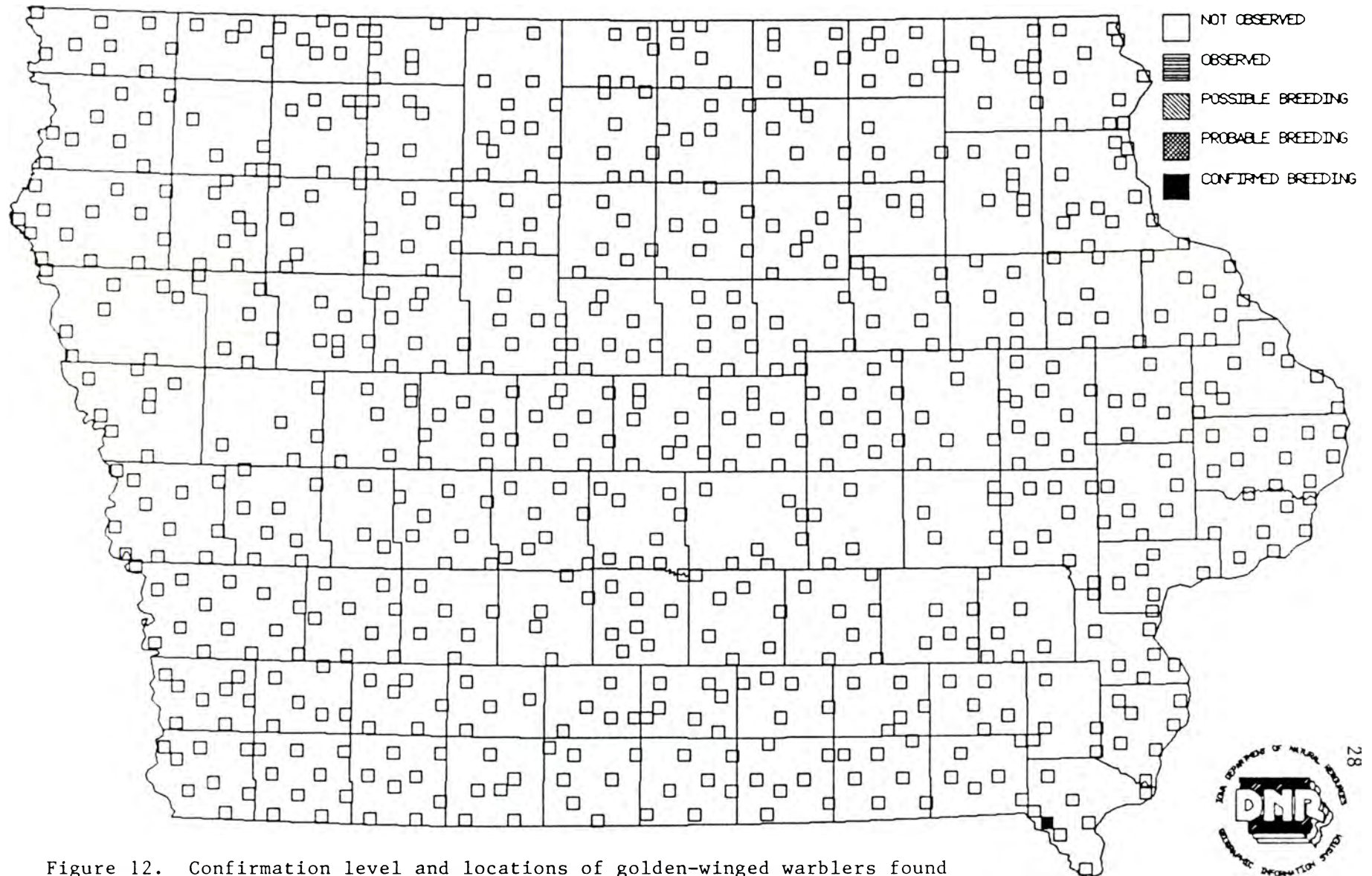


Figure 12. Confirmation level and locations of golden-winged warblers found during Iowa's Breeding Bird Atlas, 1985-1990.

CERULEAN WARBLER (Dendroica cerulea)

	PRIORITY	STANDARD
Observed	1	-
Possible	22	8
Probable	10	-
Confirmed	3	-

The Cerulean Warbler is a regular, uncommon migrant, but can be locally common during the summer in deciduous forests along rivers and streams in southern and eastern Iowa (Dinsmore et al. 1984). The Cerulean Warbler is not listed as threatened, endangered or a species of special concern in Iowa.

The BBA documented the presence of the Cerulean Warbler in 28 counties (Fig. 13). Most of the sightings were in the eastern third of the state with a few scattered sightings in central Iowa along major river corridors. The majority of the sightings were in priority blocks that contained public woodlands. Confirmed sightings occurred in blocks that contained large forests such as Yellow River State Forest, Lacey Keosauqua State Park and Shimek State Forest. Probable sightings occurred in forested areas such as Effigy Mounds National Monument, Ledges State Park, Bloody Run, Pike's Peak State Park, Clayton County Conservation-Osborn area, White Pine Hollow, Palisades Kepler State Park, Amana Woods, Elk River Junction and Bond Hill.

