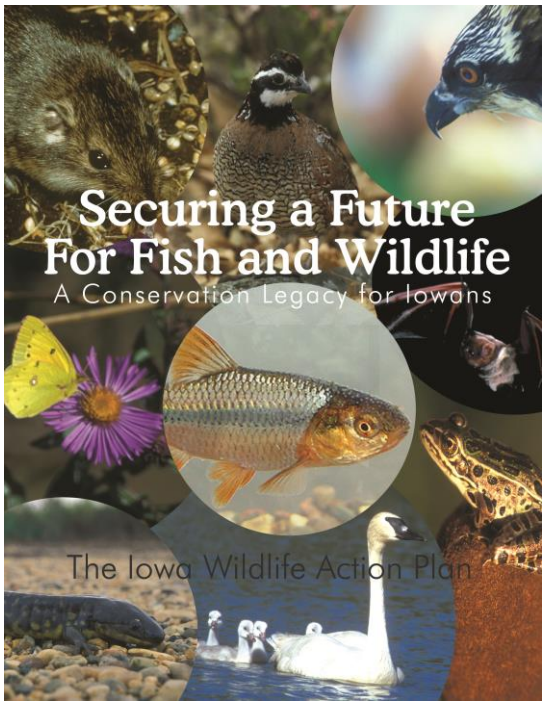
EXECUTIVE SUMMARY

Iowa Wildlife Action Plan

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

Iowa Department of Natural Resources

2015



For the full Plan, please visit: http://www.iowadnr.gov/Conservation/Wildlife-Stewardship/Iowa-Wildlife-Action-Plan

Iowa Wildlife Action Plan
Executive Summary

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

Current and Future Wildlife Management: New Challenges, Threats, and Expectations

Traditional Funding Model for Wildlife Conservation in the U.S.

Since the development of modern-day wildlife management in the 1930s, the funding model for wildlife conservation in the U.S. has been heavily reliant upon sportsmen and women. This relationship is described by Organ et al. (2012):

> "From the earliest days of active management and enforcement by nascent state fish and wildlife agencies, hunters, anglers, and trappers have funded restoration and conservation initiatives. License and permit fees, a motor boat fuels tax, and excise taxes on hunting, shooting sports, and angling products provide dedicated funding for habitat conservation, harvest management, research, restoration, and monitoring initiatives by state agencies. The excise tax programs have permanent, indefinite appropriation status, which means that the revenues are automatically distributed to the states each year and not subject to congressional whim."

This funding model served wildlife conservation well for many decades and led to the successful restoration of many species of wildlife as well as the habitats upon which they depend. However, as declines in participation in hunting and angling have been observed over the long term, it has become increasingly clear that the reliance upon sportsmen and women for conservation of all wildlife is insufficient and unsustainable. Furthermore, as all wildlife, not just game and sportfish species, are held in the public trust, the fairness of the funding system has been questioned.

Sustainable Funding and Teaming With Wildlife

Since the 1980s, state fish and wildlife agencies have struggled to meet an increasing number of constituent demands while facing larger and more complex threats to the natural world, while relying on a funding model which was developed in large part to restore populations of sportfish and game. As the scientific fields of Wildlife and Fisheries Management, Conservation Biology, Landscape Ecology, Global Change Biology and Human Dimensions of Wildlife Conservation advanced and matured, the complexity of the conservation issues faced by State Fish and Wildlife Agencies was increasingly recognized. The need for management attention to nongame species and to functioning ecosystems became increasingly apparent. In the 1990s, in response to these increased challenges, the Association of Fish and Wildlife Agencies (AFWA) initiated the Teaming With Wildlife (TWW) coalition on behalf of State Fish and Wildlife Agencies. This coalition sought, and still seeks, sustainable, dedicated funding for fish and wildlife conservation at the national level.

