Chapter Eight

Priorities for Conservation Actions

Required Element #4: Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions.

In 2005, this Plan was originally conceived to be a 25-year strategic plan. Specific operational priorities are beyond the scope of this Plan. Operational plans that identify shorter-term (1-5 year) priorities for implementing the conservation actions identified in Chapter 6 may be developed by individual entities contributing to the plan, or by IWAP Implementation Committee or its Working Groups or Subcommittees.

For example, using this Plan as a foundation, DNR's Wildlife Bureau developed more specific plans for each of its three sections (Public Lands Wildlife Management, Research, and Private Lands Wildlife Management). This process was valuable in focusing the Bureau's efforts. The process of stepping the IWAP visions and goals into a plan for a specific organization also makes it more explicit how various portions of the organization can most effectively contribute to the realization of the Plan's visions, and how these roles weave together to make an impact.

While this plan does not identify detailed, near-term priorities, this first part of this chapter describes the broad-scale priorities for each of the six Vision Elements, and the second part depicts the geographic priorities of this plan, which culminate in Map 8-25 "High Opportunity Areas for Cooperative Conservation." Iowa needs to continue building a diverse, resilient habitat base to support sustainable wildlife populations. When the IWAP was originally developed, it established habitat protection, restoration and enhancement as the foundation for improving the status of SGCN. At the time, the Plan stressed that at least three general approaches need to be taken:

1) **Protect and enhance existing habitats that benefit SGCN**. This approach gives priority to areas of the state with existing habitat for SGCN or that can be suitable with habitat enhancements. Areas with the greatest existing species diversity should be targeted, land acquired or permanent conservation easements developed, and the appropriate management plans implemented. This approach is the most cost-effective way to benefit the most species in the short term. But SGCN are declining with the amount of existing habitat available today. Enhancing these habitats may slow the decline in local populations, but in the Steering Committee's view will not by itself reverse statewide or regional declines.

   The greatest potential to apply this approach is for SGCN that inhabit wooded habitats and some grasslands. These existing habitats are most abundant in the Driftless Area, the Central Irregular Plains, the Loess Hills, and along the interior river systems (Map 2-1). The Central Irregular Plains, Rolling Loess Prairies, and Steeply Rolling Loess Prairie ecoregions have many acres of mostly cool season grasslands enrolled in the short-term Conservation Reserve Program that could be permanently protected and enhanced to improve habitat for SGCN. Few if any wetlands or wetland-grassland complexes exist in private ownership.

2) **Develop new habitats for SGCN in areas where these habitats do not exist**. This approach would provide new habitat for SGCN but at a higher cost. Establishing new habitats and restoring populations will extend the range of these species, provide the potential for greater genetic diversity and interaction between populations, and reduce the chances of local population extinctions if travel corridors are also provided. It will also be necessary to meet the recreation goals (50% increase in wildlife-associated recreation in areas near home).

   Partnerships between DNR, USFWS, Iowa County Conservation Boards and private conservation organizations have had many successes restoring wildlife habitats on agricultural land. Agricultural lands too steep or too wet for economical farming have been targeted for acquisition or protection, then wetlands and grasslands have been restored or grazed pastures allowed to revert to forest.

   Opportunities to restore habitats for SGCN exist statewide. The Des Moines Lobe currently has the greatest

acreage of restored wetland-grassland complexes in the state and nearly unlimited opportunities for further conservation activities. Similar opportunities exist on a more restricted basis in the Loess Prairies and the Eastern Iowa and Minnesota Drift Plains. Riparian wetlands can be restored along most of the interior river systems.

3) **Improving the status of aquatic SGCN will require a more broadly-applied conservation effort**. Habitat in rivers, streams, lakes, impoundments and wetlands can be improved only if soil erosion, siltation and all the associated problems are reduced (Chapter 5). Targeting areas to protect and restore habitats for terrestrial SGCN will help with this process but will not protect enough land by itself to help all aquatic systems. Vegetative cover must be returned to more of the landscape to hold soil in place. Existing soil-retention programs like terracing, buffer strips and no-till agriculture need to be expanded and new approaches explored to make soil conservation more widely acceptable and financially attractive to the farming community.

   Targeting individual watersheds with a comprehensive conservation effort to improve the status of all SGCN and to serve as demonstration areas is the best initial approach to build support for more-widespread efforts. DNR in cooperation with Iowa Department of Agriculture and Land Stewardship (IDALS), Iowa's County Conservation Boards (CCBs), U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and Farm Services Agency (FSA), Iowa Soil & Water Conservation Districts, U.S. Environmental Protection Agency (EPA) and local government entities has had success in restoring selected watershed to provide a variety of wildlife, recreational, social and economic benefits to local communities.

   A blend of all three approaches will continue to be necessary to accomplish all the goals of the IWAP. The plight of all SGCN in Iowa is caused by the loss of native vegetation from the landscape that provided wildlife habitat and kept soil and associated products out of the waters. Protecting existing habitats is a good strategy to prevent further losses, but it alone will not return SGCN to their former range or raise populations to a viable level. Habitats for SGCN need to be restored in socially acceptable places. Widespread conservation practices will be needed to address water quality issues and are best approached on a watershed basis.

Priorities for Vision Elements

Wildlife Vision

Iowa will have viable wildlife populations that are compatible with modern landscapes and human social tolerance.

Goal 1

Common species will remain common.

Priorities: Continued monitoring will be necessary to detect downward trends in abundance or contractions of area occupied within the State. Current examples of common Iowa species experiencing recent population declines include Common Nighthawk, Chimney Swift, and Tiger Salamander.

The first goal is most likely to be achieved by taking a broad, habitat-based approach to conservation as opposed to highly localized actions targeting specific species. Conservation activities to address the first goal should be directed to regions of the state identified in the map of High Opportunity Areas for Collaborative Conservation (Map 8-25). In these areas there are many opportunities to leverage funding, making each conservation dollar go further.

Goal 2

Populations of SGCN will increase to viable levels

Priorities: To achieve this goal the second approach to habitat protection must be taken - creating new habitats for SGCN through land protection and management and by taking specific conservation actions designed to improve the status of SGCN that need more intensive assistance. This will take a combination of habitat protection, habitat management and scientific inventory and monitoring.

The habitat protection issues are discussed under the habitat vision goals below. The inventory and monitoring issues are discussed in Chapter 7. Once the distribution and abundance of SGCN are more fully understood, conservation actions can be tailored to their recovery. Specific habitat management prescriptions can be defined to assist key species, populations may need translocation to newly created habitats or to isolated tracts of existing habitat, connections may need to be developed between habitat blocks, etc.

Goal 3

The abundance and distribution of wildlife will be balanced with its impact on the economic livelihood and social tolerance of Iowans.

Priorities: Past experience has shown that human social tolerance to wildlife must be cultivated and considered when implementing new conservation actions in a landscape dominated by private land. For example, concentrated populations of white-tailed deer and giant Canada geese have created problems for citizens in some circumstances, precipitating a need for the Wildlife Depredation Program. Wildlife management in Iowa always takes place in the context of relationships and being respectful of neighbors. Examples include managing water levels on public wetlands during periods of heavy rainfall to reduce the risk of flooding on adjacent private lands and notifying local residents in advance of prescribed burns. Potential issues need to be considered when implementing the conservation actions outlined in this Plan and steps taken to minimize impacts on neighboring landowners.

Research on Iowan's Wildlife Value Orientations (WVO) and tolerances for certain species and conservation actions was conducted in 2012-2013 (Stephenson et al. 2013). Iowan's WVOs were assessed again in 2018 (Dietsch et al. 2018). Periodic follow-up on this project to track trends or changes in Iowan's WVOs and to address specific issues of current relevance would be helpful in achieving this goal.

Habitat Vision

Iowa will have healthy ecosystems that incorporate diverse, native habitats capable of sustaining viable wildlife populations.

Goal 1

By 2030, the amount of permanently protected wildlife habitat in Iowa will be doubled.

Priorities: Coordination with other wildlife and biodiversity conservation plans prepared by natural resource agencies and private conservation organizations should continue to be a high priority. Prioritization criteria used by these organizations differ and may include different classes of species or different regional boundaries. Their cumulative site priorities are important in identifying significant locations for future habitat protection actions through partnerships (Map 8-3 through Map 8-24).

In the past, land acquisition efforts in Iowa were directed at purchasing the highest quality habitats available at the time funds were available. Too frequently this resulted in scattered small tracts of land that provided limited opportunity for biodiversity management, had little connectivity, and were difficult to manage logistically. Habitat blocks were too small to manage for more than one habitat class (e.g. grasslands or forest) on the area. If multi-species management was attempted the resulting habitat patches were too small to attract area-sensitive species. The Neal Smith National Wildlife Refuge is a notable example of a large-scale restoration (by Iowa standards) that is attempting to establish a functional tallgrass prairie ecosystem.

Since the 1980's habitat acquisitions have focused on the eventual development of major conservation areas of 3,000 - 5,000 acres in more or less continuous blocks. Experience has shown that areas of this size allow management for biodiversity between habitat classes and provide the ability to manage for multiple successional stages within one habitat class. This approach benefits multiple SGCN that need different successional stages on the same site or single species whose habitat needs change throughout the year. It also benefits game species that typically are more abundant in early successional stages as well as nongame. Partners In Flight has adopted a similar approach in designing Bird Conservation Areas, an initiative which Iowa has been implementing since 2001.

Expanding existing large core conservation areas to the desired size should be given priority over work in smaller areas. Map 8-2 shows the location of existing habitat complexes of 2,000 acres or larger that are in public ownership that could reach the 3,000-acre threshold with comparative ease. These are permanently protected conservation lands owned by DNR, county conservation boards, the federal government (U.S. Fish and Wildlife Service - National Wildlife Refuges and Waterfowl Production Areas, U.S. Army Corps of Engineers), The Nature Conservancy, Iowa Natural Heritage Foundation or protected under long-term federal wetland easements.

Land (or funding) is seldom available for acquisition in blocks of this size, so initial purchases in a new geographical area should be screened for expansion potential. Conservationists working in target areas to acquire large tracts must exhibit patience. State government in Iowa relies on willing sellers to acquire or protect land. Projects of this size can take a decade or longer to complete.

Map 8-2 also shows extensive areas of the state that do not have core habitat blocks to meet the habitat or recreation goals of this Plan. The Loess Prairies, Steeply Rolling Loess Prairies, and west-central portion of the Des Moines Lobe ecoregions are notably devoid of these areas, as is the northern third of the Eastern Iowa & Minnesota Drift Plains ecoregion. Smaller geographic areas without permanently protected conservation lands can be found in all the other ecoregions as well.

Not all habitat protection efforts can be vested in acquiring large core blocks of habitat. Once the distribution of more SGCN is better understood, key smaller tracts of habitat may be identified that are required for the protection of exceptionally imperiled SGCN. Connectivity needs to be established between large core areas that are isolated from other tracts. A more dispersed approach may be needed to protect target watersheds and aquatic SGCN rather than concentrating efforts in one location. These decisions need to be made on a case-by-case basis.

Goal 2

Protected habitats will be diverse, representative, native plant communities in large and small blocks on public and privately-owned land and waters.

Priorities: While most terrestrial and aquatic habitat classes occur in every region of the state, certain habitat classes were historically more prevalent in specific landforms. Habitat-oriented conservation actions aimed at SGCN should primarily protect, restore, and enhance native habitats and native SGCN. Priority habitat classes by region are shown in Table 8-1.

Habitat protection and management decision-makers, however, must be realistic in assessing changes that have occurred since pre-settlement times. Many native habitats have been displaced from their original sites. Habitat reconstruction or restoration activities should be focused in areas with the most potential for successful reestablishment of ecosystem processes and maintenance of ecosystem function.

Table 8-1. Priority habitat classes by ecoregion

PRIORITY HABITAT CLASSES		
ECOREGION	**TERRESTRIAL**	**AQUATIC**
40a. Loess Flats and Till Plains	• Savanna • Grasslands • Shrublands	• Rivers • Streams • Ponds • Lakes (constructed)
47a. Northwest Iowa Loess Prairies	• Grasslands • Wetlands	• Streams
47b. Des Moines Lobe	• Grasslands • Wetlands • Riparian Forest • Savanna	• Rivers • Oxbows

PRIORITY HABITAT CLASSES		
ECOREGION	**TERRESTRIAL**	**AQUATIC**
47c. Eastern Iowa and Minnesota Drift Plains	• Grasslands • Wetlands • Riparian Forest	• Rivers • Streams (cold, cool or warm water)
47d. Missouri Alluvial Plain	• Forest	• Missouri River Channel • Oxbows
47e. Steeply Rolling Loess Prairies	• Grasslands • Shrublands • Savanna	• Rivers • Streams • Ponds
47f. Rolling Loess Prairies	• Grasslands • Shrublands • Savanna	• Rivers • Streams • Ponds • Lakes (constructed)
47m. Western Loess Hills	• Grasslands (northern 1/3) • Woodlands (southern 2/3) • Savanna	• Streams
52b. Paleozoic Plateau/ Coulee Section	• Open Woodland • Grassland • Forest	• Coldwater Streams • Rivers • Backwaters
52c. Rochester/ Paleozoic Plateau Upland	• Goat Prairie • Deciduous Forests • Open Woodland	• Coldwater Streams
72d. Upper Mississippi Alluvial Plain	• Riparian Forest	• Rivers • Backwaters

Management Vision

Diverse wildlife communities will be developed on public and private lands and waters through the use of adaptive ecological management principles.

Goal 1

Wildlife management will be based on science.

Priorities: Strategies within this vision stress educated partners working together. The following elements are key to the success of this goal.

- Conservation actions adopted as part of the IWAP should be based on the best available science. Research, inventory, survey, and monitoring needs for SGCN are identified in Chapter 7.
- Prior to implementation of management actions, the purpose, intended outcomes, and assumptions underlying the actions should be made explicit, and the possibility for evaluation of the action in an Adaptive Resource Management framework should be explored.
- Better communication must be developed between wildlife scientists, the staff of government land management agencies at all levels, public land managers, and private landowners to assure that an adaptive approach is built into land management decisions.

Recreation Vision

More Iowans will participate in wildlife-associated recreation, and all Iowans will have access to publicly owned recreation areas to enjoy wildlife in its many forms.

Goal 1

The number of Iowans participating in wildlife-associated recreation (wildlife viewing, hunting, fishing, photography, hiking, outdoor classrooms, etc.) will increase 50 percent by 2030.

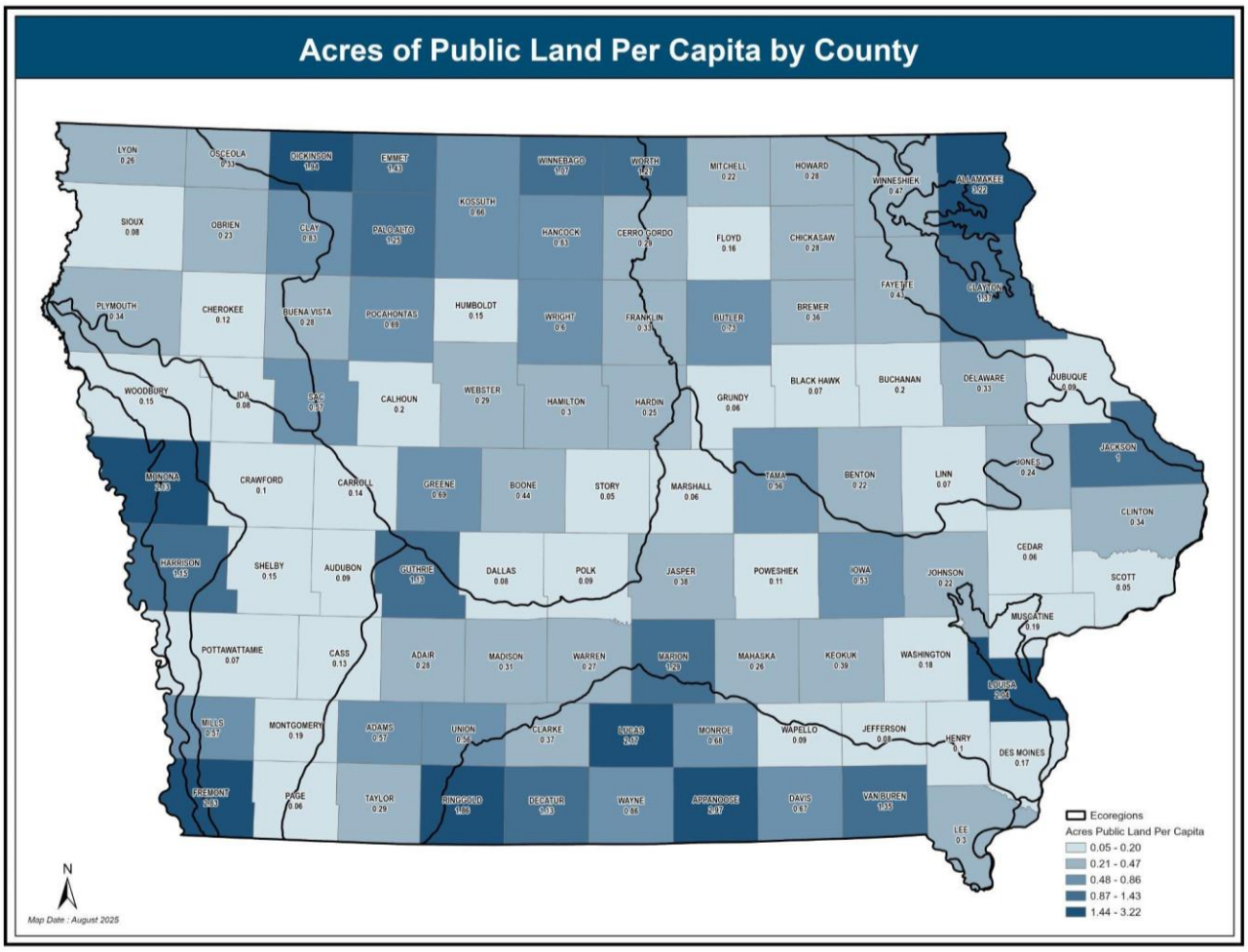
Priority: A broad and expanded base of support is needed to help ensure that wildlife and habitat management and protection efforts receive adequate attention and investment. A 2022 survey of Iowans indicates high rates of participation in outdoor recreation, and even higher rates of interest in future participation. Wildlife-associated recreation plays a significant role, with over 1 million anglers, over 433,000 hunters, and nearly 842,000 people travelling to view wildlife. The survey also shows that birdwatching and wildlife photography are popular with Iowans (Responsive Management 2022). Continued development and expansion of opportunities and resources for wildlife-associated recreation, combined with efforts to engage specific audiences will be critical.

Goal 2

Wildlife-associated recreation will be available to all Iowans on public lands near their home.