Although Iowa-specific data are lacking, Hands et al. (1989) noted that in the north-central region, BBS data indicated a 3.1 percent annual decline in cerulean populations between 1966 and 1987. Habitat fragmentation is believed to be the major reason for the decline. Bond (1957) noted ceruleans tended to use forest greater than 40 acres. Robbins et al. (1989) suggested preserving tracts of mature, lowland deciduous forest greater than 1,730 acres for Cerulean Warblers.

The lack of large woodlands in Iowa will continue to restrict the distribution and nesting of Cerulean Warblers. However, ceruleans appear to be inhabiting many of the state's largest forested areas. Continuance of these large forested areas will be vital to the presence of the Cerulean Warbler. Unfortunately, the actual breeding population and nesting success of these warblers is unknown in the state. Additional population monitoring plus research on the relationship between forest size and nesting success should be conducted.

Cerulean Warbler

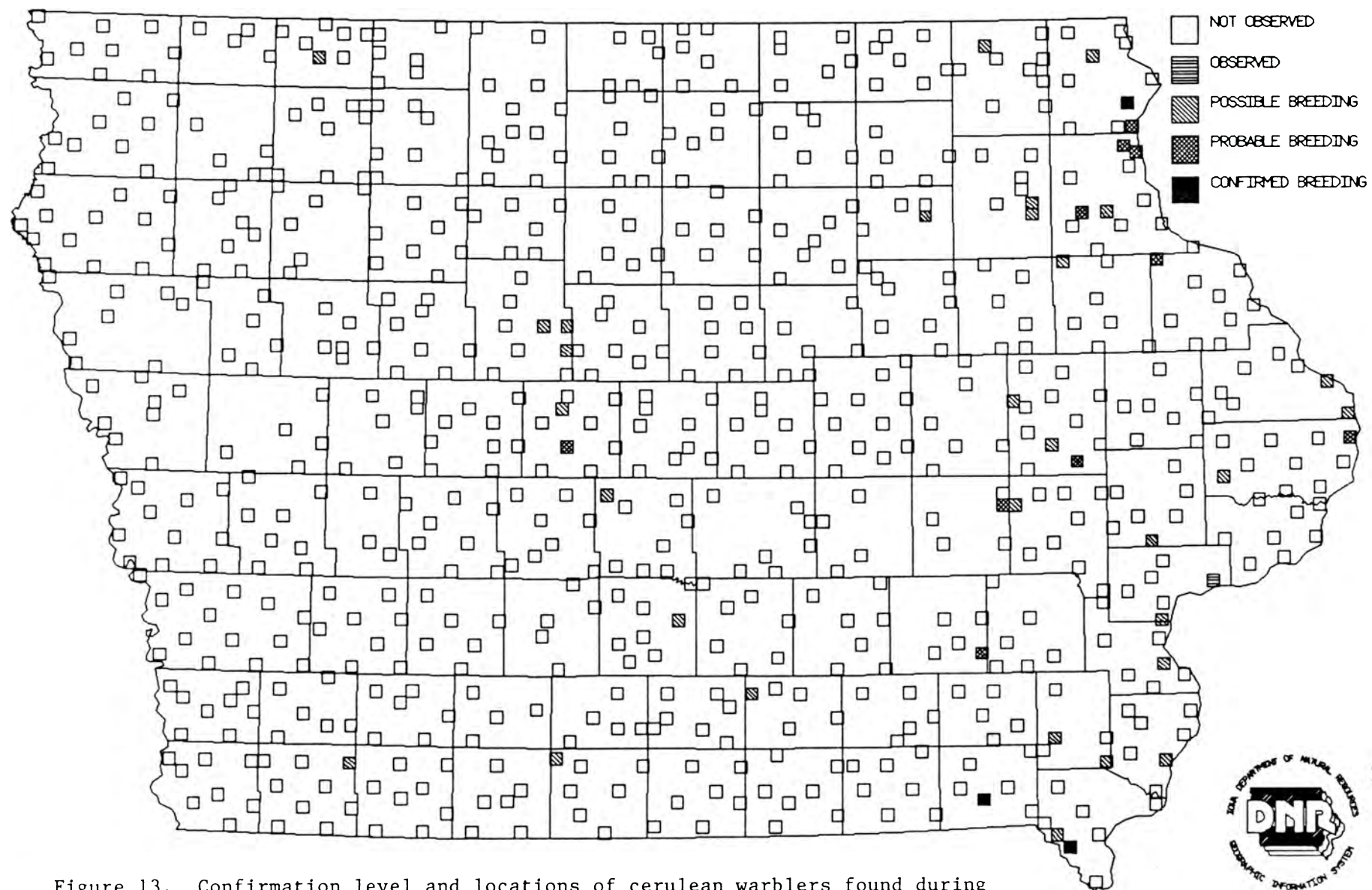


Figure 13. Confirmation level and locations of cerulean warblers found during Iowa's Breeding Bird Atlas, 1985-1990.