State and Tribal Wildlife Grants Program (SWG)

One outcome of the TWW coalition's efforts is a program titled *State and Tribal Wildlife Grants (SWG)*. Appropriations for SWG have been passed annually since 2002, though the program is subject to yearly Congressional debate. The program's annual allocations have averaged approximately $56.7 million. These grants, managed by the U.S. Fish and

Wildlife Service, have required non-federal matching funds that vary from 25% to 50% depending on the year and type of program. Iowa DNR has received approximately $10.6 million in SWG (and, in 2001, from the related Wildlife Conservation and Restoration Program) funds from 2001-2015, with an average annual appropriation of ~$709,000. These funds have been used to implement this Plan through increased research, habitat protection, and management for Species of Greatest Conservation Need designated in the Plan. Iowa must match the SWG income with non-federal funds and many partners have worked together to leverage the federal funds in order to most effectively conserve the species and habitats that were identified as priorities within this Plan. Projects using SWG funds must benefit Species of Greatest Conservation Need identified in a State's Wildlife Action Plan.

State Wildlife Action Plans

In 2003, as a requirement to maintain eligibility for State Wildlife Grant funds, all states, territories and tribes which received SWG appropriations were required by Congress to develop Comprehensive Wildlife Conservation Strategies, now generally referred to as State Wildlife Action Plans (SWAPs). All 50 States and five U.S. territories developed a State Wildlife Action Plan (SWAP) in 2005.

State Wildlife Action Plans outline the steps that are needed to conserve wildlife and habitat before they become too rare or costly to restore. Taken as a whole, these proactive plans present a national action agenda for preventing wildlife from becoming endangered.

State Wildlife Action Plans conserve wildlife and natural places. They assess the health of each state's wildlife and habitats, identify the problems they face, and outline the actions that are needed to conserve them over the long term. To learn more about State Wildlife Action Plans and view links to other states' plans, please visit: www.teaming.com

The Eight Required Elements of a State Wildlife Action Plan

As a condition of receiving SWG funds, Congress mandated that state fish and wildlife agencies develop a *Comprehensive Wildlife Conservation Plan* (State Wildlife Action Plan) by October 1, 2005, and review and revise the plan every 10 years thereafter. Congress directed that the plans must identify and be focused on the species in greatest need of conservation yet address the full array of wildlife and wildlife-related issues. Congress identified eight required elements to be addressed in each State's Plan:

1. Information on the distribution and abundance of wildlife, including low and declining populations as each State Fish and Wildlife agency [DNR] deems to be appropriate, that are indicative of the diversity and health of wildlife of the State. Low and declining populations of fish and wildlife are defined in the Plan as Species of Greatest Conservation Need (SGCN).
2. Locations and relative conditions of key habitats and community types essential to conservation of SGCN.
3. Descriptions of problems which may adversely affect SGCN or their habitats and priority research and survey efforts needed to identify factors that may assist in restoration and improved conservation of SGCN and their habitats.
4. Descriptions of conservation actions necessary to conserve SGCN and their habitats and establish priorities for implementing such actions.

5. Provisions for periodic monitoring of SGCN and their habitats, for monitoring the effectiveness of conservation actions, and for adapting these conservation actions as appropriate to respond to new information or changing conditions.
6. Each State's provisions to review its Strategy [Plan] at intervals not to exceed ten years.
7. Each State's provisions for coordination during the development, implementation, review, and revision of its Strategy [Plan] with Federal, State, and local agencies and Indian Tribes that manage significant areas of land water within the State, or administer programs that significantly affect the conservation of SGCN or their habitats.
8. Each State's provisions to provide the necessary public participation in the development, revision, and implementation of its Strategy [Plan].

The Plan must utilize the best available knowledge on the distribution and abundance of wildlife, historical documentation and other references to identify Iowa's wildlife conservation needs. The Plan must address the needs of all wildlife, but focus primarily on SGCN and their habitats as determined by DNR.

Iowa's Wildlife Action Plan

Iowa's Plan was initially approved in 2006, and subsequently modified in 2012. This version represents the first comprehensive revision of Iowa's Plan.

Framework Outlined in Initial Plan

The Steering Committee which first developed Iowa's Plan made several decisions which have left a lasting imprint upon this first comprehensive revision.