Priority: In a culture where time for leisure activities is limited, new participants in wildlife -associated recreation will need to find public lands on which to recreate close to home. While all Iowans deserve access to quality natural areas, the first priority should be given to acquiring and protecting public natural areas close to larger population centers. This will create an appreciation for wildlife-associated recreation among the greatest number of citizens in the early stages of the 25-year effort and generate support needed for completing the Plan. The current spatial arrangement of conservation lands relative to population centers are displayed below (Map 8-1). The distribution of existing public lands is shown in Map 8-23.

Map 8-1. Distribution of Iowa's public land in relation to county population size



Education Vision

Iowans will respect wildlife for its many values and they will advocate effectively for conservation of wildlife and wildlife habitats.

Goal 1

Iowans will understand the relationships of:

- Land use, and its impacts on wildlife diversity and abundance
- land use, and its impacts on quality of life for all citizens
- land use, and its impacts on Iowa's economic sectors related to wildlife recreation
- wildlife diversity & abundance, and its impacts on quality of life in Iowa
- wildlife diversity & abundance, and its impacts on Iowa's economy
- quality of life for all citizens, and its impacts on Iowa's economy
- Iowa's economic decisions and their impacts on wildlife-based contributions to quality of life for all citizens
- Iowa's economic decisions and their impacts on wildlife diversity & abundance

Priorities: The conservation actions proposed to implement this vision incorporate national standards proposed by the Association of Fish and Wildlife Agencies. The relationships among the health of Iowa's lands and waters and its human and wildlife communities are complex and dynamic. Therefore, it will be important to continue efforts to coordinate with other sectors (e.g., education, tourism, economic development, regional planning, and public health organizations) in the development of conservation education programs and messages.

Funding Vision

Stable, permanent funding will be dedicated to the management of wildlife at a level adequate to achieve the visions of this plan.

Goal 1

Government (Federal, State, and County) and private conservation spending will be increased so that the goals of this Plan are reached by 2030.

Goal 2

Funding will be dependable, secure, and appreciated as a powerful economic and social investment.

Priorities: Of the six vision statements, reaching the Funding Vision goal is the highest priority, as none of the other visions can be realized in anything near the 25-year time frame without increased funding. An estimate of the costs and benefits for implementing the IWAP is included in Chapter 10.

No single conservation organization or stakeholder group has the power to attain the necessary funding on their own. A broad effort, inclusive of all potential stakeholders will be necessary. A grass roots coalition of wildlife enthusiasts of all types - birdwatchers, bird feeders, hikers, back packers, hunters, anglers, photographers, etc. - is a start, but it should also include local government leaders whose communities stand to benefit from increased recreation revenues and improved quality of life. Only a broad-based coalition will have the strength necessary to obtain a sustainable, dedicated federal funding stream for all-wildlife conservation.

At the Federal level, Congress must act to supply basic funding to the states equivalent to the $1.3 billion targeted in the Recovering America's Wildlife Act. Funding at the state level will be essential to obtain whatever level of non-Federal matching funds will be mandated by Congress.

Geographic Priorities

Map 8-2 through Map 8-24 represent a broad array of wildlife and biodiversity plans, programs and priority areas prepared by natural resource entities. Map 8-25 displays a combination of these priorities. If the areas displayed as priorities in Map 8-25 could be conserved or restored such that they functioned as healthy ecosystems with intact ecosystem functioning, then we might expect that the visions of this Plan had been achieved: Iowa would have

sustainable, connected networks of healthy, resilient, ecosystems to sustain viable wildlife populations and to provide accessible recreation opportunities and enjoyment for all.

The purpose of displaying geographic priorities is also more practical than simply depicting a grand vision of one potential scenario for Iowa's future. Map 8-25 and the maps that comprise it are used in a variety of ways to inform the design and delivery of conservation programs. Conservation organizations use the map to determine where to pursue conservation projects with partners and most effectively leverage their limited dollars. Granting entities use the map to delineate priority areas for wildlife conservation work. Transportation or utility development planners can use the map to help them identify areas of importance to wildlife to avoid disturbance, or areas that would be good candidates for mitigation in the event of disturbance to wildlife or habitat elsewhere.

Geographic Priority Layer Name	
Existing protected land complexes of 2,000 acres or larger	Map 8-2
Prairie Pothole Joint Venture Priority Wetland Complexes	Map 8-3
Landowner Incentive Program Site Priorities	Map 8-4
The Nature Conservancy's Priority Areas within Iowa	Map 8-5
Bird Conservation Areas	Map 8-6
Priority Amphibian and Reptile Conservation Areas	Map 8-7
Iowa Audubon's Important Bird Areas	Map 8-8
Designated & Proposed Critical Habitat for Federally Listed Species	Map 8-9
Ducks Unlimited Priority Areas	Map 8-10
Natural Resources Conservation Service Wetland Easements	Map 8-11
Watersheds with Coldwater Streams	Map 8-12
Priority Shallow Lakes	Map 8-13
Iowa Natural Heritage Foundation Priorities	Map 8-14
Lakes Restoration Program Priority Lakes Watersheds	Map 8-15
Habitat conservation priorities identified by Wildlife Bureau field staff	Map 8-16
Savanna Restoration Potential	Map 8-17
Forest Stewardship Potential	Map 8-18
Greater Prairie-chicken Predicted Habitat	Map 8-19
U.S. Army Corps of Engineers Sustainable Rivers Program	Map 8-20
Mapped Prairies	Map 8-21
Northern Tallgrass Prairie Focal Areas	Map 8-22
Existing Conservation and Recreation Lands	Map 8-23
Grassland Bird Conservation Priorities	Map 8-24
High Opportunity Areas for Cooperative Conservation Actions	Map 8-25

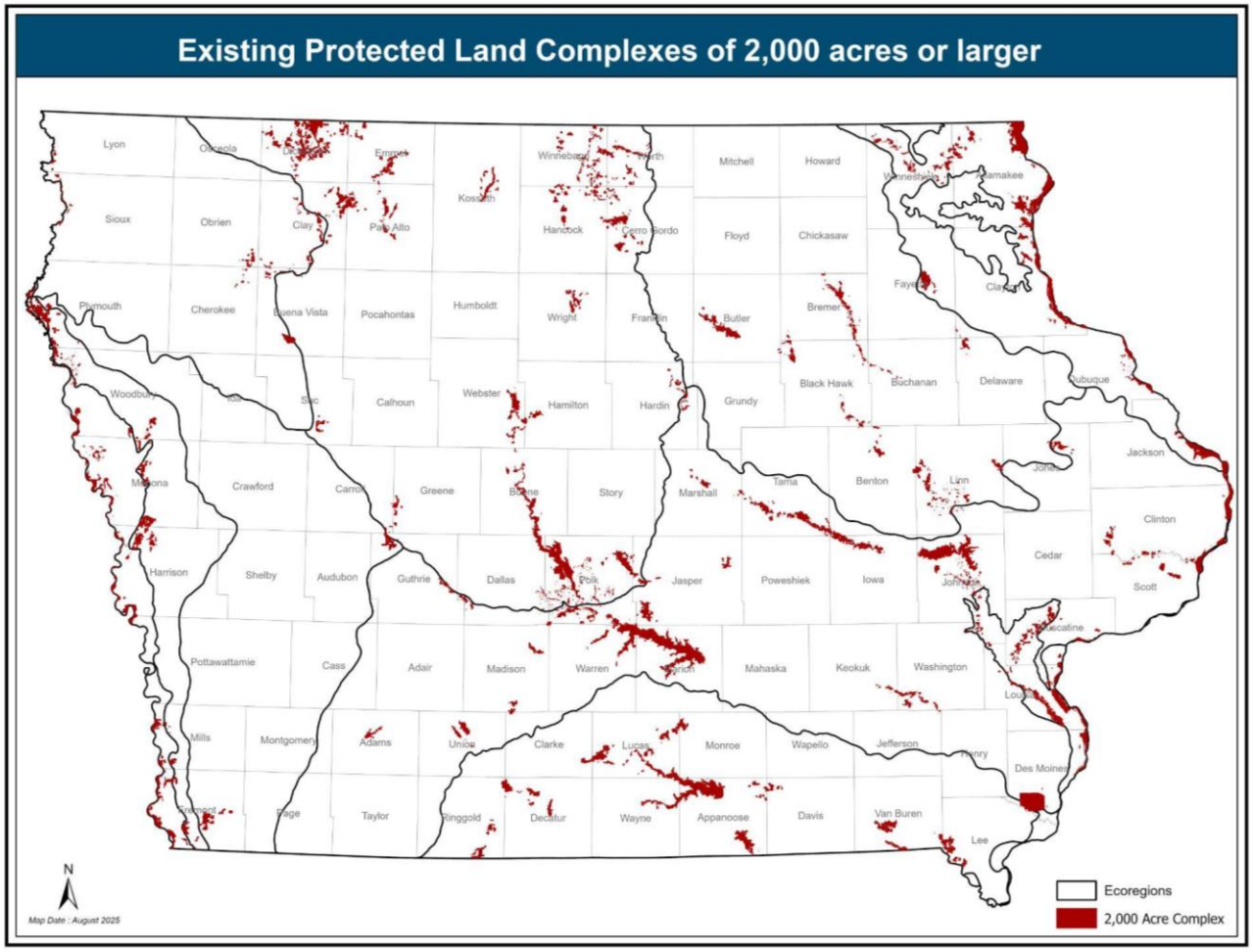
Process for Geographic Priority Map Updates or Changes

Because the IWAP is designed to serve as a living document that strategically guides conservation efforts across many sectors and entities, it is most useful when the information within the Plan is up to date. For this reason, occasional updates and/or corrections to layers that are presented below will likely be necessary prior to the next IWAP revision. For example, as additional Bird Conservation Areas are designated or shallow lake restoration priorities are updated, the associated map may be updated and corrected in the shapefiles that underlie Map 8-25. As such corrections or updates occur subsequent requests for the electronic shapefiles will contain the updated maps.

If, at a point prior to the next IWAP comprehensive review and revision, the Implementation Committee or its Working Groups decide that a full review of geographic priorities is warranted, then that review process will be coordinated by

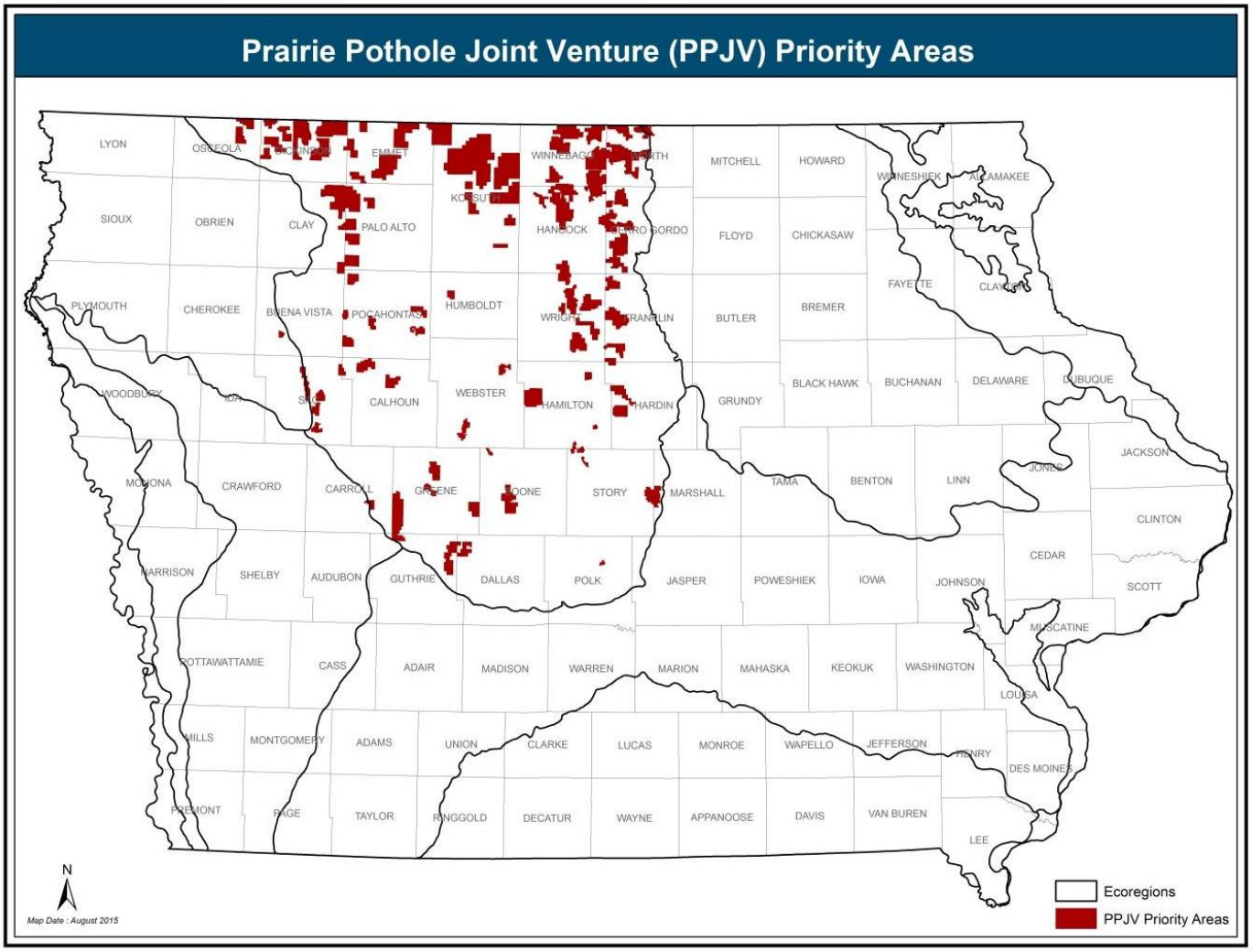
the Habitat Working Group, and will be submitted as a minor or major revision to the U.S. Fish and Wildlife Service for approval.

Map 8-2. Existing protected land complexes of 2,000 acres or larger



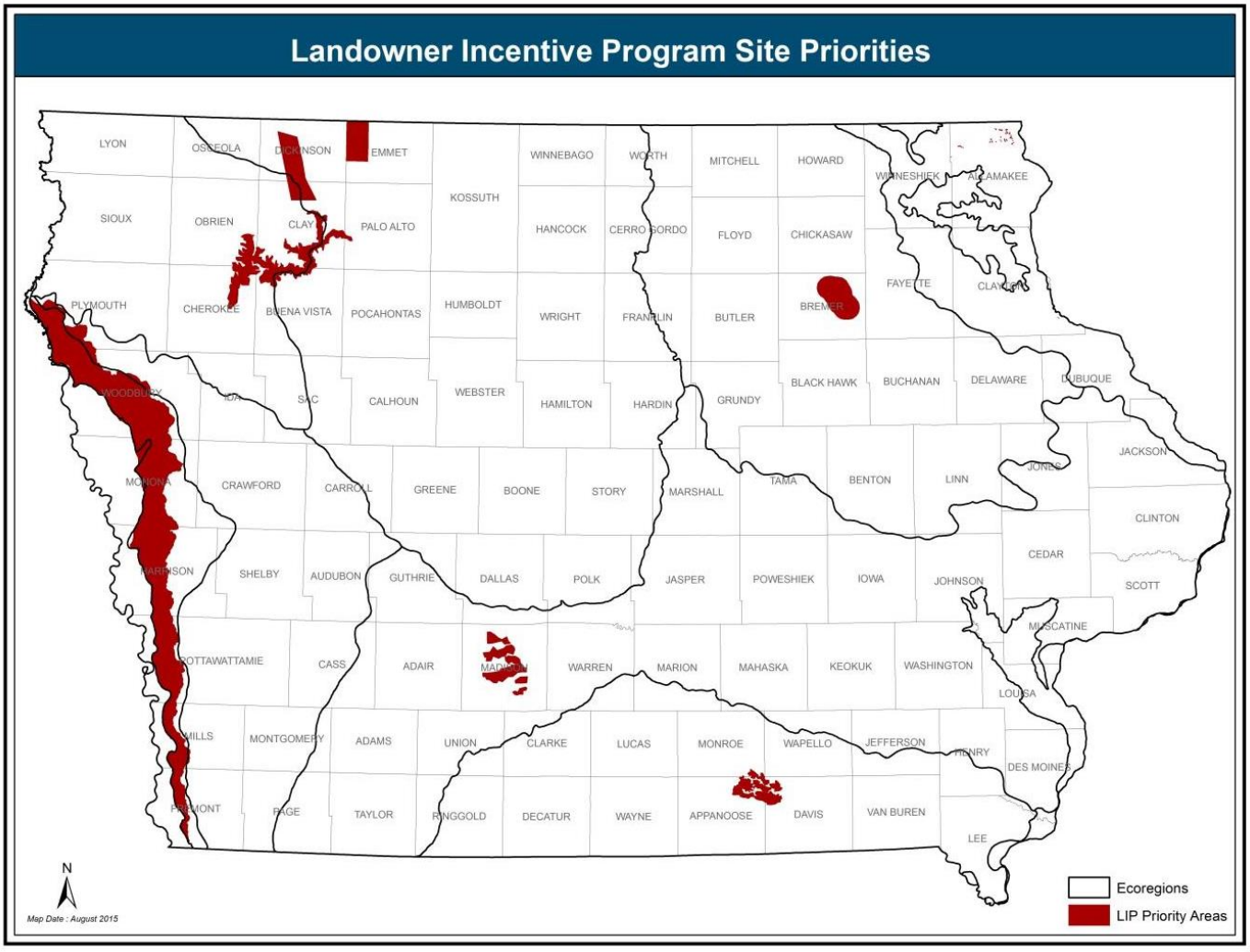
Map 8-3. Prairie Pothole Joint Venture Priority Wetland Complexes

The Prairie Pothole Joint Venture of the North American Waterfowl Management Plan is an effort by government agencies and conservation organizations to protect and restore waterfowl habitat within the Prairie Pothole Region of the United States and Canada. Existing and restorable wetland complexes within the Prairie Pothole Region of Iowa have been identified and are shown below. Although initially targeted at waterfowl species, emphasis within the Prairie Pothole joint Venture has been extended to nongame species as well. Research sponsored by DNR and Iowa State University has demonstrated that a variety of birds and other SGCN have successfully re-colonized these restored habitats.