HENSLOW'S SPARROW (Ammodramus henslowii)

	PRIORITY	STANDARD
Observed	-	-
Possible	1	5
Probable	1	-
Confirmed	-	-

The Henslow's sparrow is a regular, rare summer resident found in tall grasslands, prairie remnants and weedy fields (Dinsmore et al. 1984). Howe et al. (1984) considered the Henslow's Sparrow one of Iowa's rarest grassland birds. Hayden Prairie was noted by both Howe et al. (1984) and Dinsmore et al. (1984) as one of the few probable nesting sites in the state. Other sightings have been reported, but none represents a persistent breeding population (Howe et al. 1984). By 1900, the sparrow was already uncommon (Dinsmore et al. 1984). In Iowa, the Henslow's Sparrow is listed as threatened (Appendix D).

The six summer records noted by Dinsmore et al. (1984) from 1960 until 1982 were primarily in northeastern and east-central Iowa. The atlas project documented 7 sparrow occurrences in six counties, primarily in the southern two tiers of counties (Fig. 14). No Henslow's Sparrows were found on Hayden Prairie (northeastern Iowa). This shift in distribution to southern Iowa could be a reflection of the less intense row crop farming in the Southern Pasture Region and the addition of CRP grasslands. Overall, it was disappointing that more Henslow's were not documented since over 2 million acres of CRP lands were added during the project.

Hands et al. (1989) noted that BBS data showed an annual 2 percent decline in Henslow populations in the north-central region. Habitat loss is the major reason for the population decline. Henslow's Sparrows require large grasslands with dense vegetative litter (Robins 1979) and numerous forbs (Wiens 1969). Native prairie provided adequate habitat, however, less than 0.1 percent of Iowa's native prairie remains (Howe et al. 1984). Grazed pastures would not provide adequate vegetative structure and mowed or frequently burned grasslands would also be unsuitable.

The preservation of large, diverse grasslands will be necessary to maintain Henslow's Sparrows in the state. Studies conducted elsewhere on minimum viable areas for nest sites and vegetative characteristics would provide management information that could be implemented. Like the Barn Owl, the Henslow has erratic occurrences in the state and no persistent population to help ensure its survival.

Henslow's Sparrow

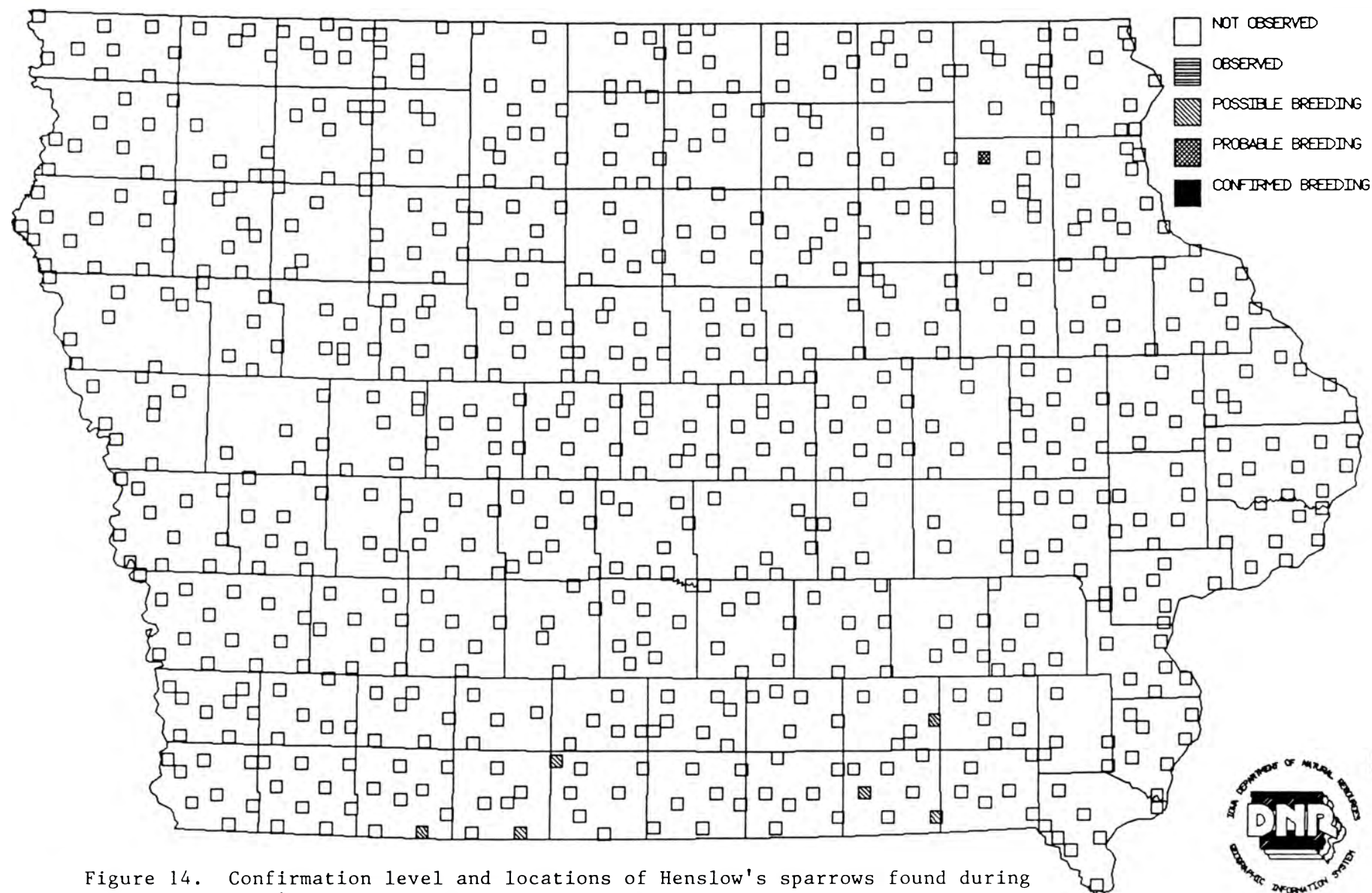


Figure 14. Confirmation level and locations of Henslow's sparrows found during Iowa's Breeding Bird Atlas, 1985-1990.