1. The IWAP would be a wildlife plan; plants are not specifically addressed except as an integral component of wildlife habitat.
2. The IWAP would have a 25-year focus. Long-term continuity is needed to accomplish ambitious objectives, but achievements are needed to be accomplished in a time frame that can be appreciated by Plan supporters.
3. The IWAP would be strategic in nature. Operational plans to implement the visions and strategies would be crafted later to fit the unique missions and capabilities of conservation organizations and individuals interested in Plan Implementation.

To assure the Plan would involve a diversity of conservation viewpoints, representatives of 105 conservation, recreation, education and agricultural support organizations were invited to serve on a formal Advisory Group; 93 individuals representing 59 organizations agreed to participate (Appendix 2).

2015 Comprehensive Revision Process

Persons representing much of the ecological and conservation expertise existing in the state were included in various stages of the revision process, either as members of committees or as consultants and reviewers of specific portions of the IWAP.

A variety of efforts were made to ensure that information about the Plan received statewide distribution to the public as well:

- A complete draft of the revised Plan was placed on the DNR's web site with the email address for the Plan Coordinator, who received comments.
- As an alternative to downloading the draft Plan from the website, a CD-ROM containing the draft revised Plan was supplied to individuals upon request.
- Statewide news releases advertised completion of the Draft revised Plan, where it was available and how to comment.
- The public comment period for the draft IWAP revision was held from August 4, 2015 – September 11, 2015. A total of three written comments were received and incorporated in whole or part into the final version of the Plan.

Iowa's Conservation Legacy

Iowans maintain a strong connection to wildlife, and many participate directly in wildlife-associated recreation. The 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation reported that wildlife-related recreation (hunting, fishing, and wildlife viewing) contributed $1,033,723,000 to Iowa's economy in 2011. Over 1.3 million Iowans age 16 and older participated in these activities in that year.

Moreover, regardless of their participation in wildlife-associated recreation, Iowans strongly favor conservation. In 2013, a non-partisan survey of Iowa's voters found that 97% of respondents agree with the statement "We need to ensure that our children and grandchildren can enjoy Iowa's land, water, wildlife, and natural beauty the same way we do" (Weigel and Metz, 2013).

Preserving all the species that reside in or migrate through the state and their habitats is important to maintaining the health of Iowa's wildlife which contributes not only to the economy, but also to the aesthetic value of the state. Maintaining Iowa's biological diversity will help this natural resource persist for many years into the future and continue to provide nature's benefits that we enjoy through hunting, fishing, wildlife viewing, and other outdoor recreational activities.

History of the Formation and Conservation of Iowa's Natural Communities

Iowa's Physiography

Topography

Iowa is a state of 56,239 square miles (36,016,500 acres) bordered by the Mississippi River on the east, and the Missouri and Big Sioux Rivers on the west. Iowa has a relatively low relief - elevations run from a high of 1,670 feet above mean sea level in Osceola County in northwestern Iowa to 480 feet above mean sea level in Lee County in the southeastern corner of the state.