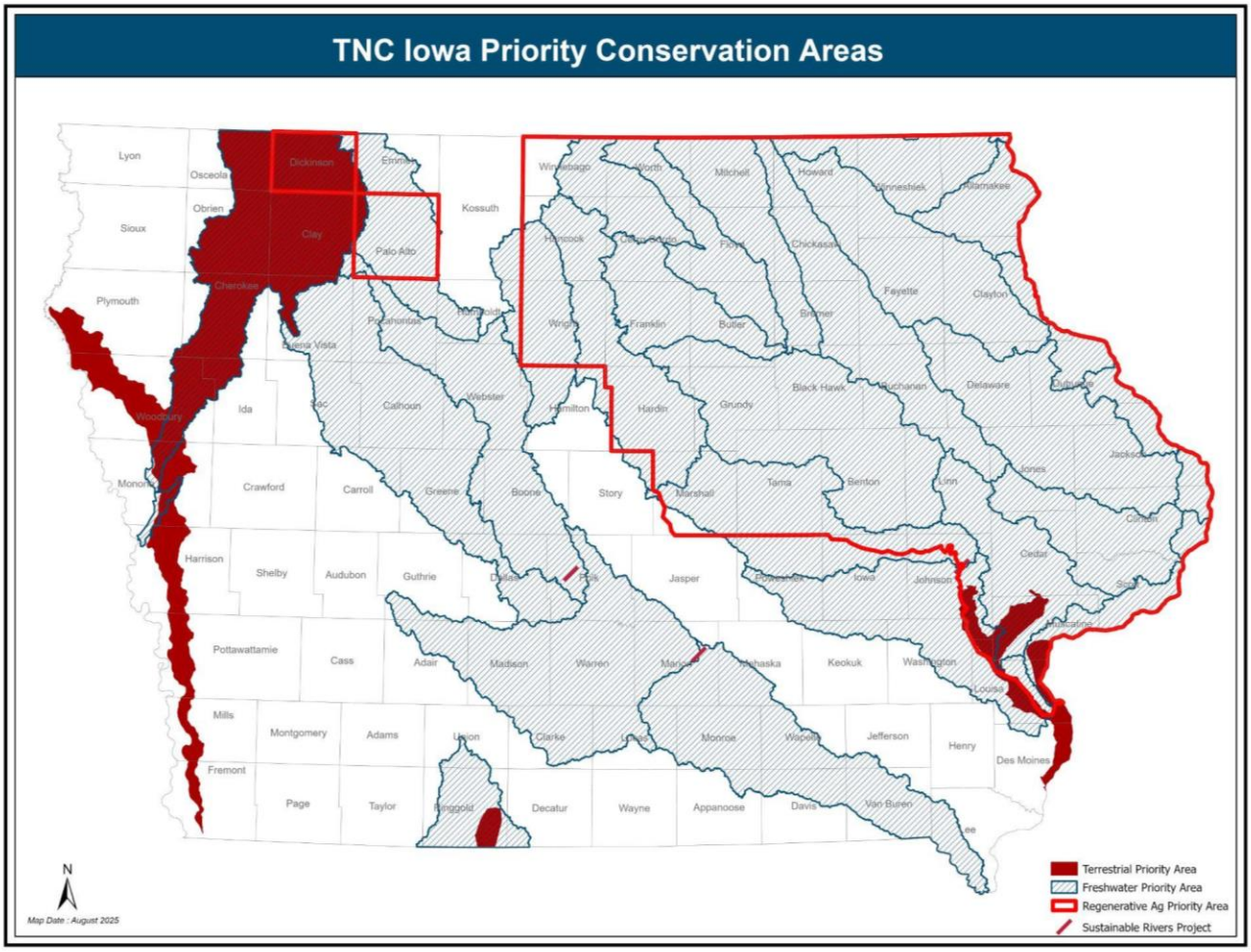
Map 8-4. Landowner Incentive Program Site Priorities

The Landowner Incentive Program (LIP) was designed to protect and restore habitat for state and federally listed endangered and threatened plant and animal species on private lands. The program provided financial incentives and educational materials to private landowners willing to participate in the program. Scientists knowledgeable about Iowa's Threatened and Endangered species established site priorities. The identified sites include known and potential habitats for endangered and threatened species. Although LIP was discontinued and program work was completed in Iowa in 2010, this map layer is considered important in determining current and future Wildlife Action Plan priorities, because habitat work in these areas would benefit listed species and those SGCN that utilize similar habitats. For this map, LIP priorities which are now encompassed by other priority layers (e.g., Topeka Shiner Critical Habitat, BCAs, ARCA) have been removed to reduce duplication.



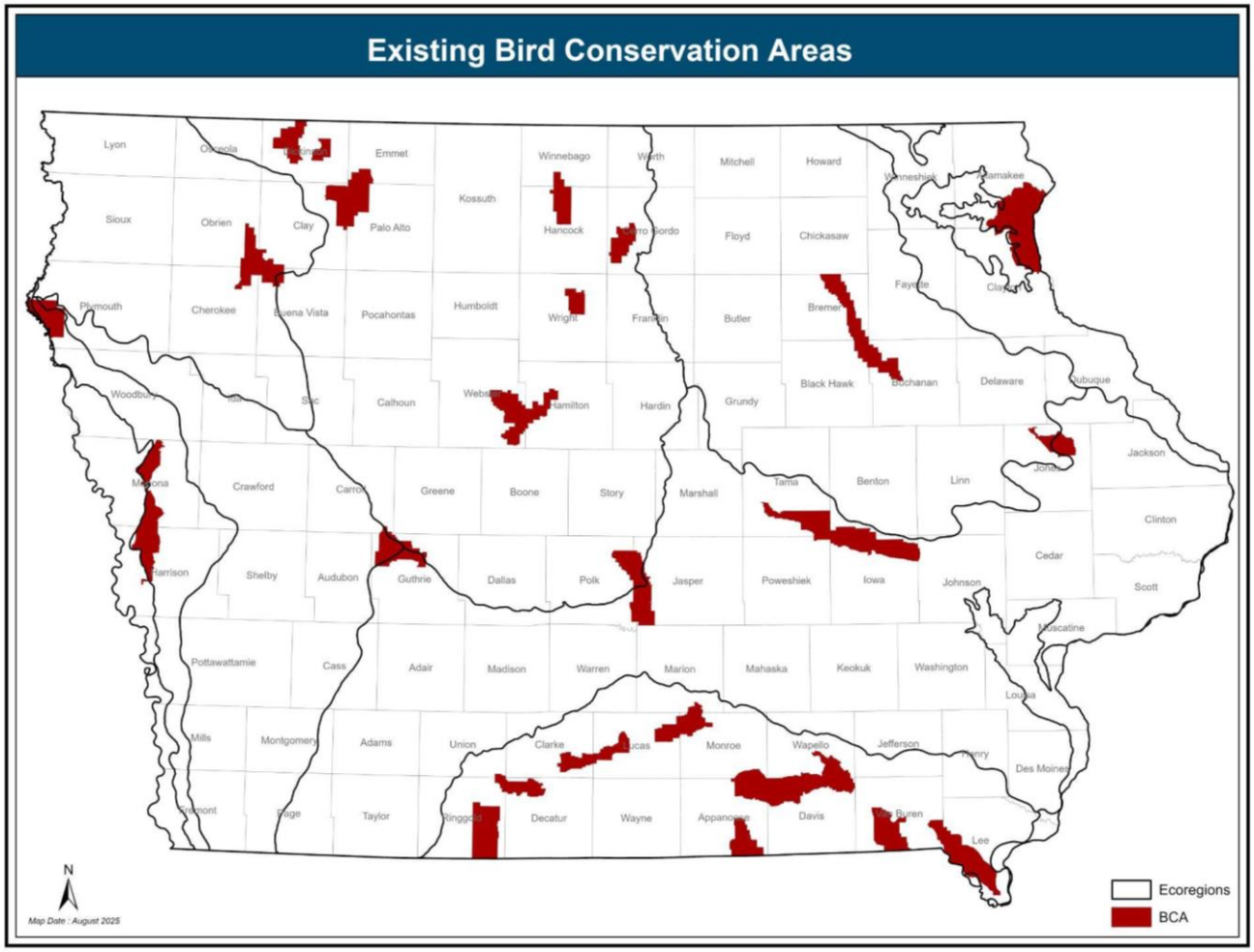
Map 8-5. The Nature Conservancy's Priority Areas within Iowa

This map reflects the terrestrial, freshwater, and regenerative agriculture priority areas of The Natural Conservancy.



Map 8-6. Bird Conservation Areas

Bird Conservation Areas have been designated by DNR as significant habitat complexes for birds generally following guidelines established by Partners in Flight. They are areas of 10,000 acres or more made up of a core area of permanently protected natural habitat surrounded by a matrix of public and private natural lands. This concept is backed by research that suggests viable bird populations require conservation efforts at a landscape-oriented level. While targeted specifically at birds, large tracts of natural habitat such as these have been identified throughout this Plan as providing significant habitat protection and restoration potential for SGCN.

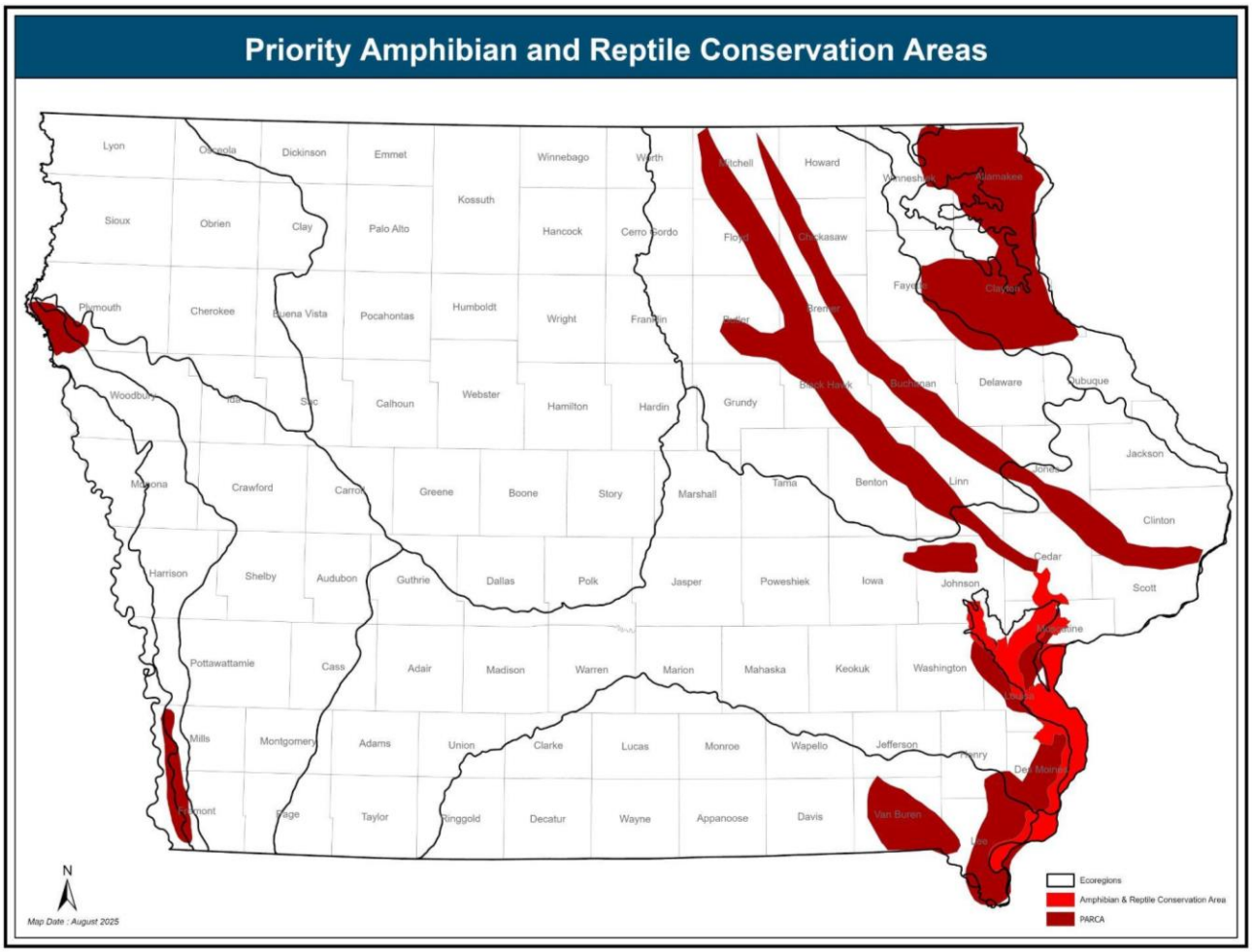


Map 8-7. Priority Amphibian and Reptile Conservation Areas

This map depicts priorities established to benefit reptiles and amphibians through two separate processes.

Priority Amphibian and Reptile Conservation Areas (PARCAs) are areas of high conservation value for amphibians and reptiles, collectively referred to as herpetofauna. Partners in Amphibian and Reptile Conservation (PARC) developed criteria to identify PARCAs and hosted state-level workshops with herpetologists across the nation to identify PARCAs to prioritize the most viable populations of rare reptiles and amphibians. Iowa's PARCAs were identified in 2017.

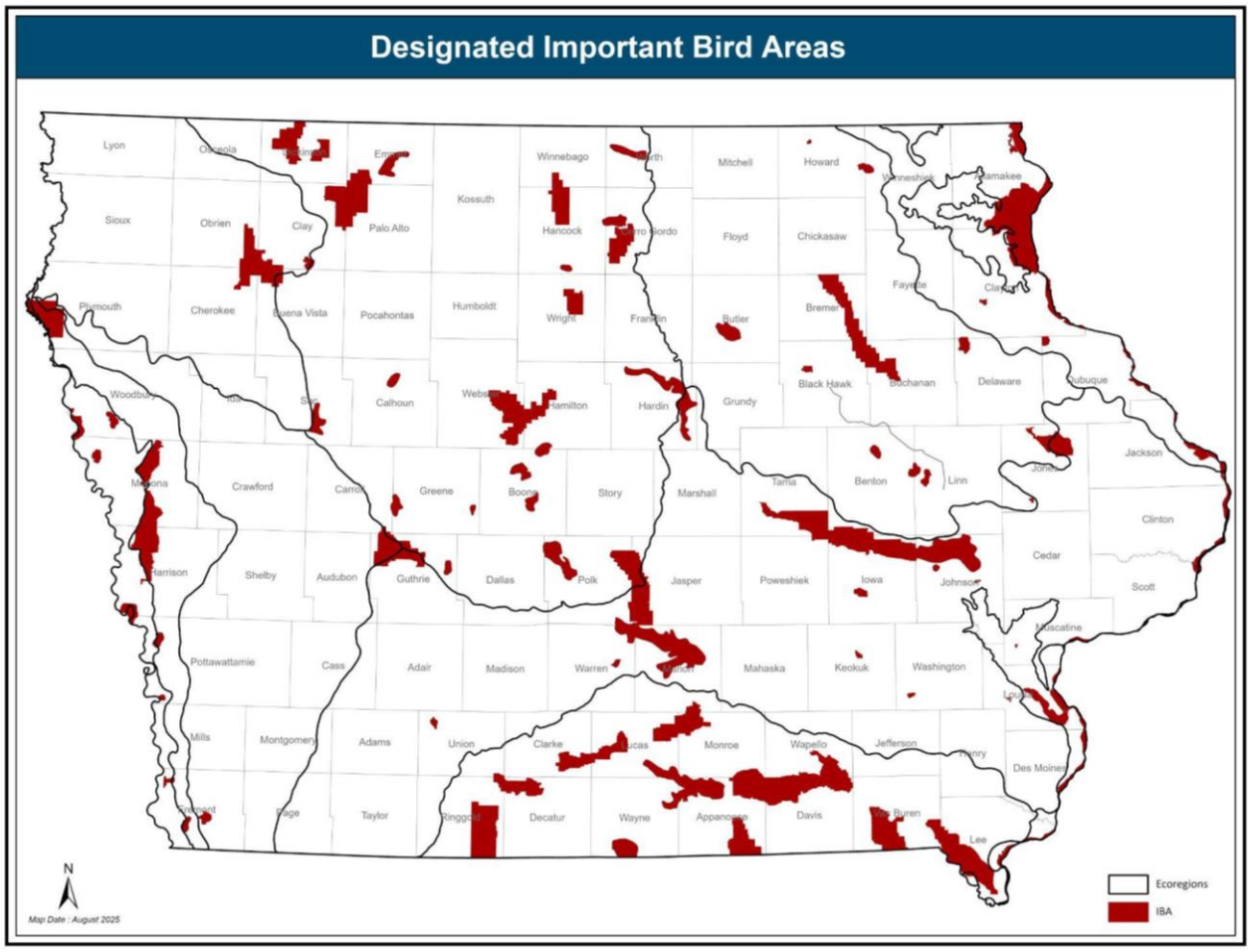
Iowa dedicated the nation's first-ever Amphibian and Reptile Conservation Area (ARCA) in 2007. The Southeast Iowa Amphibian and Reptile Conservation Area (ARCA) includes public and private lands in Iowa's Mississippi Alluvial Plain. Modeled on the Bird Conservation Area concept (Map 8-6) it spans approximately 470,000 acres. The area's diverse features - including riverbeds, grasslands, rock outcrops, streams, ponds and ephemeral wetlands - provide habitat for many species.



Map 8-8. Iowa Audubon's Important Bird Areas

Iowa Audubon's Important Bird Areas (IBA) Program is a citizen-led, science-based and data-driven bird conservation initiative. Phase l of this long-term effort is the identification, recognition and prioritization of habitats that support the most seriously declining species of birds. A State IBA Technical Committee evaluated all data received on a habitat-by-habitat basis, and then voted to confer IBA recognition when criteria were met. Habitats that meet criteria are considered to be the most essential habitats.