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SPECIES	AQU#	OB	PO	PR	CO	DATE, NOTES
PIED-BILLED GREDE	006.					
*EARED GREBE	004.					
*WESTERN GREBE	001.					
*DOUBLE CRESTED CORMORANT	120.					
*AMERICAN BITTERN	190.					
LEAST BITTERN	191.					
GREAT BLUE HERON	194.					
*GREAT EGRET	196.					
GREEN-BACKED HERON	201.					
*BLACK-CROWNED NIGHT-HERON	202.					
*YELLOW-CROWNED NIGHT-HERON	203.					
CANADA GOOSE	172.					
WOOD DUCK	144.					
GREEN-WINGED TEAL	139.					
*AMERICAN BLACK DUCK	133.					
MALLARD	132.					
*NORTHERN PINTAIL	143.					
BLUE-WINGED TEAL	140.					
NORTHERN SHOVELER	142.					
*GADWALL	135.					
*AMERICAN WIGEON	137.					
*CANVASBACK	147.					
REDHEAD	146.					
*RING-NECKED DUCK	150.					
*LESSER SCAUP	149.					
*BUFFLEHEAD	153.					
*HOODED Merganser	131.					
RUDDY DUCK	167.					
TURKEY VULTURE	325.					
*BALD EAGLE	352.					
*NORTHERN HARRIER	331.					
*SHARP-SHINNED HAWK	332.					
*COOPER'S HAWK	333.					
*RED-SHOULDERED HAWK	339.					
*BROAD-WINGED HAWK	343.					
*SWAINSON'S HAWK	342.					
RED-TAILED HAWK	337.					
AMERICAN KESTREL	360.					
GRAY PARTRIDGE	288.1					
*CHUKAR	288.2					
RING-NECKED PHEASANT	309.1					
RUFFED GROUSE	300.					
WILD TURKEY	310.					
NORTHERN BOBBWHITE	289.					
*KING RAIL	208.					
VIRGINIA RAIL	212.					
SORA	214.					
*COMMON MOURNER	219.					
AMERICAN COT	221.					

SPECIES	AQU#	OB	PO	PR	CO	DATE, NOTES
*PIPING PLOVER	277.					
KILLDEER	273.					
*AMERICAN AVOCET	225.					
SPOTTED SANDPIPER	263.					
*UPLAND SANDPIPER	261.					
*COMMON SNIPES	230.					
AMERICAN WOODCOCK	228.					
*WILSON'S PHALAROPE	224.					
*FRANKLIN'S GULL	059.					
*FORSTER'S TERN	069.					
*LEAST TERN	074.					
*BLACK TERN	077.					
ROCK DOVE	313.1					
*RINGED TURTLE-DOVE	315.2					
MOURNING DOVE	316.					
BLACK-BILLED CUCKOO	388.					
YELLOW-BILLED CUCKOO	387.					
*COMMON BARN-OWL	365.					
EASTERN SCREECH-OWL	373.					
GREAT HORNED OWL	375.					
*BURROWING OWL	378.					
BARRED OWL	368.					
*LONG-EARED OWL	366.					
*SHORT-EARED OWL	367.					
COMMON NIGHTHAWK	420.					
*CHUCK-WILL'S-WIDOW	416.					
WHIP-POOR-WILL	417.					
CHIMNEY SWIFT	423.					
RUBY-THROATED HUMMINGBIRD	428.					
BELTED KINGFISHER	390.					
RED-HEADED WOODPECKER	406.					
RED-BELLIED WOODPECKER	409.					
YELLOW-BELLIED SAPSUCKER	402.					
DOWNY WOODPECKER	394.					
HAIRY WOODPECKER	393.					
NORTHERN FLICKER	412.					
PILEATED WOODPECKER	405.					
EASTERN WOOD-PEWEE	461.					
ACADIAN FLYCATCHER	465.					
*ALDER FLYCATCHER	466.1					
WILLOW FLYCATCHER	466.					
*LEAST FLYCATCHER	467.					
EASTERN PHOEBE	456.					
*SAY'S PHOEBE	457.					
GREAT CRESTED FLYCATCHER	452.					
WESTERN KINGBIRD	447.					
EASTERN KINGBIRD	444.					
*SCISSOR-TAILED FLYCATCHER	443.					
HORNED LARK	474.					