Climate

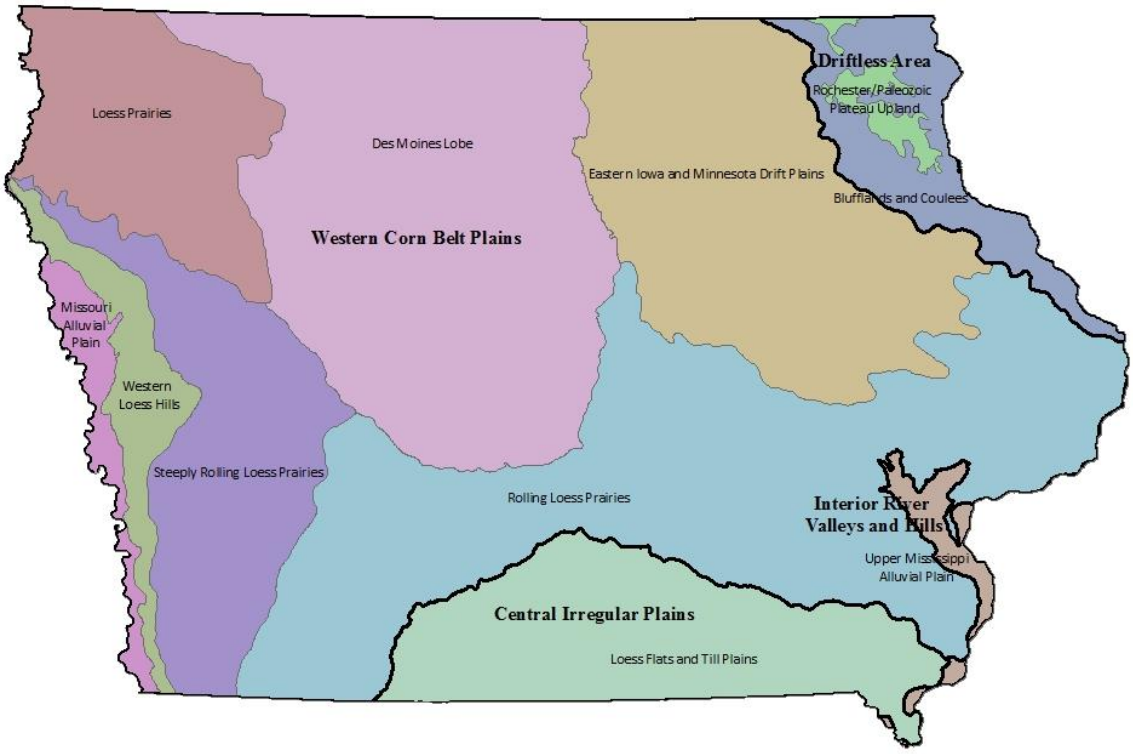
Iowa's climate is classified as humid continental and is characterized by warm summers and cold winters. The average annual temperature is 47.6°F. Average temperature in the summer is 71.5°F. December to February winter temperatures average 21.2° (NOAA 2015) with an average winter difference of 6.5 degrees between north and south. Temperature minimums of -25°F are not uncommon in northern Iowa.

Geology

Iowa's natural communities are as much a result of its recent geologic past as they are a result of climatic conditions (Prior 1991). The boundaries of the ecoregions that resulted from this geologic history coincide well with the boundaries of other habitat based classification systems (Map 1). The names of the ecoregions follow the US EPA (Omernik) Level III and IV Ecoregions. Descriptions of Level III ecoregions are taken from the US Environmental Protection Agency (EPA)'s Descriptions of Level III Ecoregions, accessed on the EPA website: http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

Map 1. Level III & IV Ecoregions of Iowa (US EPA – Omernik)

Large font denotes the names of Level III ecoregions and small font, Level IV ecoregions.



Level III Ecoregion Descriptions

The following narrative is organized by EPA Level III ecoregions. Level III ecoregions are relatively homogeneous; in Chapter 2 of the full Plan, tables under each major heading describe subtle differences in landform, geology and native plant communities that characterize the EPA Level IV ecoregions they encompass.

40. The Central Irregular Plains

The Central Irregular Till Plains have a mix of land use and are topographically more irregular than the Western Corn Belt Plains (47) to the north, where most of the land is in crops. The region, however, is less irregular and less forest covered than the ecoregions to the south and east. The potential natural vegetation (PNV) of this ecological region is a grassland/forest mosaic with wider forested strips along the streams than historically found in Ecoregion 47 to the north. The mix of land use activities in the Central Irregular Plains has included mining operations of high-sulfur bituminous coal. The disturbance of these coal strata in southern Iowa has degraded water quality and affected aquatic biota.

47. Western Corn Belt Plains

Once mostly covered with tallgrass prairie (and, in the Des Moines Lobe, interspersed depressional wetlands), over 80 percent of the Western Corn Belt Plains is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, an average annual precipitation of 26 to 37 inches, which occurs mainly in the growing season, and fertile, warm, moist soils make this one of the most productive areas of corn and soybeans in the world. Agricultural practices have contributed to environmental issues, including surface and groundwater contamination from fertilizer and pesticide applications as well as concentrated livestock production.