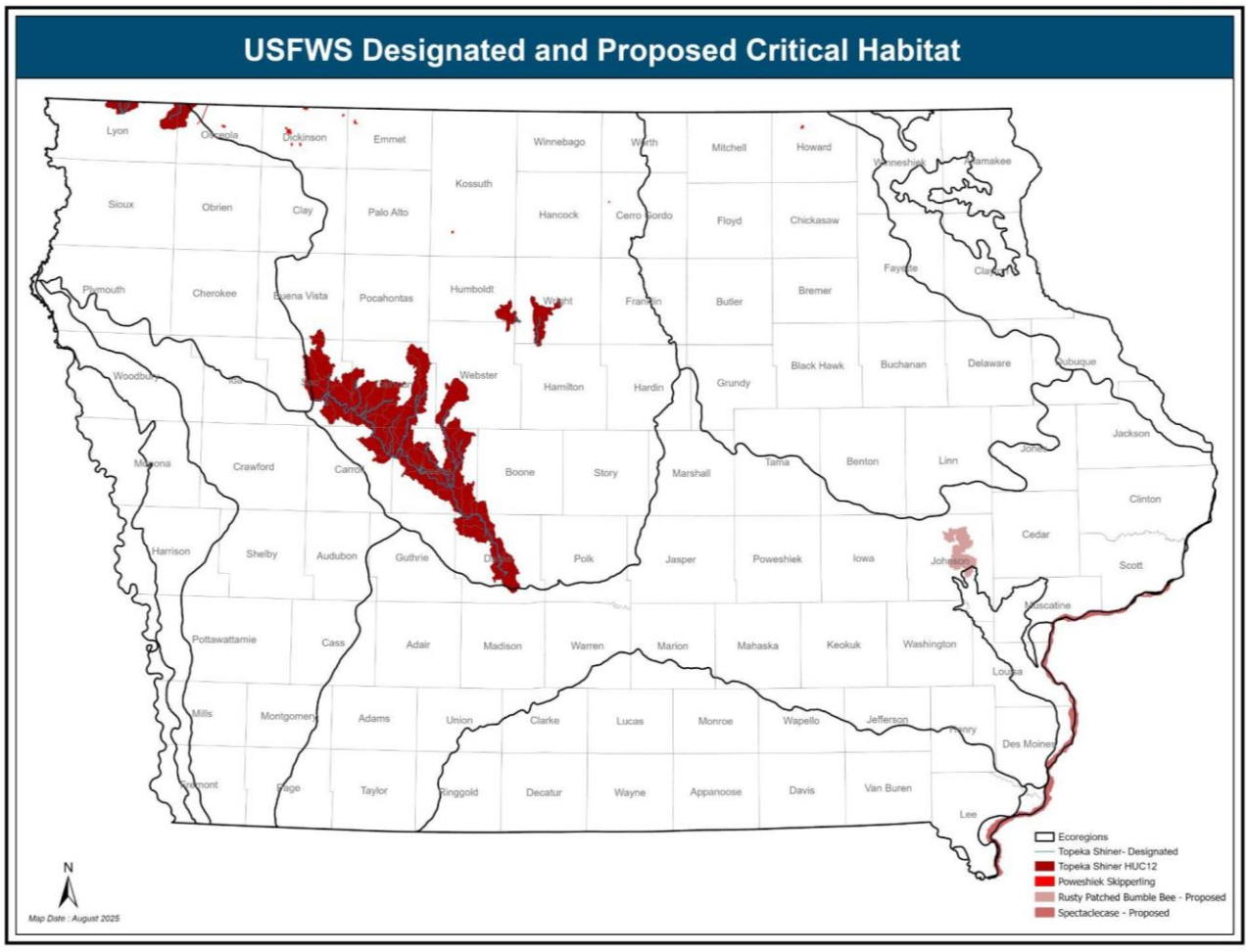
Phase 2 of the IBA Program is long-term monitoring of bird populations and habitat conditions, and organizing education programs at designated IBA sites where appropriate. Phase 3 is working with landowners and land managers to develop and implement long-term conservation plans to protect, restore, enhance and manage IBAs according to their environmental threats and conservation needs.



Map 8-9. Designated & Proposed Critical Habitat for Federally Listed Species

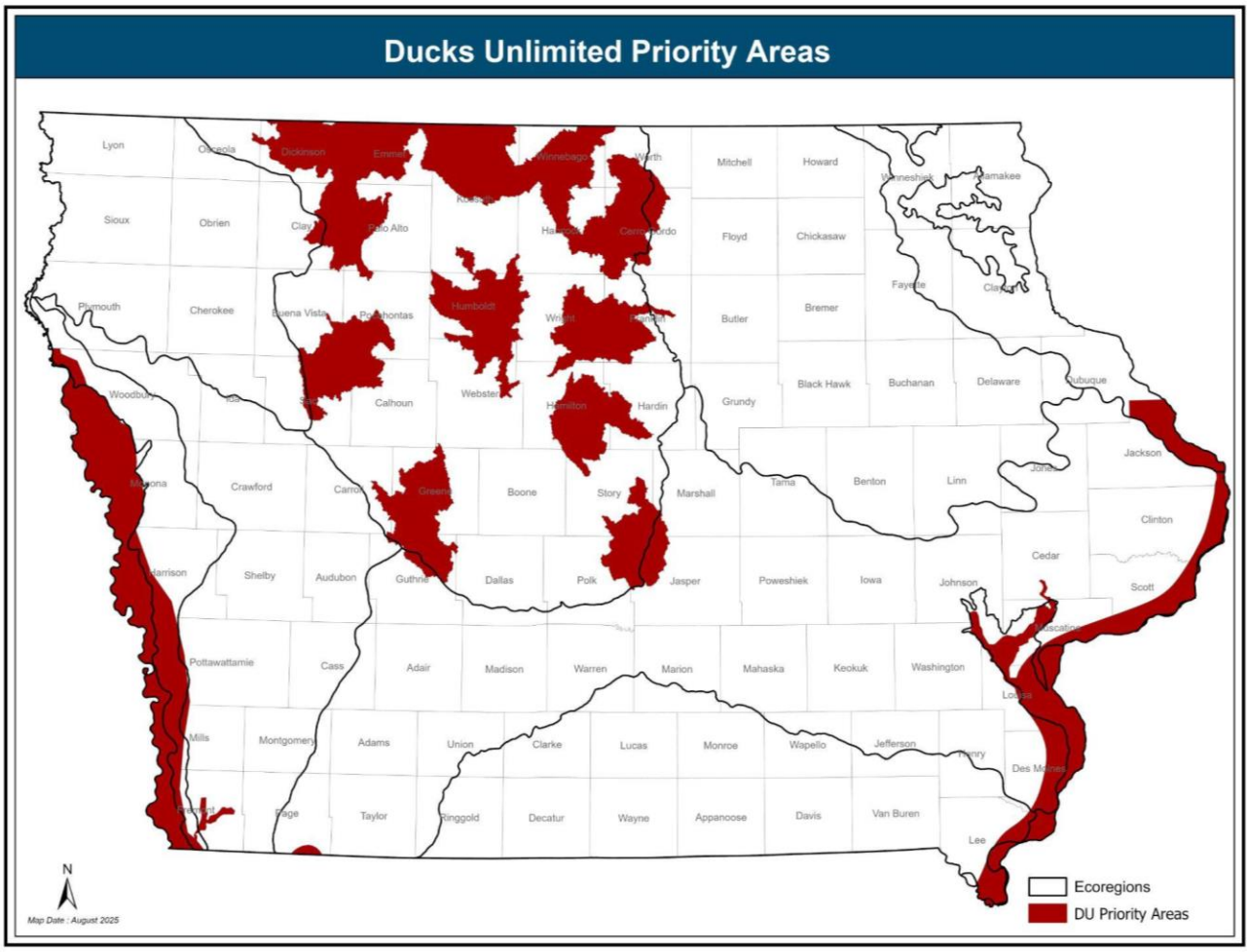
The Topeka Shiner, *Notropis topeka*, is a federally endangered species of minnow. This map shows designated critical habitat for Topeka Shiners in Iowa. The Poweshiek Skipperling (*Oarisma Poweshiek*) is a federally endangered species of butterfly. This map displays designated critical habitat for Poweshiek Skipperlings in Iowa. The Rusty Patched Bumble Bee is a federally endangered species. This map shows areas that have been proposed for designation as critical habitat for Rusty Patched Bumble Bees. The Spectaclecase is a federally endangered species of freshwater mussel. This map shows areas proposed for designation as critical habitat for the Spectaclecase.

This habitat is essential for the conservation of these two species and may require special management and protection. An area is designated as critical habitat through the federal regulatory process. The designation does not set up a preserve or refuge and has no specific regulatory impact on landowners' actions on lands that do not involve federal agency funds, authorization, or permits. Although this map displays critical habitat for only four species, it can be used to help set priorities for conservation actions in those parts of the state.



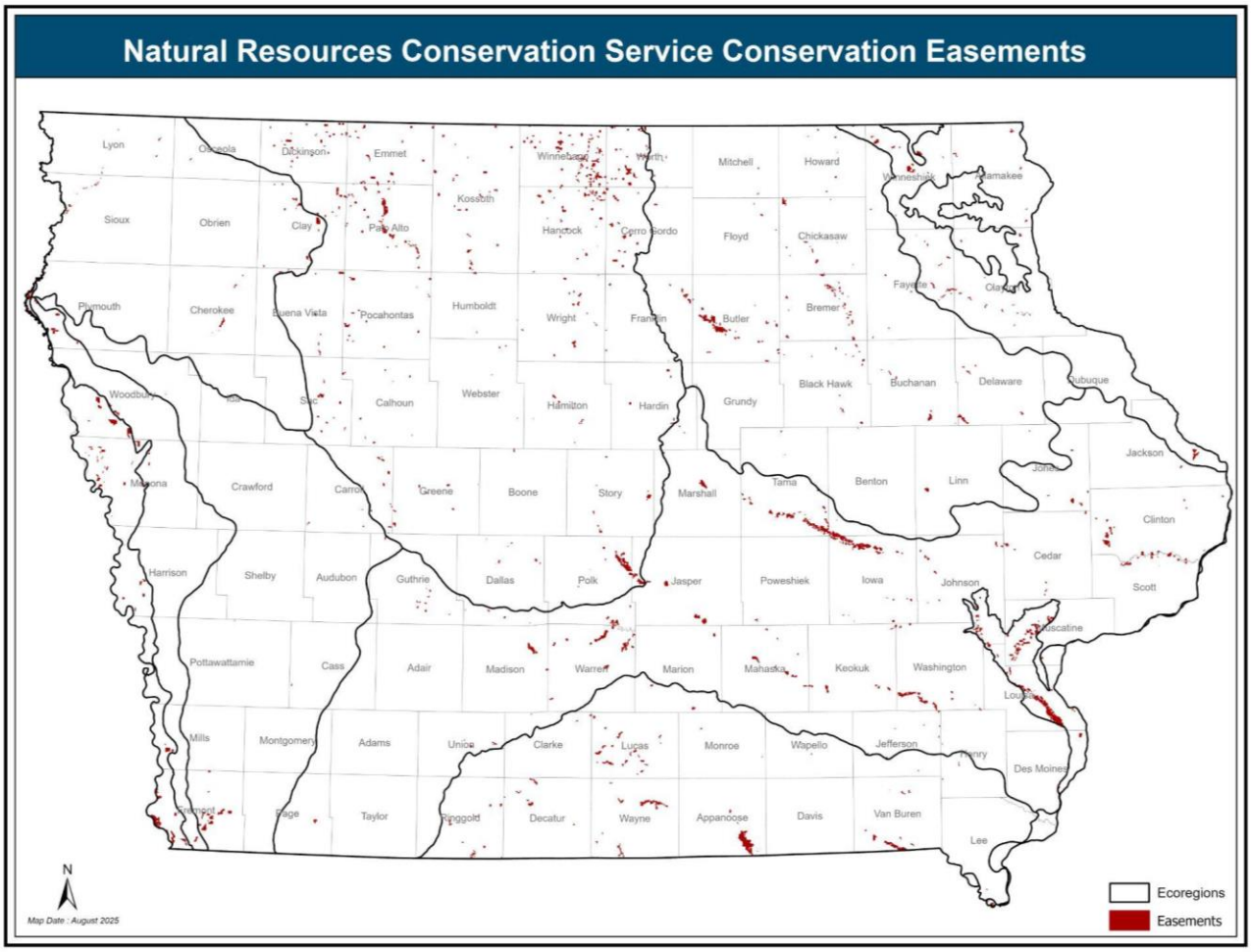
Map 8-10. Ducks Unlimited Priority Areas

Priority areas for Ducks Unlimited identify areas that are critical for migratory waterfowl, including both areas on Iowa's border rivers as well as areas in the Prairie Pothole region. Ducks Unlimited's Living Lakes Initiative Emphasis Areas represent an effort to provide high-quality feeding and resting areas for migratory birds as they cross the intensively farmed Des Moines Lobe. Research suggests migrating waterfowl can lose weight as they cross the Upper Midwest because of the lack of adequate food and consequently arrive on their Canadian breeding grounds in poor condition for nesting. This initiative works to provide 3,000 - 5,000-acre wetland complexes at less than 75-mile intervals so that birds can move at a more leisurely pace and maintain their body condition.



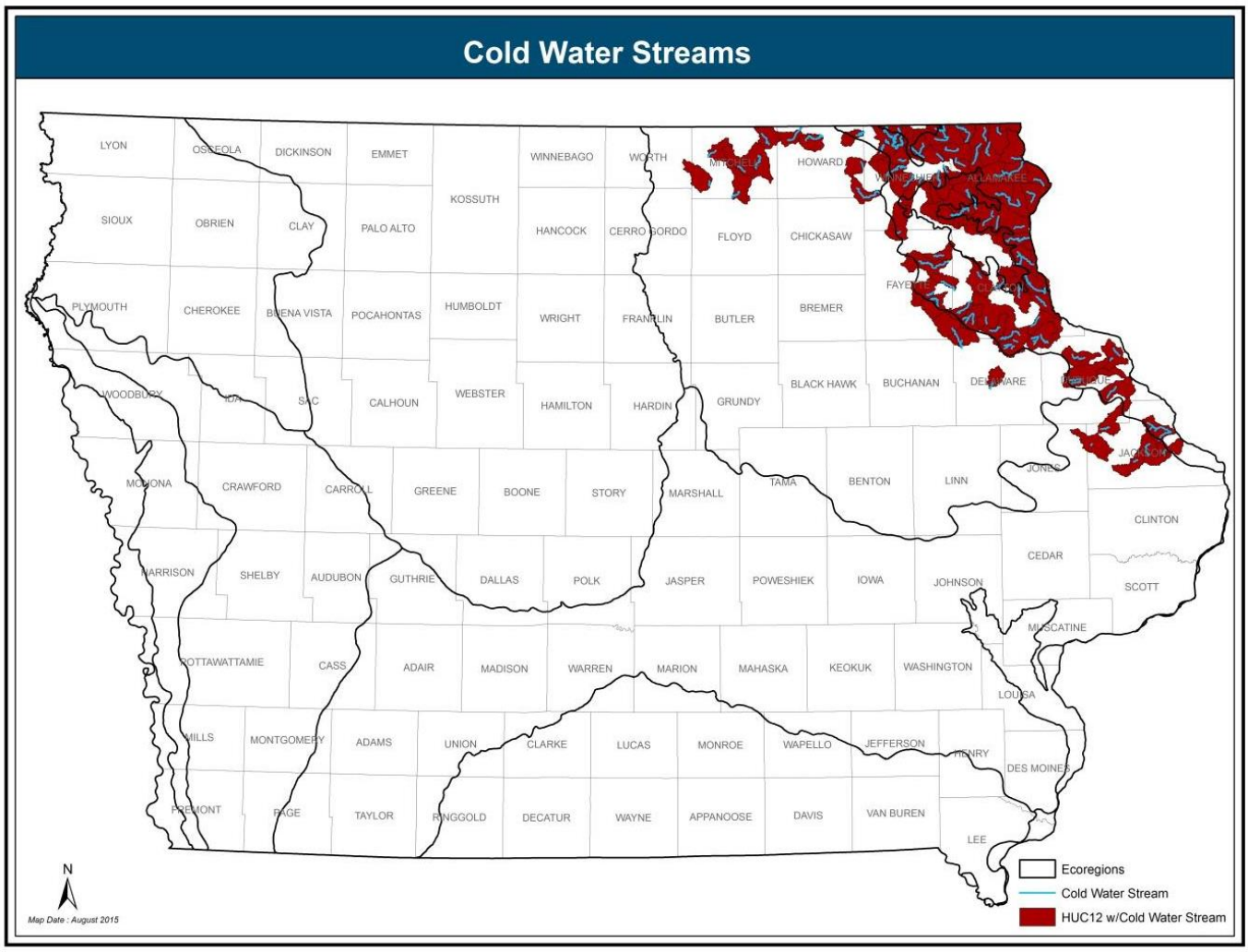
Map 8-11. Natural Resources Conservation Service Wetland Easements

The USDA Wetlands Reserve Easement (WRE, formerly called WRP), Emergency Wetlands Reserve Program (EWP), along with a few other wetlands restoration programs have helped slow the loss of wetlands in Iowa.



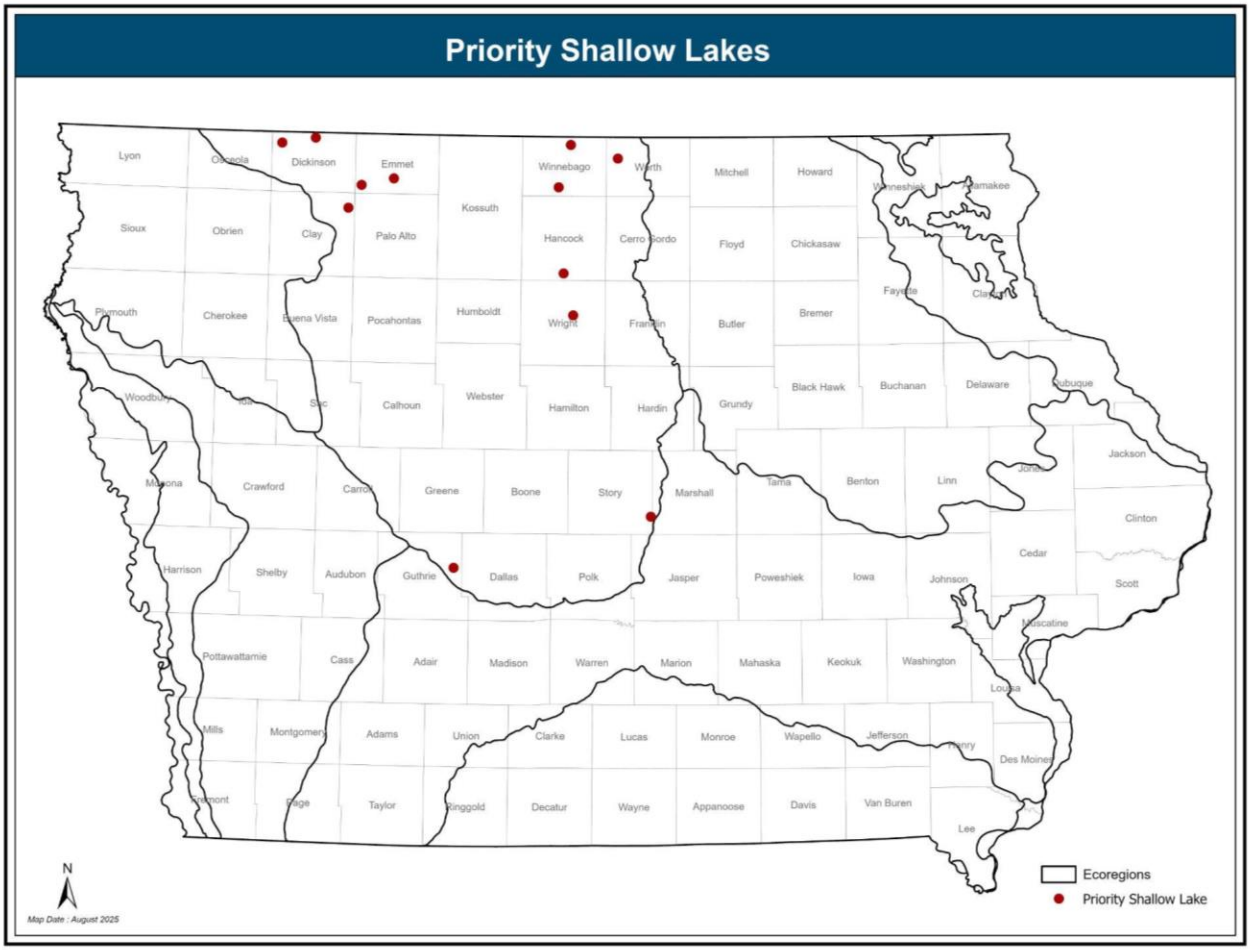
Map 8-12. Watersheds with Coldwater Streams

The Driftless Area covers over 16,000 square miles across Northeast Iowa, Southwest Wisconsin, Southeast Minnesota and Northwest Illinois. The area escaped coverage by glacial drifts which covered much of the upper Midwest during the latter part of the Pleistocene epoch. Due to its unique karst geology characterized by sinkholes, caves and springs, the Driftless Area supports a high concentration of spring-fed, regionally significant coldwater streams. Coldwater streams are flowing waters with maximum summer water temperatures that are typically below 22°C. This map displays Hydrologic Unit Code (HUC) 12 watershed containing coldwater streams.