SPECIES	AQU#	OB	PO	PR	CO	DATE, NOTES
PURPLE MARTIN	611.					
TREE SWALLOW	614.					
N. ROUGH-WINGED SWALLOW	617.					
BANK SWALLOW	616.					
CLIFF SWALLOW	612.					
BARN SWALLOW	613.					
BLUE JAY	477.					
AMERICAN CROW	488.					
BLACK-CAPPED CHICKADEE	735.					
TUFTED TITMOUSE	731.					
*RED-BREASTED NUTHATCH	728.					
WHITE-BREASTED NUTHATCH	727.					
*BROWN CREEPER	726.					
*ROCK WREN	715.					
*CAROLINA WREN	718.					
*BEWICK'S WREN	719.					
HOUSE WREN	721.					
*WINTER WREN	722.					
SEDGE WREN	724.					
MARSH WREN	725.					
BLUE GRAY GNATCATCHER	751.					
EASTERN BLUEBIRD	766.					
*VEERY	756.					
WOOD THRUSH	755.					
AMERICAN ROBIN	761.					
GRAY CATBIRD	704.					
NORTHERN MOCKINGBIRD	703.					
BROWN THRASHER	705.					
CEDAR WAXWING	619.					
*LOGGERHEAD SHRIKE	622.					
EUROPEAN STARLING	493.					
*WHITE-EYED VIREO	631.					
*BELL'S VIREO	633.					
YELLOW-THROATED VIREO	628.					
WARBLING VIREO	627.					
RED-EYED VIREO	624.					
*BLUE-WINGED WARBLER	641.					
*GOLDEN-WINGED WARBLER	642.					
*NORTHERN PARULA	648.					
YELLOW WARBLER	652.					
*CHESTNUT-SIDED WARBLER	659.					
*YELLOW-THROATED WARBLER	663.					
*CERULEAN WARBLER	658.					
*BLACK-AND-WHITE WARBLER	636.					
AMERICAN REDSTART	687.					
PROTHONOTARY WARBLER	637.					
*WORM-EATING WARBLER	639.					
OVENBIRD	674.					
*LOUISIANA WATERTHRUSH	676.					

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CHAPTER 77
ENDANGERED AND THREATENED PLANT AND ANIMAL SPECIES

[Prior to 12/31/86; Conservation Commission(290), ch 19]

571—77.1(109A) Definitions. As used in this rule:

"Endangered species" means any species of fish, plant life, or wildlife which is in danger of extinction throughout all or a significant part of its range.

"Special concern species" means any species about which problems of status or distribution are suspected, but not documented, and for which no special protection is afforded under this rule.

"Threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

571—77.2(109A) Endangered, threatened, and special concern animals. The natural resource commission, in consultation with scientists with specialized knowledge and experience, has determined the following animal species to be endangered, threatened, or of special concern in Iowa:

77.2(1) Endangered animal species:

Mammals	
Indiana Bat	Myotis sodalis
Plains Pocket Mouse	Perognathus flavescens
Red-backed Vole	Clethrionomys gapperi
Bobcat	Felis rufus
Birds	
Red-shouldered Hawk	Buteo lineatus
Northern Harrier	Circus cyaneus
Peregrine Falcon	Falco peregrinus
Piping Plover	Charadrius melodus
Common Barn Owl	Tyto alba
Burrowing Owl	Athene cunicularia
Least Tern	Sterna antillarum
Cooper's Hawk	Accipiter cooperii
Bald Eagle	Haliaeetus leucocephalus
Double-crested Cormorant	Phalacrocorax auritus
King Rail	Rallus elegans
Short-eared Owl	Asio flammeus
Fish	
Lake Sturgeon	Acipenser fulvescens
Pallid Sturgeon	Scaphirhynchus albus
Pugnose Shiner	Notropis anogenus
Weed Shiner	Notropis texanus
Pearl Dace	Semotilus margarita
Freckled madtom	Noturus nocturnus
Bluntnose Darter	Etheostoma chlorosomum
Least Darter	Etheostoma microperca

Reptiles and Amphibians

Yellow Mud Turtle	Kinosternon flavescens
Wood Turtle	Clemmys insculpta
Great Plains Skink	Eumeces obsoletus
Slender Glass Lizard	Ophisaurus attenuatus
Yellow-bellied Water Snake	Nerodia erythrogaster
Western Hognose Snake	Heterodon nasicus
Speckled Kingsnake	Lampropeltis getulus
Copperhead	Agkistrodon contortrix
Prairie Rattlesnake	Crotalus viridis
Massasauga	Sistrurus catenatus
Blue-spotted Salamander	Ambystoma laterale
Central Newt	Notophthalmus viridescens
Mudpuppy	Necturus maculosus
Crawfish Frog	Rana areolata

Butterflies

Dakota Skipper	Hesperia dacotae
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Snails

Iowa Pleistocene Land Snail	Discus macclintocki
Minnesota Pleistocene succineid	Succinea new species 1
Iowa Pleistocene succineid	Succinea new species 2
No common name	Catinella gelida
No common name	Vertigo briarensis
Meramec river vertigo	Vertigo meramecensis
Iowa Pleistocene vertigo	Vertigo new species