52. The Driftless Area

The hilly uplands of the Driftless Area easily distinguish it from surrounding ecoregions. Much of the area consists of a deeply dissected, loess-capped, bedrock dominated plateau. The region is also called the Paleozoic Plateau because the landscape's appearance is a result of erosion through rock strata of Paleozoic age rather than glacial or post-glacial deposition. Although there is evidence of glacial drift in the region, its influence on the landscape has been minor compared to adjacent ecoregions. In contrast to adjacent ecoregions, the Driftless Area has few lakes, most of which are reservoirs with generally high trophic states. Livestock and dairy farming are major land uses and have had an impact on stream quality.

72. Interior River Valleys and Hills

The Interior River Lowland is made up of many wide, flat-bottomed terraced valleys, forested valley slopes, and dissected glacial till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north (54), east (55) and west (40, 47), where most of the land is cultivated for corn and soybeans, a little less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in forest. Bottomland deciduous forests and swamp forests were common on wet lowland sites, with mixed oak and oak-hickory forests on uplands. Paleozoic sedimentary rock is typical and coal mining occurs in several areas.

Historic Plant Communities

Pre-settlement Iowa lay at a biological crossroads. Hardwood forests dominated the cooler and more humid lands east of the Mississippi River. The warmer, drier mixed grass prairie and prairie potholes of the northern Great Plains lay to the west. To the north, great maple-basswood and pine forests covered the Great Lakes region. To the south,

oak savannas gradually gave way to the vast oak-hickory forests of the Missouri Ozarks. These different ecological regions blended together in Iowa to produce a unique landscape of great biological diversity.

Roughly two-thirds of the state (an estimated 23 million acres) was dominated by lush prairies. Most was tallgrass prairie, although short grasses were present on hot, dry sites. Nearly 7 million acres of forest or forest-prairie savanna covered much of the eastern third of Iowa and followed the river valleys into the prairies to the north and west. Around 4 million acres of prairie pothole marshes dotted recently-glaciated and poorly-drained northcentral and northwest Iowa where larger wetlands and lakes protected oak savannah from prairie fires. Another million acres of backwaters, sloughs and flooded oxbows were found in the floodplains of the Mississippi, Missouri and larger inland rivers.

Impacts of Settlement

Settlement in Iowa progressed roughly southeast to northwest. Most of the south half of the state had been inhabited by the end of the 1840s; northcentral and northwest Iowa were settled in the 1850s; Lyon County in extreme northwest Iowa was the last to be settled, receiving its first homestead family in 1866.

Human population growth was slow at first. By 1840 only 43,000 settlers had braved the prairies. Pressure for cheap land Increased after the Civil War, however, and massive land grants were made to railroad builders to stimulate completion of a trans-continental railroad network. By 1870, Iowa's population had increased to nearly 650,000; by 1900 it had skyrocketed to 2 million.

At the same time Iowa was being settled a revolution was overhauling industry and agriculture. The advent of improved farm implements, coupled with a rapidly expanding population base devoted mostly to agriculture, had a devastating and permanent impact on Iowa's native plant communities.

Forests

Most of the initial forest clearing in Iowa was done to allow conversion of the land to agriculture. Iowa's native hardwoods did not prove valuable as building materials. Most of the lumber that eventually built the farm homes, barns and livestock dwellings that dotted the countryside came from the great pineries of Minnesota and Wisconsin. Starting in the 1850s, however, railroad expansion and the discovery of coal in southern Iowa fueled a demand for oak ties and mine timbers that would last into the early 20th century. By 1875, just one-third of the original 6.7 million acres of primitive forest remained, most on rough land or in floodplains either too steep or too wet to plow.

Prairies

The effect on our extensive prairies and prairie-wetland complexes was even more devastating. Starting in the 1850s, Iowa lost nearly 2 percent of its 25 million acres of native prairie a year, 3 million acres a decade, until less than 30,000 acres (0.1%) remained after 80 years.