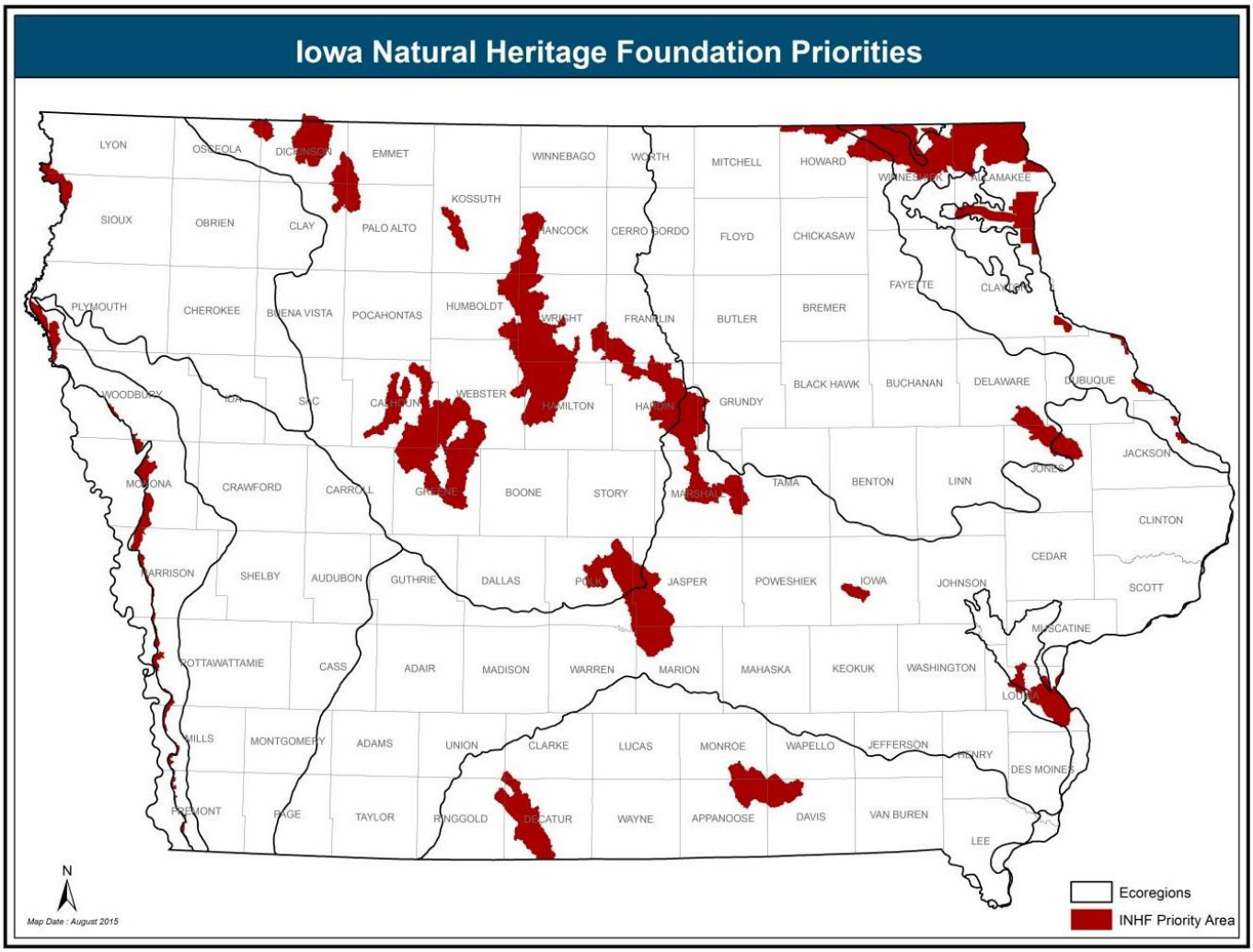
Map 8-13. Priority Shallow Lakes

Ducks Unlimited and the Iowa DNR's Wildlife and Fisheries Bureaus developed a prioritized list of shallow lakes to be renovated over the next ten years, which is updated periodically as restoration projects are completed. Natural lakes in Northwest Iowa are mainly characterized as shallow, windswept systems that exhibit poor water quality. Significant watershed changes and the introduction of common carp in the late 1800's have forever made management of these water bodies a challenge. The current focus of the Shallow Lake Restoration Program is on shallow lakes that support both fishing and wildlife benefits.



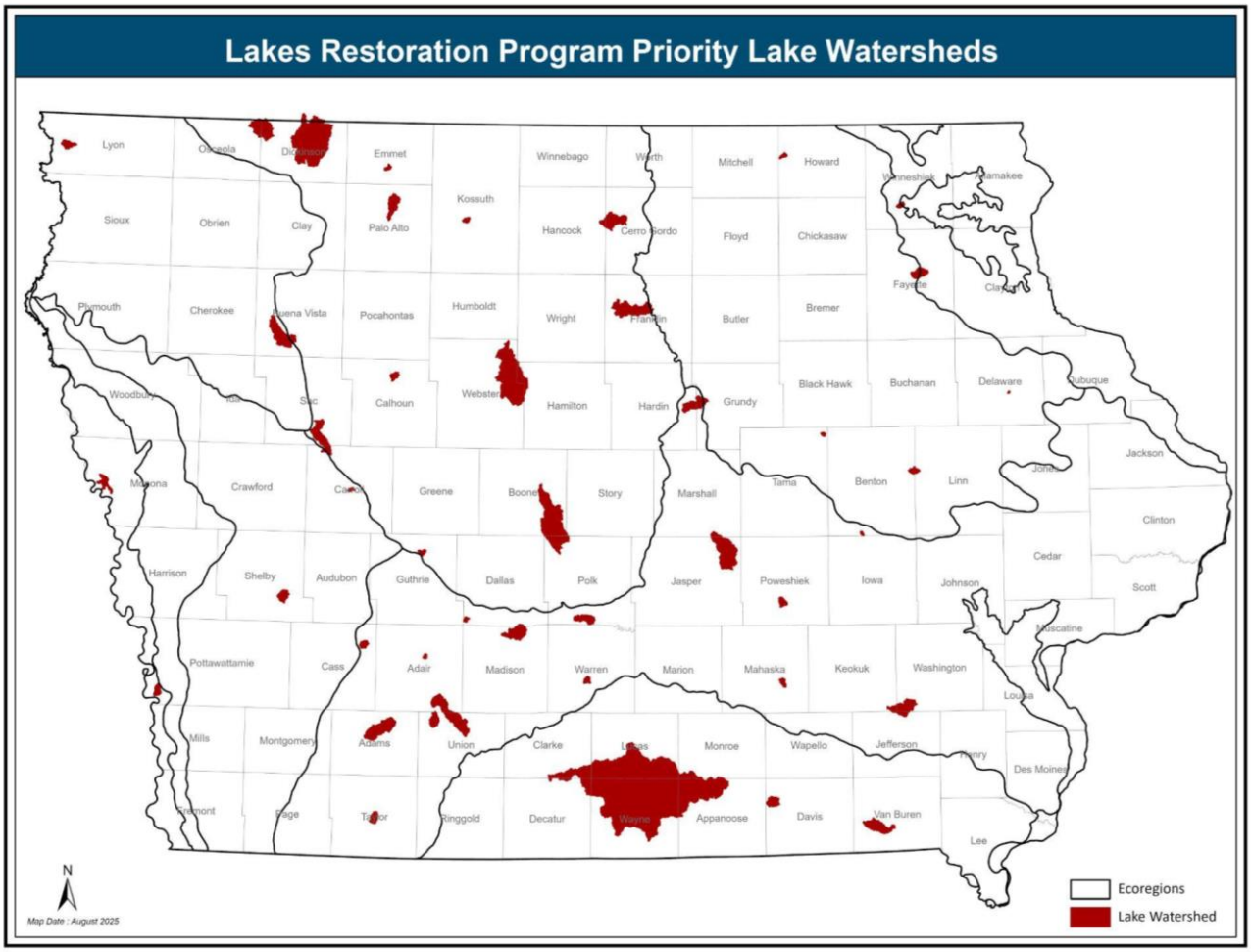
Map 8-14. Iowa Natural Heritage Foundation Priorities

The Iowa Natural Heritage Foundation (INHF) is an accredited land trust. INHF is a member-supported organization and its priorities include protecting priority lands, connecting natural landscapes and natural corridors, restoring natural areas, and engaging Iowans with Iowa's natural heritage.



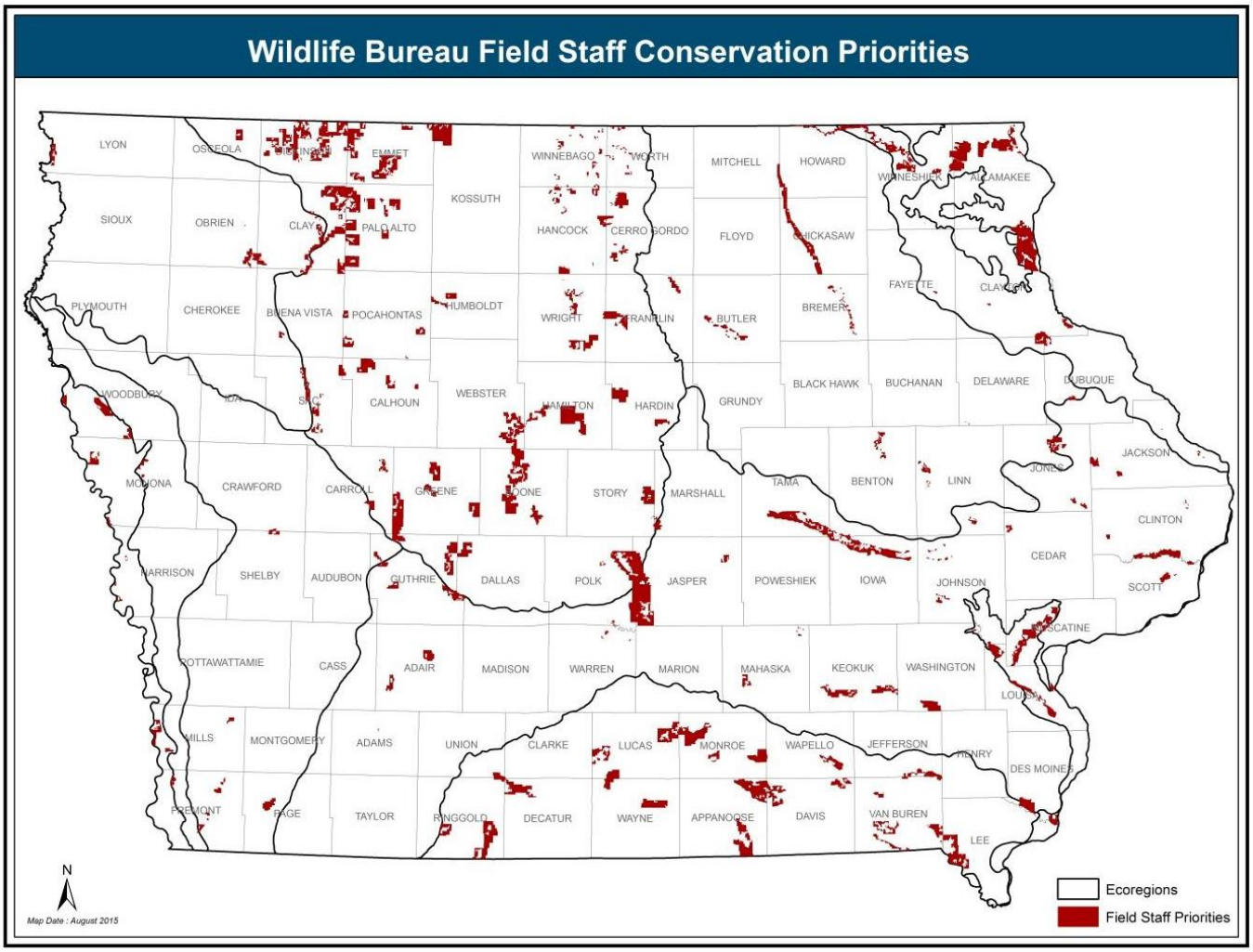
Map 8-15. Lakes Restoration Program Priority Lakes Watersheds

2006 was a milestone year of intensified focus on Iowa's lakes. This emphasis was encouraged by the 2006 Infrastructure Bill (HF2782), which provides additional funding and requires the DNR to use a science-based approach to achieving lake water quality improvements. 127 of Iowa's principal public lakes were initially ranked to develop a priority list of 35 lakes for lake restoration suitability based upon a number of socio-economic, water quality, and watershed factors. This ranking process has evolved and is still used to maintain a list of 35 lakes and 5 shallow lakes for consideration as potential lake restoration projects. As of 2025, 36 lakes have been restored and are in a maintenance phase. An additional 24 restoration projects are in progress, and 12 lakes are in a planning/evaluation phase.



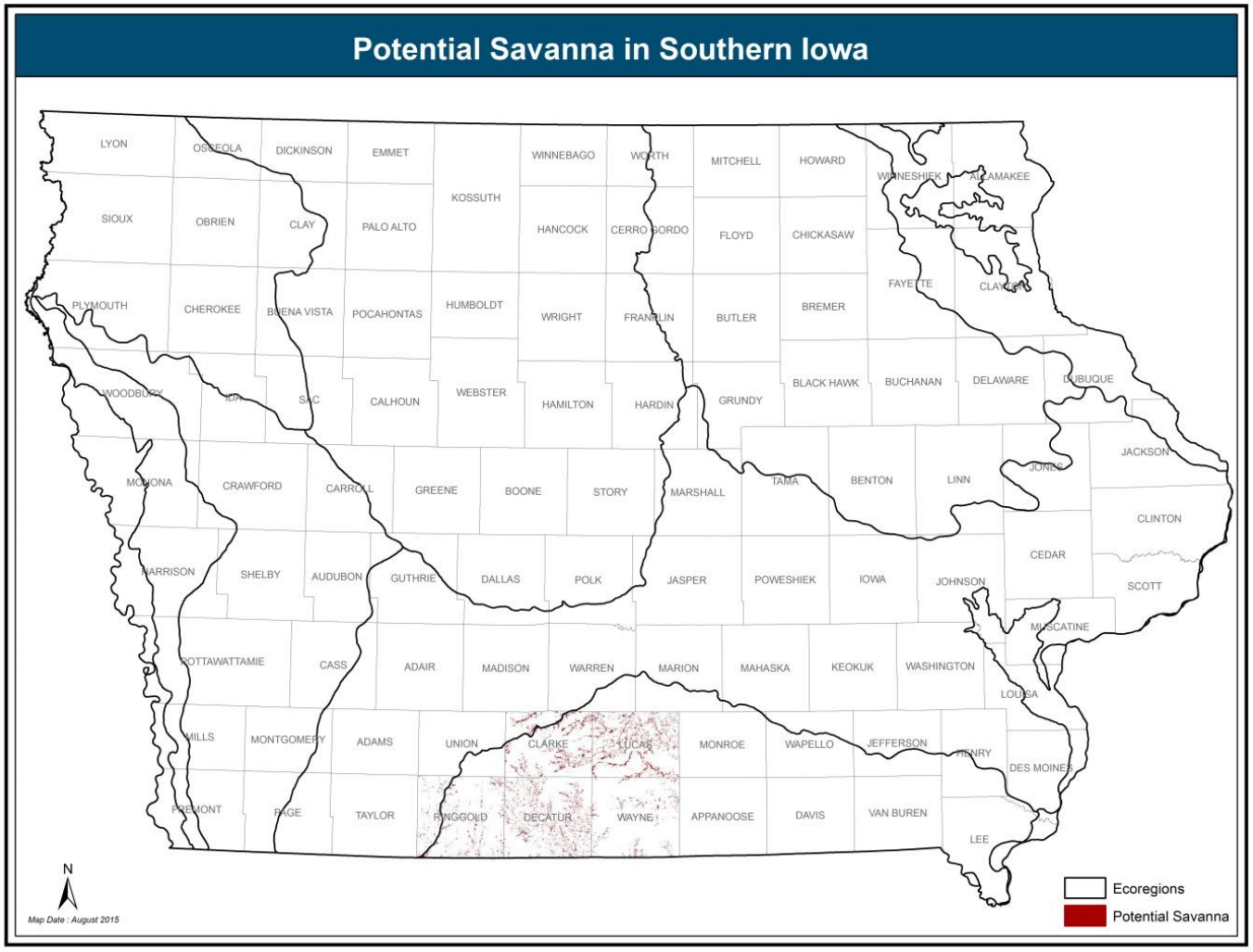
Map 8-16. Habitat conservation priorities identified by Wildlife Bureau field staff

When the importance of habitat conservation on a landscape scale became apparent, the DNR's Wildlife Bureau began to place an emphasis on the creation and maintenance of habitat complexes. This serves to provide core areas for wildlife to reproduce and maintain their populations and decreases the threats caused to populations by habitat fragmentation. With this in mind, in the mid-1990s the wildlife bureau field staff identified areas which serve as important habitat and are important to maintain as habitat, and also areas which would be most beneficial to wildlife populations if they could be restored to habitat through voluntary habitat improvement programs (such as Farm Bill conservation programs) or through easements, or acquisition from willing sellers. This is valuable information as it represents the potential habitat value assigned to individual areas by those who are intimately familiar with their local landscape.