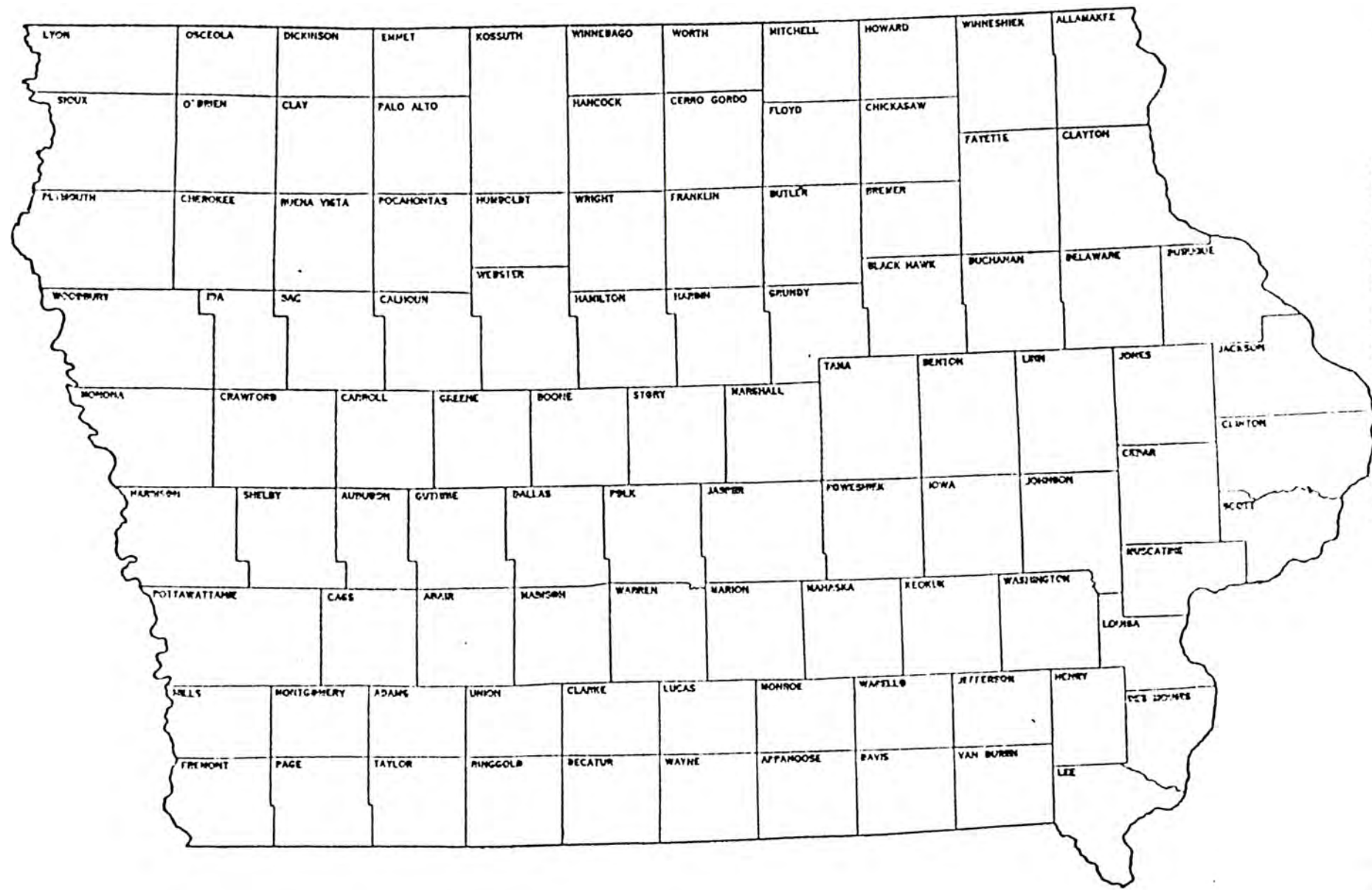
Clams

Spectacle case	Cumberlandia monodonta
Slippershell	Alasmidonta viridis (F)
Fluted shell	Lasmigona costata (R)
Buckhorn	Tritogonia verrucosa
Ozark pigtoe	Fusconaia ozarkensis
Bullhead	Pleurobema sintoxia (L)
Ohio river pigtoe	Lampsilis teres teres (L)
Slough sandshell	Lampsilis teres anodonta
Yellow sandshell	Lampsilis higginsii (L)
Higgin's-eye Pearly Mussel	

77.2(2) Threatened animal species:

Mammals

Least Shrew	Cryptotis parva
Grasshopper Mouse	Onychomys leucogaster
Woodland Vole	Microtus pinetorum
Spotted Skunk	Spilogale putorius
River Otter	Lutra canadensis