Wetlands

The vast prairie-pothole wetlands of northcentral and northwest Iowa took longer to impact. Through the first 20 years of settlement there was plenty of good land available without trying to drain and farm wetlands. In 1850, Congress passed the SwampLand Act. It directed each county to survey all wetlands and sell them at auction for 5 cents an acre, the first of what would become a century-long succession of government-subsidized efforts to drain wetlands. County drainage commissions and drainage districts were soon organized. Eventually pothole soils were discovered to be some of the most productive when dry, further accelerating the demand for drainage.

By 1917 modern clay tiles were used to drain seasonally wet fields into extensive, inter-connected drainage systems that had eliminated all but the largest wetlands. By 1906 just 25 percent of the original 4 million acres of pothole wetlands remained. By 1970 less than 1% of Iowa's historic wetlands remained.

Rivers

Border Rivers - Engineering began on the Mississippi River starting in 1824. In 1907, Congress approved creation of a navigation channel from the Missouri River confluence northward to Minneapolis. In 1935, further legislation provided for a 9-foot navigational channel maintained through a system of locks and dams as well as dredging. Navigation locks and dams result in a series of pools within the river, leading to a change in the fish community within the river towards those preferring more slow-moving water. (Harlan et al. 1987).

Engineering along the Missouri River for flood control and navigation drastically altered the river system. Between 1923 and 1976, the Missouri was corralled from a wide, braided, dynamic river to a single narrow channel. The channel area was reduced by 80%, with ~35,000 acres of this reduction being in Iowa. By the 1980s, sport and commercial fisheries along the Missouri had dwindled to a tiny fraction of their former abundance.

Interior Rivers – Because Iowa has productive, and therefore intensively cultivated, soils, the rivers which run through and drain these areas are subjected to large and sometimes sudden fluctuations. Draining heavily cultivated lands also results in silt loads, leading to sedimentation. This has changed the fish community assemblage, especially in lower, more turbid reaches of streams where the remaining species tend to be tolerant of lower water quality.

Additionally, many low-head dams were constructed across the state, usually for milling or water supply uses. By 1870, more than 1000 low-head dams dotted the state's interior rivers, restricting seasonal movement of fish species, as well as mussel species dependent upon their fish-hosts for dispersal.

Wildlife

Iowa's original wildlife populations suffered a similar fate as its native habitats and plant communities. Species that competed with humans for space, or were particularly useful for food or fiber, or required very specific habitats that were eliminated or drastically reduced did not survive. Others of less importance to humans held on in low numbers wherever suitable habitat remained. Clearing of forests, conversion of native prairies to farm fields and the draining of wetlands eliminated many species of songbirds, reptiles and amphibians. Most of the loss went unnoticed by settlers, and by the time the first naturalists began studying the flora and fauna of Iowa, much change had already occurred and went unrecorded.

Change Continues in the 20th Century

In less than a century the landscape of Iowa was changed more by settlement than that of any other state. In 1900, most of Iowa's 2 million residents lived on small, nearly self-sufficient farms of 100 acres or less. Iowa had been converted from a seemingly limitless prairie-forest-wetland mosaic into a domesticated landscape of small farms, grain fields and pastures. Most of Iowa's native wildlife was either gone or reduced to such low numbers that rabbits, squirrels, quail and the occasional prairie chicken were the only game animals available to most hunters.

The changes in Iowa's landscape in the 20th century were less dramatic but in some ways more devastating. Wildlife and its habitats were impacted by constant improvements in farming technology and the effects of government agricultural policy on farmers' decisions about how their land would be used.

Labor saving devices permitted farmers to handle ever-larger farming operations. Modern tiling machines could mechanically dig and insert underground perforated field tiles to drain even the wettest areas. The use of agricultural chemicals – herbicides, pesticides, and fertilizers – became the norm and weeds and insects were, if not conquered, at least minimized as a threat to crop yields. Farm operations have shifted from diversified agriculture to corn and soybean monocultures. Between 1900 and 2014 row crop acreages increased from 9.1 million acres to 23.4 million acres. Hay and small grain acreage decreased from 6.8 million acres to a current 1.2 million acres (NASS, 2015). Larger farms and field sizes have eliminated fencerows, windbreaks, waterways and other on-farm habitat.