Map 8-17. Savanna Restoration Potential

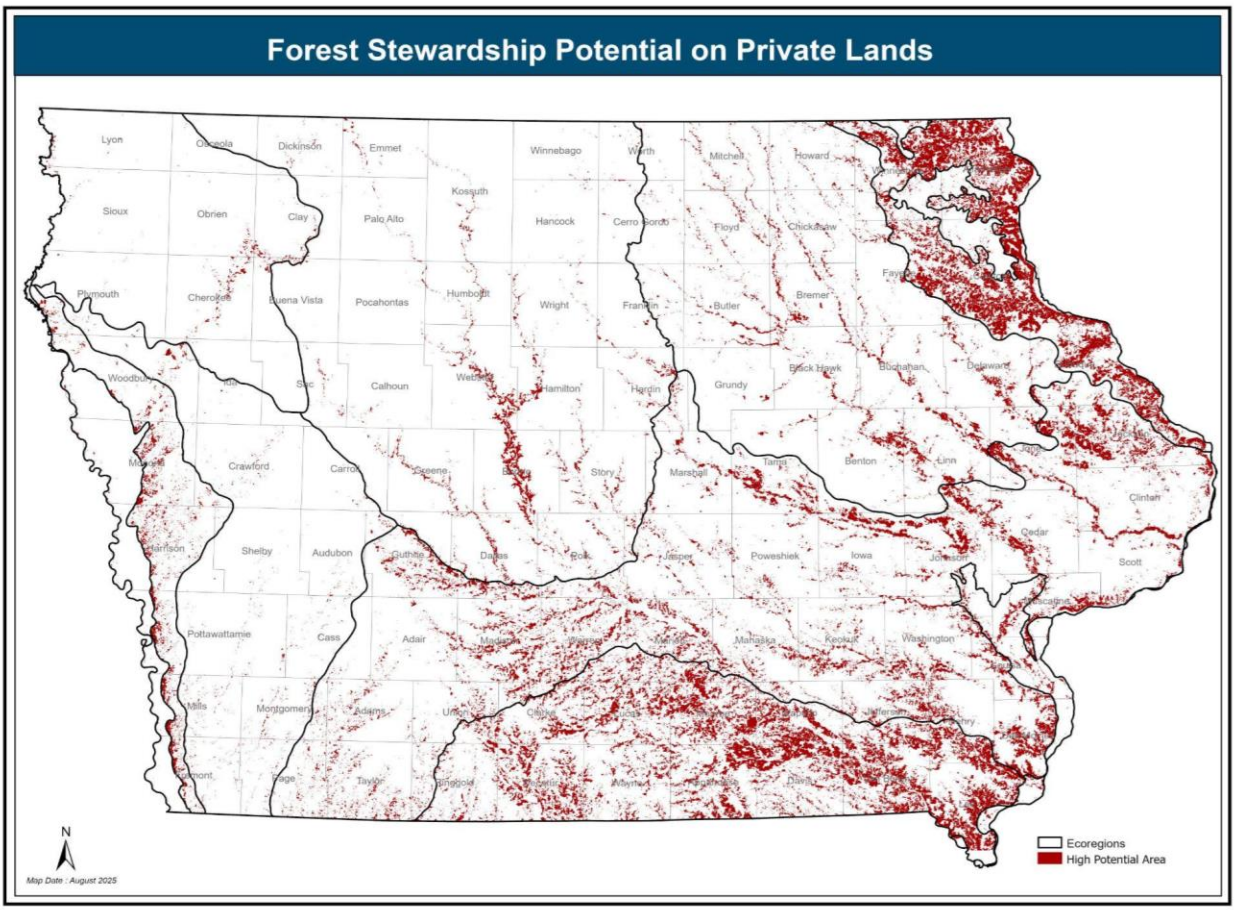
Savannah restoration potential was assessed within a five-county area in southern Iowa by the US Fish and Wildlife Service's Partners for Fish and Wildlife Program. The assessment was based upon soil type and current land cover type. This map is used by conservation partners in southern Iowa to prioritize savanna restoration work.



Map 8-18. Forest Stewardship Potential

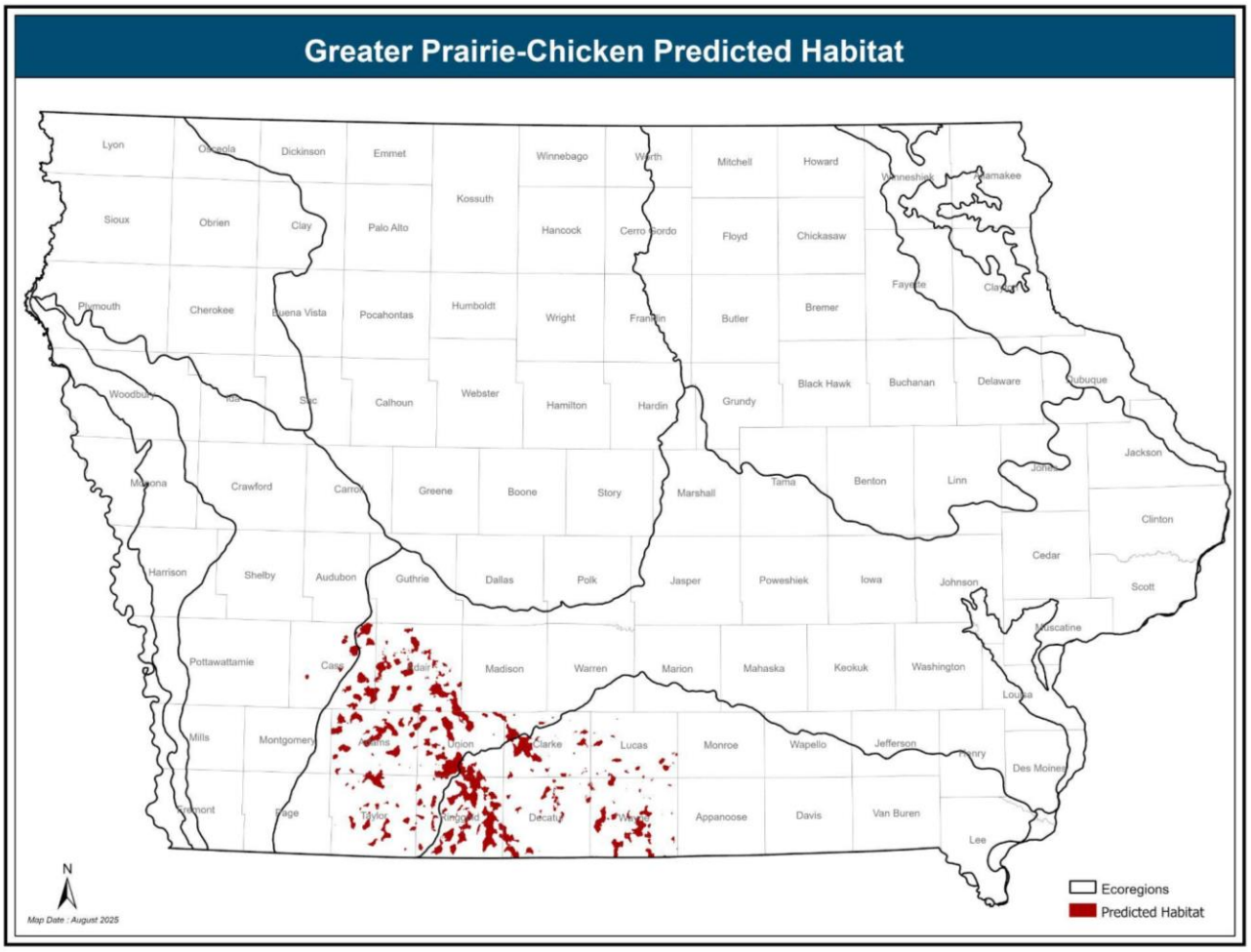
In accordance with U.S. Forest Service protocol, Iowa's Forest Stewardship Program (FSP) employs a geographically-based, landscape scale approach to prioritize the delivery of technical forestry assistance & education to Iowa's private woodland owners. Doing so helps ensure that on-the-ground forest management and reforestation activities are emphasized in areas where they will have the most impact in addressing critical state and national issues such as providing wildlife habitat, protecting watersheds, and supporting jobs and rural economies. In August 2020, Iowa developed an updated statewide GIS coverage of its Forest Stewardship Priority Lands in concert with the nationwide modernization of the Forest Stewardship Program. For more information, see the Iowa Forest Action Plan.

Variables Included	Explanation
Private forested land	Excludes public landholdings, surface water bodies, large urbanized/developed areas
Water quality	Emphasis on lands located in or near riparian zones and forested wetlands, state-designated Protected Water Areas (PWAs), and priority watersheds such as Significant Publicly-Owned Lakes and impaired waterbodies
Forest Patch Size	Emphasis on consolidating large-scale, core forest habitat areas and inclusion of isolated patches greater than 10 acres in size
Wildlife	Emphasis on including forested lands of any size or location where occurrences of Threatened, Endangered, or SGCN are known to exist
Proximity to public lands	Emphasis on privately owned forests of any size that are in close proximity to publicly owned or protected conservation lands (State Parks, WMA's, county- or federally-owned conservation lands, etc.)
Active and engaged landowners	Ensuring that private forest landowners of any size or location who have enrolled in reforestation or forest management cost sharing programs, Tree Farm, or FSP are included in priority lands coverage



Map 8-19. Greater Prairie-chicken Predicted Habitat

A Greater-prairie Chicken habitat model (Vogel et al. 2016) was developed using the Iowa DNR 2009 high resolution land cover. Dan Kaminski updated the model using 2023 annual National Land Cover Database (NLCD) land cover to provide an estimate of current lek habitat. The updated model is used to identify areas of the most likely lek habitat and to prioritize survey efforts.

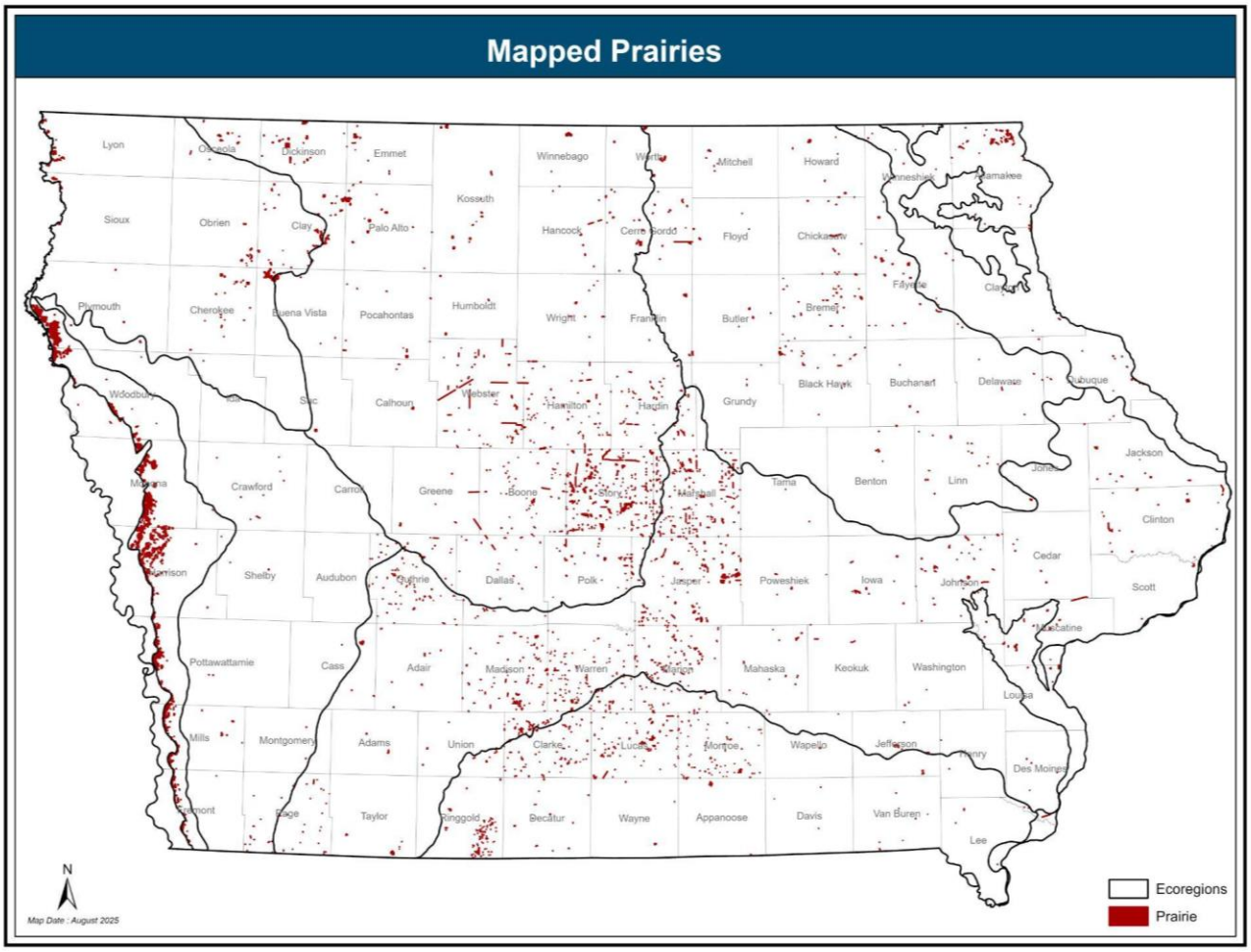


PLACEHOLDER FOR:
Map 8-20. U.S. Army Corps of Engineers Sustainable Rivers Program

We are working on obtaining an up-to-date map depicting the USACE Sustainable Rivers Program's priorities for Iowa.

Map 8-21. Mapped Prairies

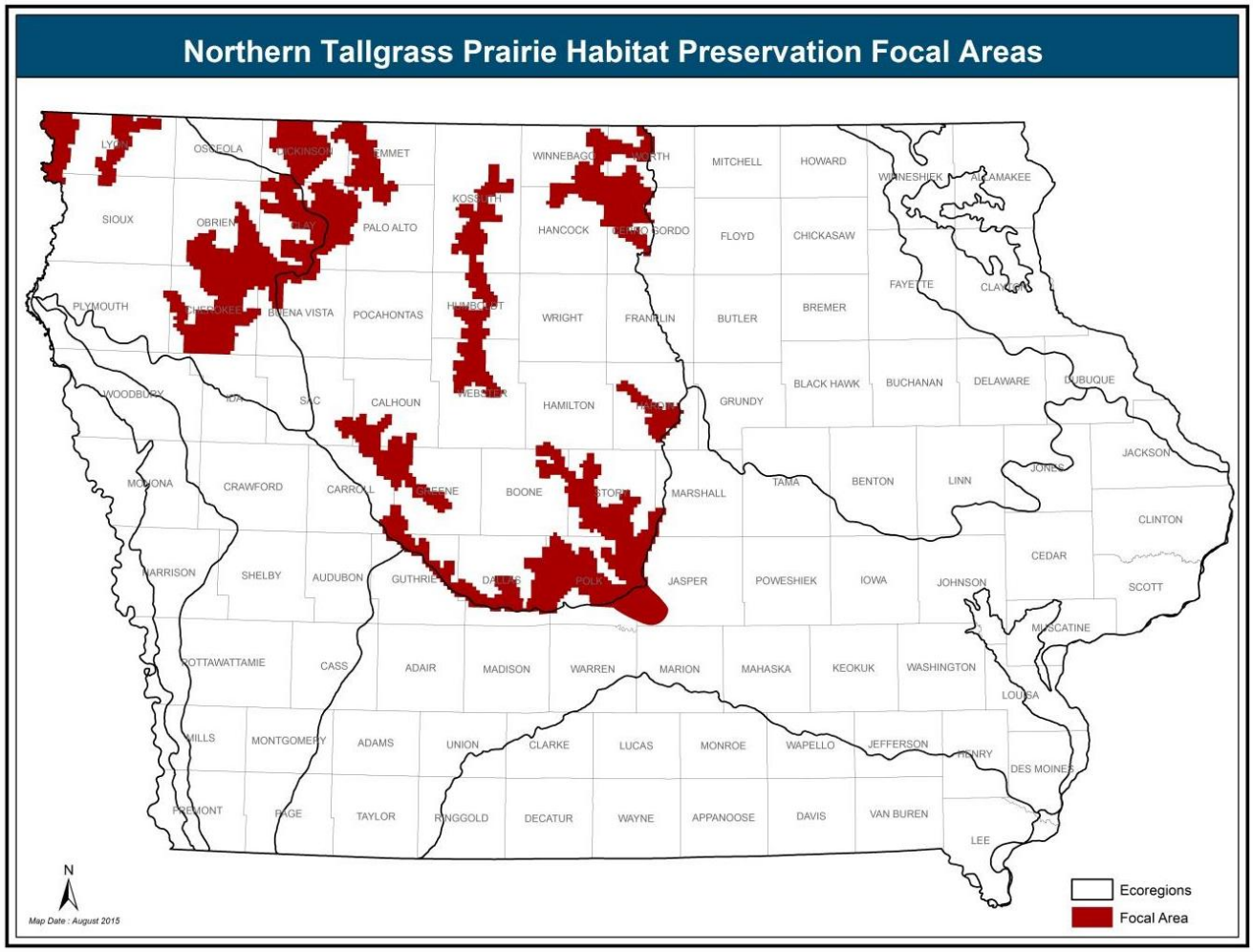
The DNR maintains a map of Prairie that includes both remnant and restored prairies of varying quality. This map represents incidental information about occurrence of prairies (as opposed to showing results of a full inventory, which has not been undertaken for Iowa). Also, please note that the size of each prairie mapped is smaller than it appears on the map; these areas are depicted in a larger format to make it possible to view them at the scale of a statewide map.