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				Snails	
	Birds		Hubricht's vertigo	Vertigo hubrichti	
Long-eared Owl	Asio otus		Occult vertigo	Vertigo occulta	
Henslow's sparrow	Ammodramus henslowii			Clams	
	Fish		Cylinder	Anodontoides ferussacianus (Lea)	
Chestnut Lamprey	Ichthyomyzon castaneus		Strange Floater	Strophitus undulatus (Say)	
American Brook Lamprey	Lampetra appendix		Elktoe	Alasmidonta marginata (Say)	
Grass Pickerel	Esox americanus		Creek heelsplitter	Lasmigona compressa (Lea)	
Blacknose Shiner	Notropis heterolepis		Purple pimpleback	Cyclonaias tuberculata (Rafinesque)	
Western Sand Darter	Ammocrypta clara		Butterfly	Ellipsaria lineolata (Rafinesque)	
Black Redhorse	Moxostoma duquesnei		Ellipse	Venustaconcha ellipsiformis (Conrad)	
Burbot	Lota lota				
Orangethroat Darter	Etheostoma spectabile				
	Reptiles and Amphibians		77.2(3) <i>Special concern animal species:</i>		
Stinkpot	Sternotherus odoratus			Mammals	
Ornate Box Turtle	Terrapene ornata		Southern bog Lemming	Synaptomys cooperi	
Earth Snake	Virginia valeriae			Birds	
Diamondback Water Snake	Nerodia rhombifera			Sterna forsteri	
	Butterflies		Forster's tern	Chlidonias niger	
Bunch-grass skipper	Problema byssus		Black tern		
Mulberry wing	Poanes massasoit			Fish	
Dusted skipper	Atrytonopsis hianna			Notropis emiliae	
Olympia Marblewing	Euchloe olympia		Pugnose minnow	Aphredoderus sayanus	
Swamp Metalmark	Calephelis muticum		Pirate perch		
Silvery Blue	Glaucopsyche lygdamus			Reptiles and Amphibians	
Baltimore	Euphydryas phaeton			Carphophis amoenus	
			Western worm snake		
				Butterflies	
			Wild indigo duskywing	Erynnis baptisiae	
			Sleepy duskywing	Erynnis brizo	
			Poweshiek skipperling	Oarisma poweshiek	
			Ottoe skipper	Hesperia ottoe	

AOU #	SPECIES	# BLCKS/709	AOU #	SPECIES	# BLCKS/709
203	YELLOW-CROWNED NIGHT-HERON	17	659	CHESTNUT-SIDED WARBLER	5
533	PINE SISKIN	16	225	AMERICAN AVOCET	4
663	YELLOW-THROATED WARBLER	16	133	AMERICAN BLACK DUCK	4
143	NORTHERN PINTAIL	15	728	RED-BREASTED NUTHATCH	3
636	BLACK-AND-WHITE WARBLER	15	224	WILSON'S PHALAROPE	3
149	LESSER SCAUP	15	719	BEWICK'S WREN	3
365	COMMON BARN OWL	15	378	BURROWING OWL	3
366	LONG-EARED OWL	14	686	CANADA WARBLER	2
364	OSPREY	12	200	LITTLE BLUE HERON	2
200.1	CATTLE EGRET	12	356	PEREGRINE FALCON	2
332	SHARP-SHINNED HAWK	11	64	CASPIAN TERN	2
230	COMMON SNIPE	11	443	SCISSOR-TAILED FLYCATCHER	2
59	FRANKLIN'S GULL	11	722	WINTER WREN	2
137	AMERICAN WIGEON	10	153	BUFFLEHEAD	2
147	CANVASBACK	9	457	SAY'S PHOEBE	2
54	RING-BILLED GULL	8	510	BREWERS BLACKBIRD	1
639	WORM-EATING WARBLER	8	307	GREATER PRAIRIE CHICKEN	1
512	GREAT-TAILED GRACKLE	8	654	BLACK-THROATED BLUE WARBLER	1
208	KING RAIL	8	355	PRAIRIE FALCON	1
547	HENSLOW'S SPARROW	7	165	WHITE-WINGED SCOTER	1
125	WHITE PELICAN	7	329	MISSISSIPPI KITE	1
684	HOODED WARBLER	7	129	COMMON MERGANSER	1
7	COMMON LOON	7	277	PIPING PLOVER	1
206	SANDHILL CRANE	7	642	GOLDEN-WINGED WARBLER	1
416	CHUCK-WILL'S-WIDOW	7	605	LARK BUNTING	1
466.1	ALDER FLYCATCHER	6	187	WHITE-FACED IBIS	1
1	WESTERN GREBE	5	141	CINNAMON TEAL	1
4	EARED GREBE	5	673	PRAIRIE WARBLER	1
367	SHORT-EARED OWL	5	688.3	EURASIAN TREE SPARROW	1
561	CLAY-COLORED SPARROW	5	715	ROCK WREN	0
74	LEAST TERN	5	315.2	RINGED TURTLE-DOVE	0
			288.2	CHUKAR	0

APPENDIX B. List of birds recorded during Iowa's Breeding Bird Atlas, 1985-1990.