By 2000, the average farm had increased to more than 340 acres. The number of farms in Iowa decreased from 203,000 in 1950 to just 93,000 in 2007 (USDA and Census Bureau - Census of Agriculture). Nearly every rural county in Iowa is experiencing a continuous outmigration, primarily by young people seeking jobs no longer available as farm size and mechanization has increased. Iowa is trending toward a more urban populace. By 2010, the population of Iowa was 64% urban, up from 25.6% in 1900, and 57% in 1970 (U.S. Census Bureau). In 2010, Iowa's population was about 3 million.

Wildlife Conservation

Not all wildlife trends of the past half-century have been negative. The creation of the Iowa State Conservation Commission (now the Iowa Department of Natural Resources or DNR) in 1935, the gradual development of wildlife science and management as professions after World War II, and the formation of DNR's Wildlife Diversity Program in 1981 have returned a portion of Iowa's native wildlife to the state. White-tailed deer, wild turkeys and giant Canada geese are now more abundant than at any time since the late 1800s. Other restoration programs have returned prairie chickens to southern Iowa, river otters to the state's streams, and peregrine falcons, ospreys and trumpeter swans nest again in Iowa. Bald eagles, bobcats and Sandhill cranes have reappeared as a result of successful conservation programs here and elsewhere. Details of these and other wildlife restoration programs are explained in *Trends in Iowa Wildlife Populations and Harvest - 2013.*

DNR has also pursued land acquisition programs to permanently protect and enhance wildlife habitat. Since 1972 Iowa waterfowlers have been required to purchase an Iowa Migratory Game Bird Stamp in addition to the Federal Migratory Bird Hunting and Conservation Stamp ("Duck Stamp"). Since 1979 all hunters have been required to purchase an Iowa Habitat Stamp along with their hunting license. Proceeds from these stamps are dedicated to habitat protection and management. Funds from the State Habitat Stamp are shared equally with Iowa's 99 County Conservation Boards.