Map 8-22. Northern Tallgrass Prairie Focal Areas

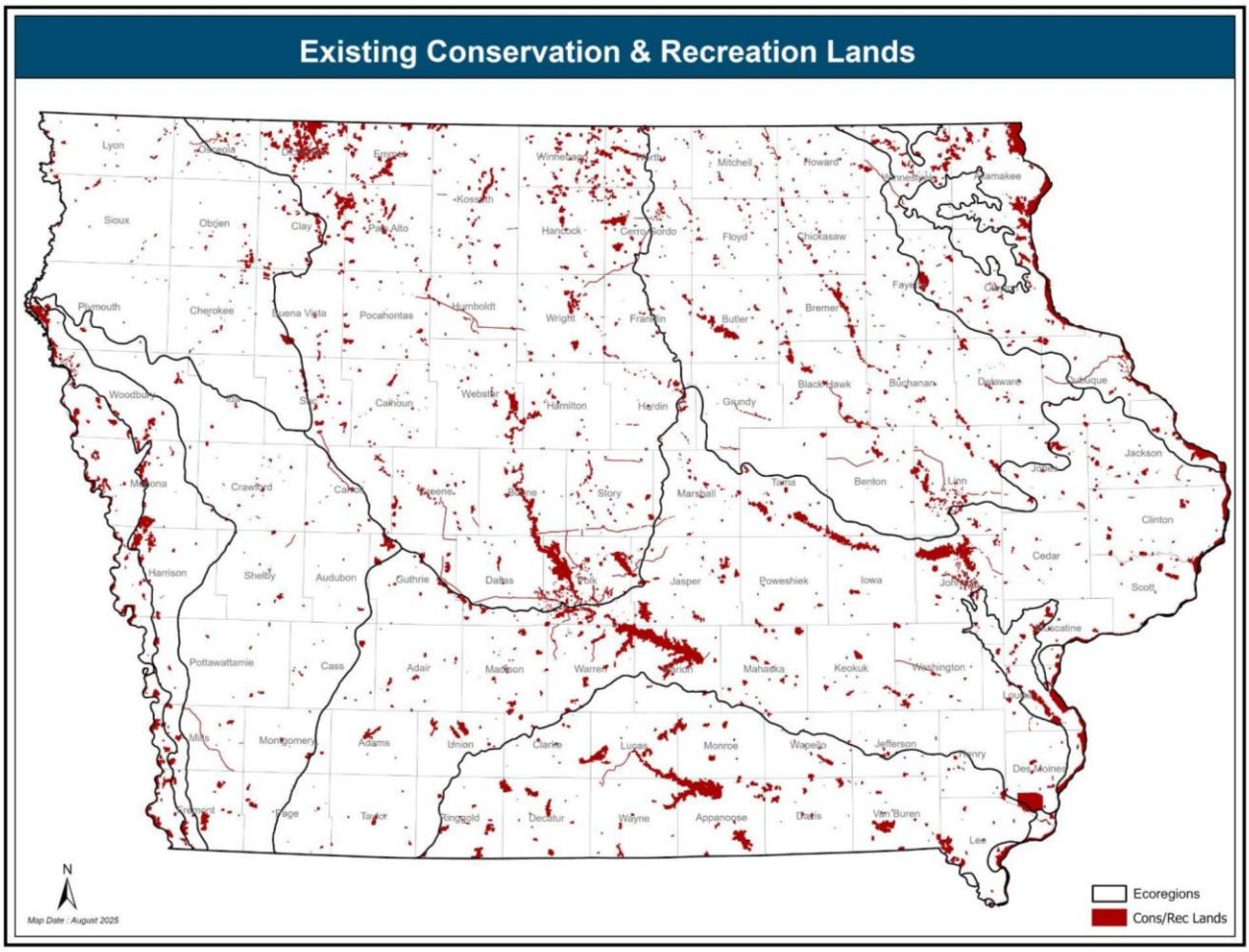
In order to protect a portion of the remaining native tallgrass prairie in Iowa and Minnesota, in 2000 Congress established the Northern Tallgrass Prairie Habitat Preservation Area (HPA). About 300,000 - 320,000 acres of native tallgrass prairie remain with the HPA. The goal is to protect 77,000 acres, which equates to 0.3% of the historic tallgrass prairie land area, across the HPA. The HPA stretches across 37 counties in northwest Iowa and 49 counties in the western third of Minnesota. The U.S. Fish and Wildlife Service (USFWS) works with partners including private entities, land trusts and other non-governmental organizations, and government agencies to protect and restore tallgrass prairie tracts within the HPA. These parcels become part of the USFWS's Northern Tallgrass Prairie National Wildlife Refuge (NTGP NWR). Therefore, the NTGP NWR is different from a typical refuge, as it is made up of scattered prairie parcels which are protected through fee title acquisition or through easements.

The Iowa Tallgrass Prairie Working Group developed a plan for tallgrass prairie conservation in Iowa in 2013. At that time, the Iowa portion of the NGTP NWR consisted of 352 acres of the total 5,255 acres within the Refuge. As part of the planning process, landscapes with the best potential for protection and restoration of native prairie were identified. These focal landscapes are displayed below.



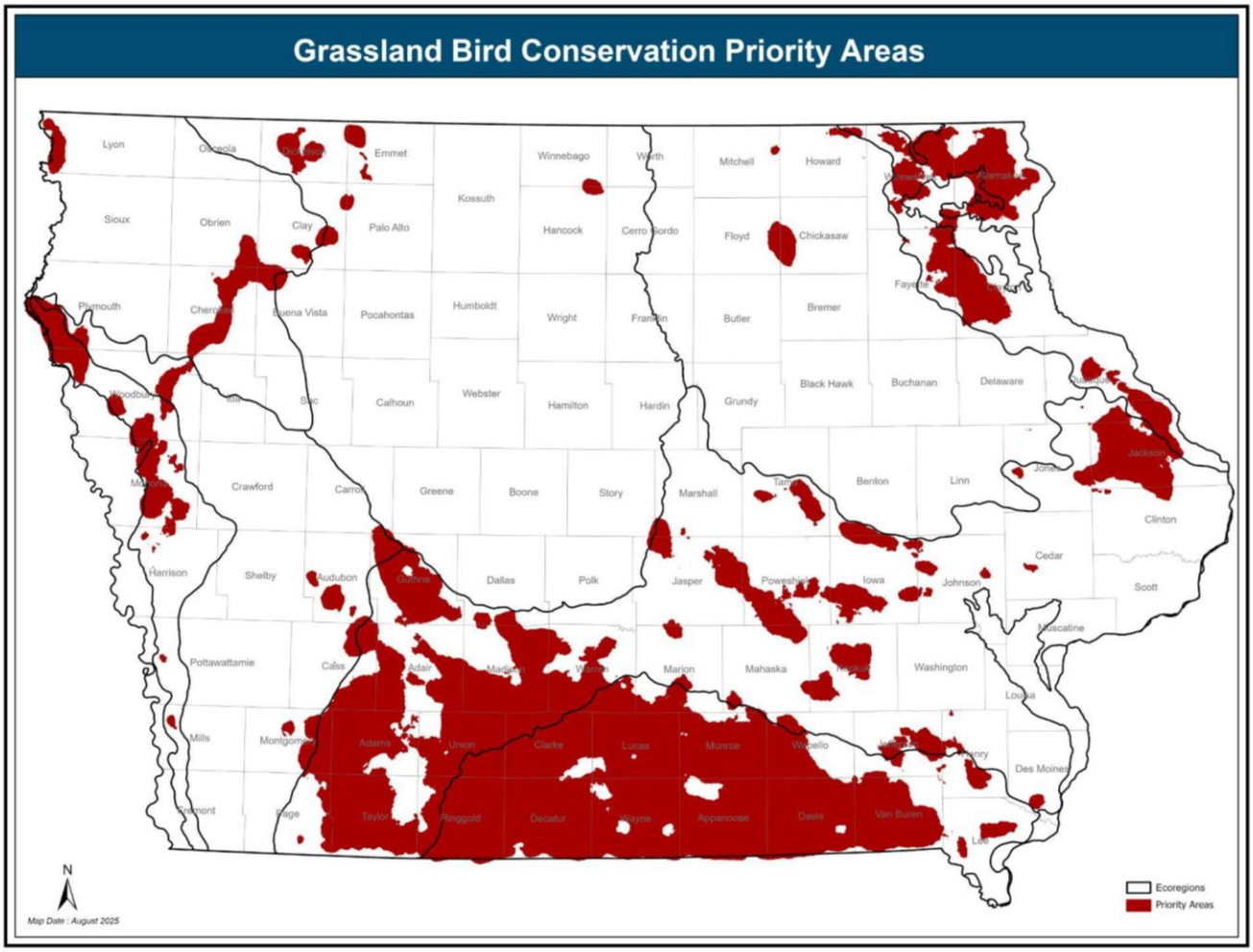
Map 8-23. Existing Conservation and Recreation Lands

This map shows the extent of areas that are utilized for conservation and recreation purposes. These lands are owned by a variety of entities including Federal agencies, Iowa DNR, and County Conservation Boards, and land trusts.



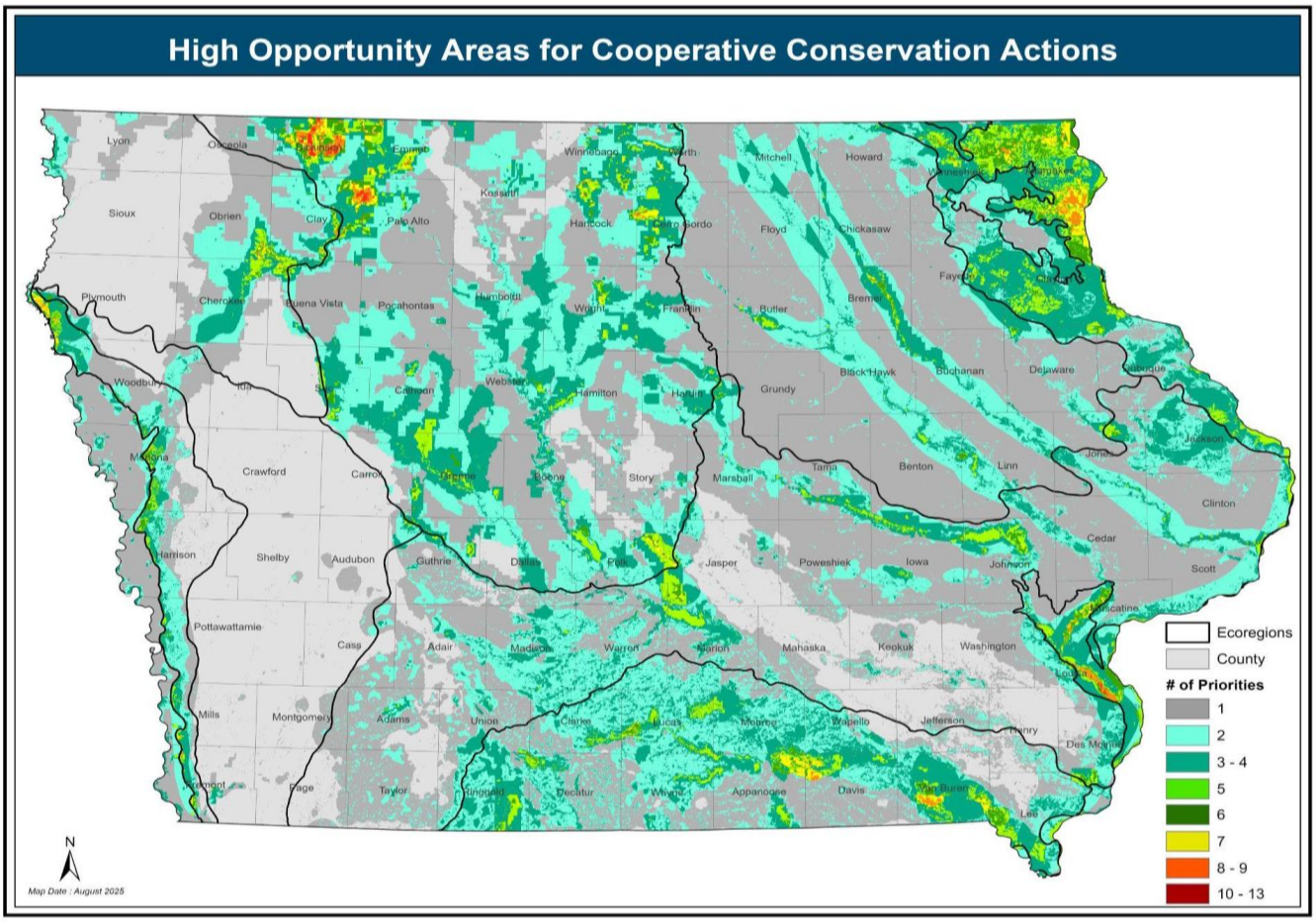
Map 8-24. Grassland Bird Conservation Priorities

Grassland birds are undergoing long-term, steep declines, as the North American grassland biome has been devastated by habitat loss and degradation. Grassland obligate species declines are the most serious. Conservation efforts are demonstrably effective, however. This layer results from an analysis of very persistent grassland, native grassland remnants that have been mapped on Wildlife Management Areas, and mapped prairies. These focal areas represent the best opportunities for conservation to benefit grassland birds.



Map 8-25. High Opportunity Areas for Cooperative Conservation Actions

Map 8-2 through Map 8-24 were combined to identify priority areas for conservation actions. The shaded areas on the map indicate areas identified as a priority for action by one or more of the plans referenced above. Darker shading indicates areas where progressively more of the plans have overlapping priorities and indicate where partnering to maximize the effect of resources should be possible.



Issue-Based Priorities: Overarching Approaches

Landscape Scale Conservation

Populations of fish and wildlife span political boundaries, as do the habitats and natural processes that support them. Therefore, effective conservation requires a landscape-scale approach. A landscape-centered approach requires collaboration across jurisdictions, in order to avoid duplication of efforts or counterproductive actions, as well as to be efficient and cost-effective. At a national level, the existence of State Wildlife Action Plans (SWAPs) is a helpful building block to effecting range-wide conservation for rare and declining species. In 2018, the Association of Fish and Wildlife Agencies (AFWA) adopted a resolution on landscape conservation and in 2020, the AFWA President's Task Force on Shared Science & Landscape Conservation Priorities pursued development of recommendations on how SWAPs can become even more effective at improving range-wide conservation of Species of Greatest Conservation Need by leading or contributing to regional and/or national landscape conservation priorities (AFWA 2021). These recommendations include the application of regional and shared approaches to plan development and implementation, increased consistency and alignment of SWAPs across jurisdictions, and inclusion of broad suites of partners during plan development and implementation. This effort led to the formation of AFWA's Landscape Conservation Joint Task Force, to enhance coordination between State and Federal wildlife conservation agencies. With each new generation of SWAPs, we are collectively working to increase accessibility and relevancy of these plans to conservation partners.

Adaptive Resource Management

This Plan's third Vision (see Chapter 6) is this vision for wildlife management: Diverse wildlife communities will be developed on public and private lands and waters through the use of adaptive ecological management principles. Adaptive Resource Management is an overarching approach to implementing this plan. It is discussed in more detail in Chapter 7.

Human Dimensions of Fish & Wildlife Conservation

Fish and wildlife management requires an understanding of ecological context for conservation actions, which is gained through biological research. Similarly, a key to successful conservation outcomes is an understanding of the societal context of conservation action, gained through rigorous social science. Therefore, recognition of the human dimensions of conservation is another overarching approach to successful implementation of this plan. This scientific arena can challenge State Fish & Wildlife Agency capacity; typically, only a small number of social scientists, if any, are housed within such agencies, limiting the number of projects that can be handled internally. Thus, partnerships with universities are important to this aspect of conservation work.

Issue-Based Priorities: Emerging Approaches

Urban & Community Conservation

Data from the US 2020 Census show that the total population of the United States grew by 22,700,000 people between 2010 and 2022 representing an increase of 7.4% (Census.gov 2022). Four counties in Central Iowa (Dallas, Polk, Story, and Warren) grew between 10.0% and 50.7% in population during that time period. While these four counties represent 4.0% of the acres of Iowa, they account for 23.1% of the total population and all fall within the highest 2 growth categories delineated by the Census. Thus, this part of the State represents the vanguard of the challenge of adapting agency conservation and engagement efforts to meet the needs of a growing human population.

In Iowa, several organizations and partnerships promote urban conservation. To name a few, Bird Friendly Iowa which promotes bird habitat, connects people with birding, and offers city or county designations if the qualifications are met; and Plant.Grow.Fly which promotes backyard habitats for pollinators. In addition, several Iowa cities participate in the National Wildlife Federation's Mayor's Monarch Pledge meaning those cities have committed to create habitat for Monarchs and other pollinators as well as providing education on pollinators to their citizens. Iowa is also unique in our County Conservation Board system (CCB) which provides at least one staff person in each county in Iowa. Many CCBs have nature centers and all provide programming for county residents related to wildlife and natural resources.

Urban/suburban areas are well known to provide food and shelter to a variety of bird species, but residents of these areas are also broadening their efforts to attract pollinators and other wildlife by planting native plants, providing water, shelter (e.g. boxes for birds, bats, and bees, brush piles, leaf piles) or reducing the amount of mowing or raking they do

in their yards. Some insect SGCN have resource needs that can be provided in a smaller amount of space or habitat, meaning that cities could be already serving as refuges (Coman et al. 2022) making it possible to increase overall populations (e.g. Monarchs) within urban areas while raising awareness and importance of rare species. Another example of refugia, depending upon how they are managed, would be stormwater ponds. In urban settings, these can provide habitat for Northern Leopard Frogs and Gray Treefrogs to successfully breed, but if not managed properly (e.g. pollution, algae) then they can become sinks for those populations (Price et al. 2014).

Ames and Gilbert Iowa provide an example of private-public partnership at the community scale. These two cities are expanding towards each other. A new housing development was planned for an area northwest of the city of Ames (~2.5 miles) and west of Gilbert (~2 miles). It was determined that at least part of the area contained a xeric, remnant prairie. The developer decided to deed 90 acres of the new subdivision to Story CCB which has the staff and knowledge to maintain and expand the prairie. On this property, Story CCB has documented Black-billed Cuckoo (woodland species) and Grasshopper Sparrow (grassland species) during the breeding season, while iNaturalist also has records for Monarchs, all of which are SGCN in Iowa. Story CCB understands the need to work closely with the residents of the subdivision in order to maintain the habitat. Meetings will need to be held to discuss prescribed fire, invasive species, potential impacts of lawn chemicals, etc. In addition to the human concerns, Story CCB will be trying to balance the needs of the various SGCN.

Pollinator Conservation

In Iowa, the primary pollinators are insects: bees, butterflies, wasps, flies, and beetles. Due to limited capacity, only a subset of these groups are evaluated in this Plan for SGCN status, but pollinator conservation is an important issue for the health of Iowa's natural communities as well as society overall. An estimated 85% of plants use animal pollination (as opposed to self-pollination, or wind or water-based pollination). And crucially for humans, approximately ⅓ of crops rely on pollination. Unfortunately, many pollinators are declining. For example, over ¼ of North America's Bumble Bee species have exhibited significant declines, even formerly common species. Learn more about pollinator declines and conservation from the Xerces Society for Invertebrate Conservation's Pollinator Conservation Program website.

The issue of pollinator decline has garnered increased attention in recent years, with the federal listing of the Rusty Patched Bumble Bee and the decline of the monarch butterfly capturing many people's interest. Pollinator conservation efforts have largely focused on providing habitat that includes pollinator-friendly plants, including spaces ranging from farmland to natural areas to urban environments. Natural resource land managers also focus on avoiding or modifying management activities that may harm rare pollinator species.

One Health

One Health is considered a collaborative approach that recognizes the interconnectedness of the health of humans, domestic and wild animals, and the ecosystems/landscapes they inhabit. The One Health framework, which is the intersection of human health, animal health, and environmental health, can be especially useful for thinking about the health of SGCN as it considers connections with humans, domestic animals, and ecosystems including habitat, invasive species, and community dynamics. The One Health paradigm can be pathogen-driven or can be used as a framework for conservation.

In a pathogen-driven framework, disease-causing agents/toxicants that impact wildlife health may also threaten human or domestic animal health and vice versa. It is especially important to understand the distribution and risks related to zoonotic pathogens, highlighting the importance of understanding wildlife disease to protect human, domestic animals, and wildlife health.

As a framework for conservation, One Health can be practiced in terms of system resilience. Anthropogenic changes to the landscape, including invasive species and exclusion of important disturbance regimes, affect wildlife populations. Biodiversity, healthy habitats free of toxicants, and intact ecological systems will by design help protect the health of wildlife populations. Healthy ecosystems provide a variety of ecosystem services for humans, agriculture, recreation and wildlife. Wildlife management actions designed around the conservation of entire ecosystems are critical to protecting the health of, and supporting resilient, wildlife populations.

For SGCN, management efforts focused on the community and ecosystem characteristics and the maintenance of biodiversity and intact disturbance regimes will promote wildlife health and resilient populations.