AOU #	SPECIES	# BLCKS/709	AOU #	SPECIES	# BLCKS/709
688.2	HOUSE SPARROW	699	628	YELLOW-THROATED VIREO	242
498	RED-WINGED BLACKBIRD	698	542	SAVANNAH SPARROW	240
761	AMERICAN ROBIN	695	388	BLACK-BILLED CUCKOO	234
316	MOURNING DOVE	694	731	TUFTED TITMOUSE	230
495	BROWN-HEADED COWBIRD	690	428	RUBY-THROATED HUMMINGBIRD	227
613	BARN SWALLOW	686	616	BANK SWALLOW	227
511	COMMON GRACKLE	681	373	EASTERN SCREECH-OWL	211
721	HOUSE WREN	678	687	AMERICAN REDSTART	203
604	DICKCISSEL	677	420	COMMON NIGHTHAWK	198
444	EASTERN KINGBIRD	676	751	BLUE-GRAY GNATCATCHER	196
529	AMERICAN GOLDFINCH	675	622	LOGGERHEAD SHRIKE	181
681	COMMON YELLOWTHROAT	673	140	BLUE-WINGED TEAL	181
493	EUROPEAN STARLING	672	466	WILLOW FLYCATCHER	175
705	BROWN THRASHER	667	608	SCARLET TANAGER	174
406	RED-HEADED WOODPECKER	667	263	SPOTTED SANDPIPER	170
477	BLUE JAY	662	724	SEDGE WREN	167
273	KILLDEER	661	674	OVENBIRD	166
581	SONG SPARROW	659	417	WHIP-POOR-WILL	165
412	NORTHERN FLICKER	644	228	AMERICAN WOODCOCK	139
598	INDIGO BUNTING	643	221	AMERICAN COOT	132
507	NORTHERN ORIOLE	642	552	LARK SPARROW	127
488	AMERICAN CROW	636	497	YELLOW-HEADED BLACKBIRD	125
309.1	RING-NECKED PHEASANT	636	261	UPLAND SANDPIPER	111
704	GRAY CATBIRD	627	196	GREAT EGRET	107
560	CHIPPING SPARROW	613	584	SWAMP SPARROW	98
313.1	ROCK DOVE	603	405	PILEATED WOODPECKER	96
337	RED-TAILED HAWK	597	6	PIED-BILLED GREBE	85
735	BLACK-CAPPED CHICKADEE	582	633	BELL'S VIREO	79
593	NORTHERN CARDINAL	578	725	MARSH WREN	76
394	DOWNY WOODPECKER	568	703	NORTHERN MOCKINGBIRD	75
501.1	WESTERN MEADOWLARK	555	77	BLACK TERN	66
595	ROSE-BREASTED GROSBEAK	539	465	ACADIAN FLYCATCHER	63
540	VESPER SPARROW	529	333	COOPER'S HAWK	62
423	CHIMNEY SWIFT	511	597	BLUE GROSBEAK	57
546	GRASSHOPPER SPARROW	510	677	KENTUCKY WARBLER	55
360	AMERICAN KESTREL	510	519	HOUSE FINCH	50
461	EASTERN WOOD-PEWEE	498	447	WESTERN KINGBIRD	47
766	EASTERN BLUEBIRD	484	331	NORTHERN HARRIER	45
727	WHITE-BREASTED NUTHATCH	480	637	PROTHONOTARY WARBLER	45
563	FIELD SPARROW	469	120	DOUBLE CRESTED CORMORANT	44
390	BELTED KINGFISHER	459	139	GREEN-WINGED TEAL	43
387	YELLOW-BILLED CUCKOO	455	467	LEAST FLYCATCHER	43
627	WARBLING VIREO	445	658	CERULEAN WARBLER	43
474	HORNED LARK	444	214	SORA	42
494	BOBOLINK	443	641	BLUE-WINGED WARBLER	42
501	EASTERN MEADOWLARK	440	756	VEERY	41
325	TURKEY VULTURE	439	300	RUFFED GROUSE	41
452	GREAT CRESTED FLYCATCHER	435	676	LOUISIANA WATERTHRUSH	40
194	GREAT BLUE HERON	422	718	CAROLINA WREN	39
617	N. ROUGH-WINGED SWALLOW	420	131	HOODED MERGANSER	39
375	GREAT HORNED OWL	418	69	FORSTER'S TERN	36
144	WOOD DUCK	418	142	NORTHERN SHOVELER	35
409	RED-BELLIED WOODPECKER	409	402	YELLOW-BELLIED SAPSUCKER	35
289	NORTHERN BOBWHITE	387	202	BLACK-CROWNED NIGHT HERON	34
132	MALLARD	373	648	NORTHERN PARULA	31
619	CEDAR WAXWING	368	191	LEAST BITTERN	31
652	YELLOW WARBLER	364	167	RUDDY DUCK	30
612	CLIFF SWALLOW	352	343	BROAD WINGED HAWK	30
393	HAIRY WOODPECKER	348	683	YELLOW-BREASTED CHAT	30
288.1	GRAY PARTRIDGE	328	726	BROWN CREEPER	28
456	EASTERN PHOEBE	328	190	AMERICAN BITTERN	28
614	TREE SWALLOW	324	352	BALD EAGLE	27
587	RUFIOUS-SIDED TOWHEE	298	610	SUMMER TANAGER	25
172	CANADA GOOSE	287	342	SWAINSON'S HAWK	23
201	GREEN-BACKED HERON	279	212	VIRGINIA RAIL	23
624	RED-EYED VIREO	277	146	REDHEAD	21
368	BARRED OWL	276	631	WHITE-EYED VIREO	21
310	WILD TURKEY	273	219	COMMON MOORHEN	21
611	PURPLE MARTIN	265	339	RED-SHOULDERED HAWK	20
755	WOOD THRUSH	248	135	GADWALL	19
506	ORCHARD ORIOLE	246	150	RING-NECKED DUCK	18