Full Life Cycle Conservation

Management of natural resources requires working beyond state borders on a regular basis. Iowa's ecoregions extend past our boundaries and most SGCN have ranges beyond the borders of the state, requiring partnerships with neighboring states to accomplish needed actions to achieve shared conservation goals. Watersheds and flyways often encompass all or parts of multiple states and require complex coordination among many partners and jurisdictions to improve conditions, regulate harvest, and provide needed habitat. Recovery of declining species that have large ranges requires coordination with partners and agencies with interest and jurisdiction throughout the species' range, including internationally.

Full Life-cycle Conservation is an effort to protect and maintain migratory species habitat during all periods of life throughout their annual cycles (I.e. breeding, nonbreeding, and migration). Full life-cycle conservation of migratory species is one area of Iowa's commitment to cross-border conservation and is imperative to the improvement and long-term sustainability of Iowa's natural communities and species. Neotropical migrant birds, waterfowl, and monarch butterflies are key examples of species whose populations rely on conservation partnerships beyond Iowa's borders. To prevent migratory species from becoming endangered, and recover those already endangered, we must understand and address the totality of threats facing the species throughout their full life-cycle and Iowa's role in supporting their populations. This is particularly important for neotropical migratory birds.

Bird declines and urgency: In light of recent research that quantified a net loss of 2.9 billion birds in the last 50 years, and a 28% decline of migratory species over that time (Rosenberg et al. 2019), we cannot afford to ignore the threats that many migratory birds face across their full life-cycle ranges.

Why full life-cycle conservation is important

1. 69% percent of the birds found in Iowa are neotropical migratory birds and spend up to eight months of the year beyond the borders of the U.S., some traveling thousands of miles each way.
2. Millions of migratory birds that breed across Canada and the U.S. rely on a relatively small geography within Mexico, Central America, South America, and the Caribbean (called the Neotropics) during migration and the nonbreeding season, making habitat conservation in these regions extremely important for whole populations of species.
3. Threats to these vital Neotropical landscapes, ecosystems, and the birds that use them vary by country and region but include deforestation, commodity agriculture (palm oil), illegal logging, contaminants, and insufficient enforcement on protected areas, among others.

Intense poverty across this region of the world adds to the dire need for support from international partners that have a shared interest in the protection and conservation of shared avifauna. Conservation efforts on international migratory stop-over sites and the nonbreeding grounds work to curb these threats through acquisition and protection of lands used as migratory pathways and nonbreeding sites; education of landowners on regenerative agricultural and ranching practices including shade-grown coffee farming; the creation and maintenance of native tree nurseries and reforestation efforts; and other actions.

The Cerulean Warbler for example, is an Iowa SGCN and neotropical migrant that relies on a limited range during the nonbreeding season. This species has been declining across the North American breeding range, and full life-cycle conservation efforts to conserve habitat and reduce threats to the species in the nonbreeding range are critical to stabilizing populations (Figure 8-1).

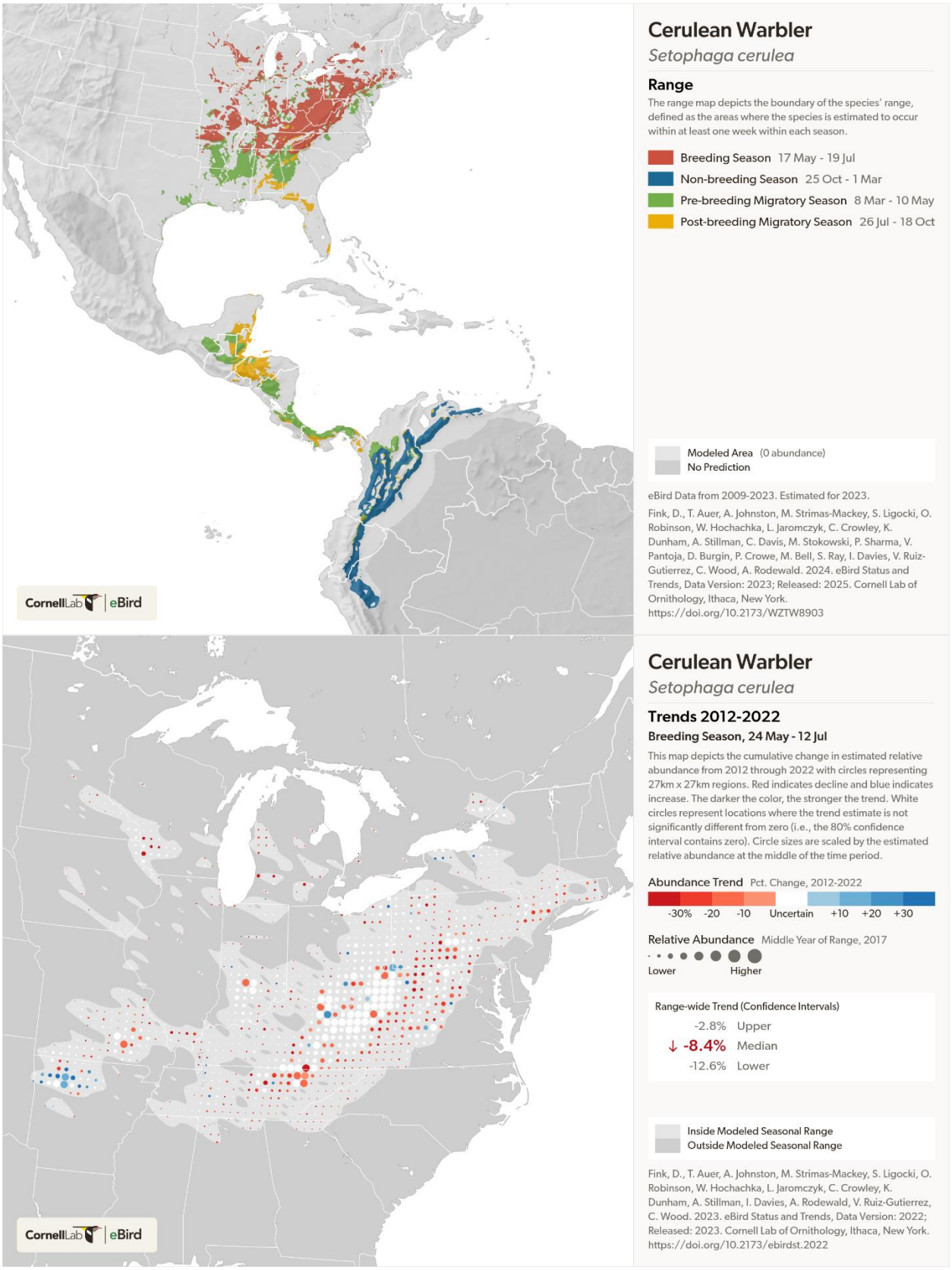


Figure 8-1. The full life-cycle range of the Cerulean Warbler and the breeding population trend map for the species, from Cornell Lab or Ornithology, based on eBird data.

Southern Wings

- The Association of Fish and Wildlife Agencies' (AFWA) created Southern Wings in 2009. Southern Wings facilitates state fish and wildlife agency participation in the conservation of priority migratory birds across their full life-cycle. The latest tracking data, stopover habitat information, and research is used to guide Southern Wings conservation projects. Since 2009, 41 states have contributed over $4.2 million to conservation efforts on stop-over sites and wintering grounds in Mexico, Central America, South America, and the Caribbean.
- Strategic actions vary by project and species but include slowing or reversing continued deforestation through reforestation efforts and implementation of regenerative agroforestry systems with local landowners; securing protection of core migratory bird habitat through protected area creation and management; improving or reestablishing shade-grown coffee practices that maintain or create migratory-bird foraging habitat; working with local communities to build sustainable conservation capacity and ownership; among others.

Southern Wings full life-cycle conservation efforts in Mexico, Central and South America support over 150 species of Neotropical migrants that migrate through or overwinter in these rich habitats, including Iowa SGCN.

The following stewardship maps, created by the Cornell Lab of Ornithology, show the migratory connections between Iowa and the rest of the hemisphere. Stewardship Connections show the relative strength of connection between Iowa and the rest of the hemisphere for 34 priority species. Uniqueness of Stewardship Connections depict how uniquely-connected Iowa is to the rest of hemisphere relative to all other states for 34 priority species. These maps can help prioritize international conservation efforts to support Iowa's birds.

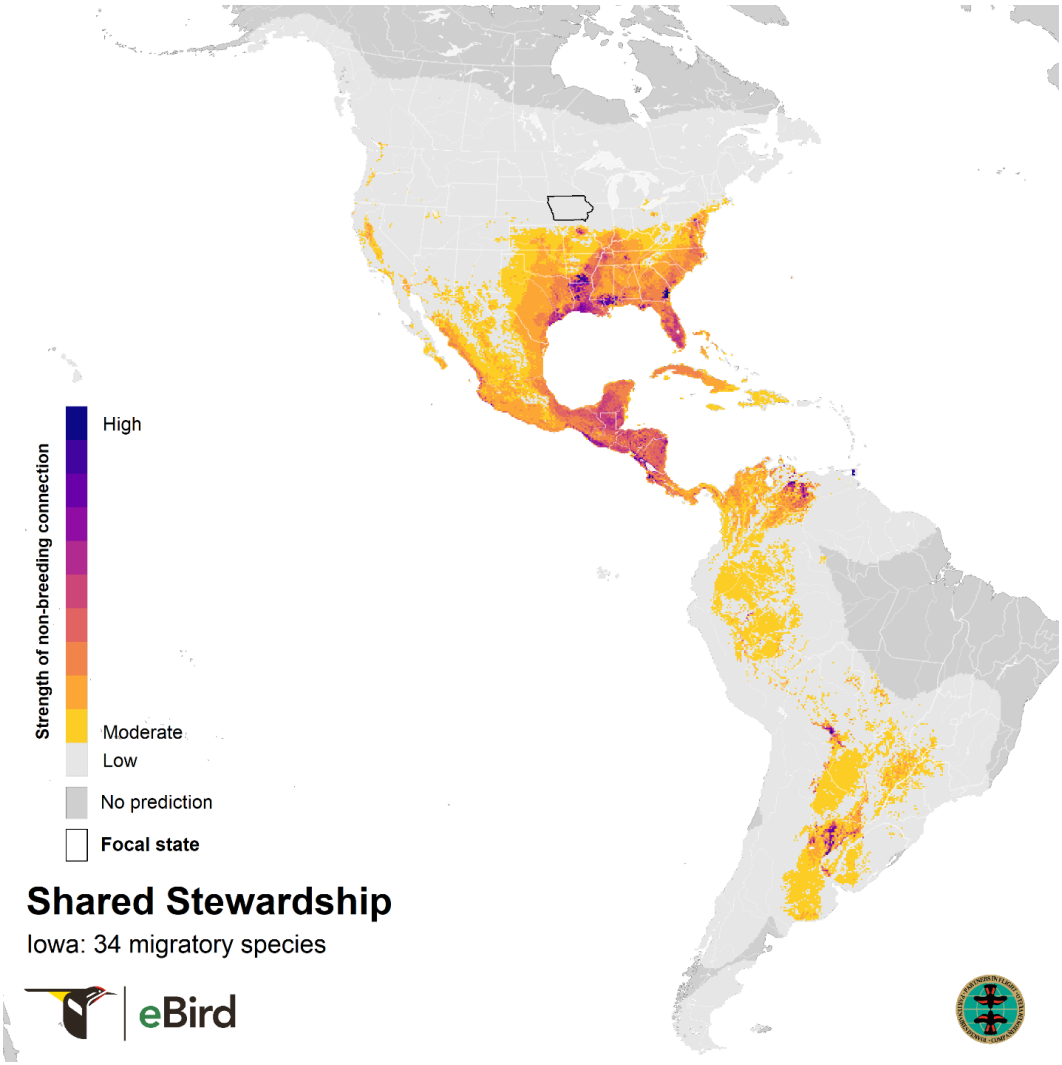


Figure 8-2. Iowa migratory bird Stewardship Connections map created by the Cornell Lab of Ornithology, based on 34 priority breeding species in Iowa.

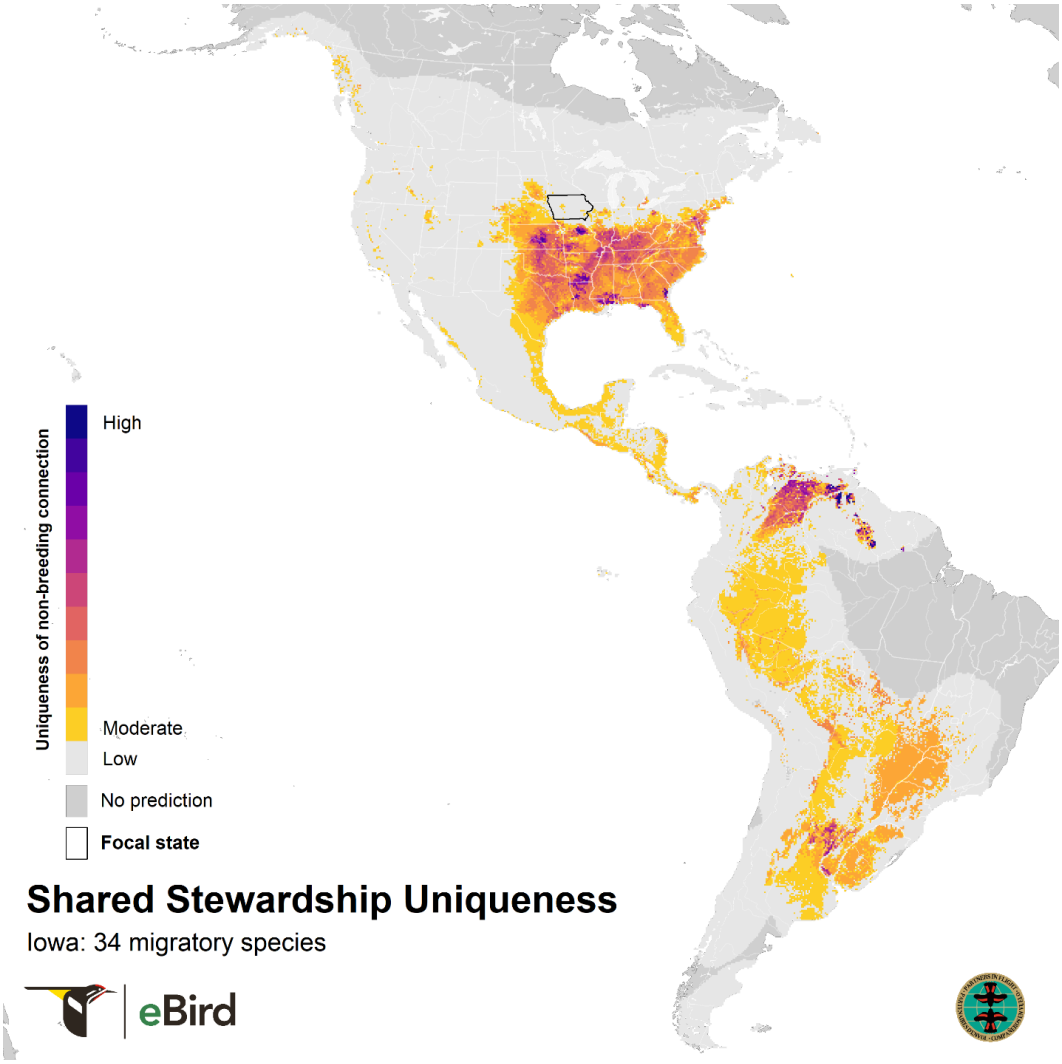


Figure 8-3. Iowa migratory bird Stewardship Uniqueness map created by the Cornell Lab of Ornithology, based on 34 priority breeding species in Iowa.

Table 8-2. 34 priority breeding bird species included in stewardship maps, listed alphabetically by common name.

Species Common Name	% of Global Breeding Population in Iowa	Species Common Name	% of Global Breeding Population in Iowa
Baltimore Oriole	8.1	Eastern Wood-Pewee	3.5
Bell's Vireo	1.1	Field Sparrow	5.1
Bobolink	5.6	Grasshopper Sparrow	2.1
Brown Thrasher	3.9	Gray Catbird	7.7
Brown-headed Cowbird	2.3	Great Blue Heron	1.7
Chipping Sparrow	1.2	Great Crested Flycatcher	2.5
Cliff Swallow	2.4	Henslow's Sparrow	17.6
Common Grackle	3.2	Indigo Bunting	3.2
Common Yellowthroat	4.2	Killdeer	2.8
Dickcissel	11	Northern Rough-winged Swallow	1.4
Eastern Kingbird	3.4	Orchard Oriole	3
Eastern Meadowlark	4.5	Red-winged Blackbird	4
Eastern Phoebe	1.7	Rose-breasted Grosbeak	7.2
Eastern Towhee	1.7	Sedge Wren	5.3

Species Common Name	% of Global Breeding Population in Iowa	Species Common Name	% of Global Breeding Population in Iowa
Upland Sandpiper	2.1	Wood Duck	5.2
Warbling Vireo	1.7	Yellow-billed Cuckoo	1.7
Willow Flycatcher	4.3	Yellow-throated Vireo	2

References Cited in Chapter Eight

Association of Fish and Wildlife Agencies (AFWA). 2021. Leading at-risk fish and wildlife conservation: A framework to enhance landscape-scale and cross-boundary conservation through coordinated State Wildlife Action Plans. A report from the AFWA State Wildlife Action Plan and Landscape Conservation Work Group to the AFWA Wildlife Diversity Conservation and Funding Committee. Washington, D.C. 29 pages.

Coman, IA, CE Cooper-Norris, S Longing, G Perry. 2022. It Is a Wild World in the City: Urban Wildlife Conservation and Communication in the Age of COVID-19. Diversity 2022, 14, 539. https://doi.org/10.3390/d14070539

Dietsch, AM, AW Don Carlos, MJ Manfredo, TL Teel, & L Sullivan. 2018. State report for Iowa from the research project entitled "America's Wildlife Values." Fort Collins, CO: Colorado State University, Department of Human Dimensions of Natural Resources.

Price, SJ, JW Snodgrass, and ME Dorcas. 2014. Managing Aquatic Environments for Wildlife in Urban Areas. In: Urban Wildlife Science: Theory and Practice (pp. 361-388) Eds: RA McCleery, CE Moorman, and MN Peterson. Springer, New York.

Responsive Management. 2022. Iowa residents' participation in and attitudes toward outdoor recreation. Responsive Management, Harrisonburg, VA.

Stephenson, AL. 2013. *Assessment of wildlife value orientations, state agency credibility, and tolerance for mountain lions in Iowa.* Thesis, Iowa State University, Ames IA.

U.S. Geological Survey. 2023. Annual NLCD (National Land Cover Database); accessed at https://www.mrlc.gov/data.

Vogel, JA, DM Debinski, and SE Shepherd. 2016. Conservation, Habitat Use, and Genetic Diversity of a Translocated Population of Greater Prairie-chickens in Iowa. FBMS Grant # F12AF01102, Final Report. Iowa State University, Ames, USA.