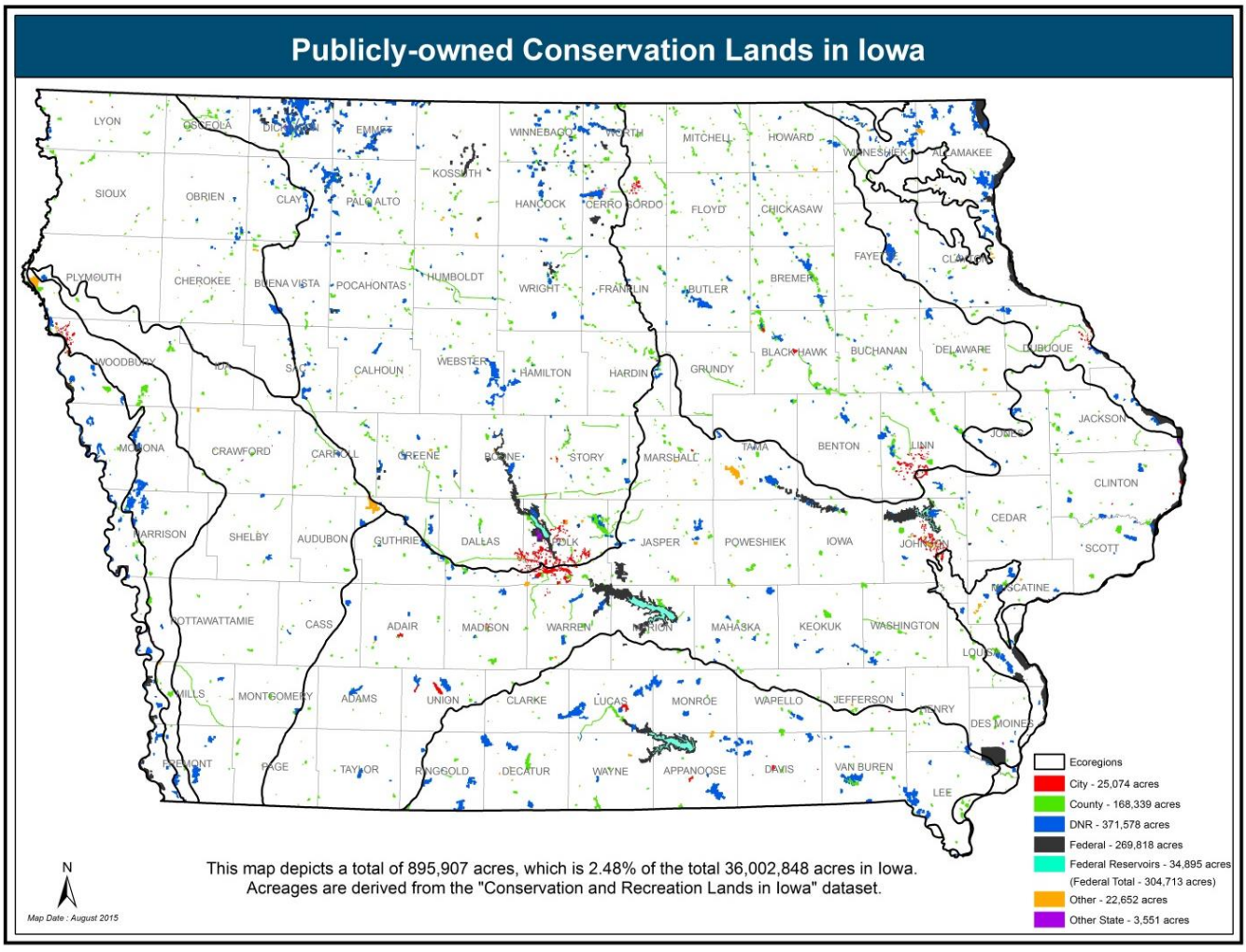
DNR has doggedly sought funds for habitat protection through the North American Waterfowl Management Plan, the North American Wetlands Conservation Act, State Wildlife Grants, the Environmental Protection Agency, Iowa County Conservation Boards and others. DNR also partners with a number of NGOs to extend the reach of state and Federal funds. The Iowa Natural Heritage Foundation, Ducks Unlimited, Pheasants Forever, the National Wild Turkey Federation, and The Nature Conservancy have been major cooperators with DNR's habitat protection programs. Numerous other NGO's and individual private contributors have helped as well.

Iowa remains one of the states with the highest proportion of privately held land. In 2004 as the IWAP was first being developed, public conservation lands accounted for just over 600,000 acres, or just 1.7% of the land area of the state. In 2015, public conservation lands are estimated at 895,924, or 2.48% of land area of the state. Some of this increase is due to land protection over the last decade. However, most of the increase is attributable to an improved estimate

due to technological improvements which allow for increased data sharing between cities, counties, state, and federal entities.

Public lands dedicated to conservation purposes are displayed in Map 2. Unlike most other states across the Midwest and West, Iowa does not have a significant presence of lands owned by the US Forest Service, Bureau of Land Management, or the National Park Service. Therefore, unlike other states which have significantly higher federal land bases, a relatively high proportion of Iowa's habitat base is managed by the Iowa DNR, County Conservation Boards, and of course, private landowners.

Map 2. Publicly-owned Conservation Lands in Iowa



Wildlife habitat on private lands has also received attention from DNR programs for decades. In fact, Farm Game Habitat crews roamed the state in the 1950s and 1960s helping landowners establish habitat on their property. The DNR's current Private Lands Program was formed in 2002 to take better advantage of wildlife-friendly USDA farm programs and other Federal grants like the Landowner Incentive Program (LIP) or Wildlife Habitat Incentive Program (WHIP). Now in its 15th year, the Private Lands Program is successful in Iowa because of its many partnerships including Natural Resources Conservation Service, Farm Service Agency, Pheasants Forever, Fish and Wildlife Service, AmeriCorps, Local Soil and Water Conservation Districts, and most importantly, Iowa's landowners. The Program uses this Plan as strategic guidance, working with any interested landowners but also trying to direct staff and resources to highest priority wildlife conservation issues.

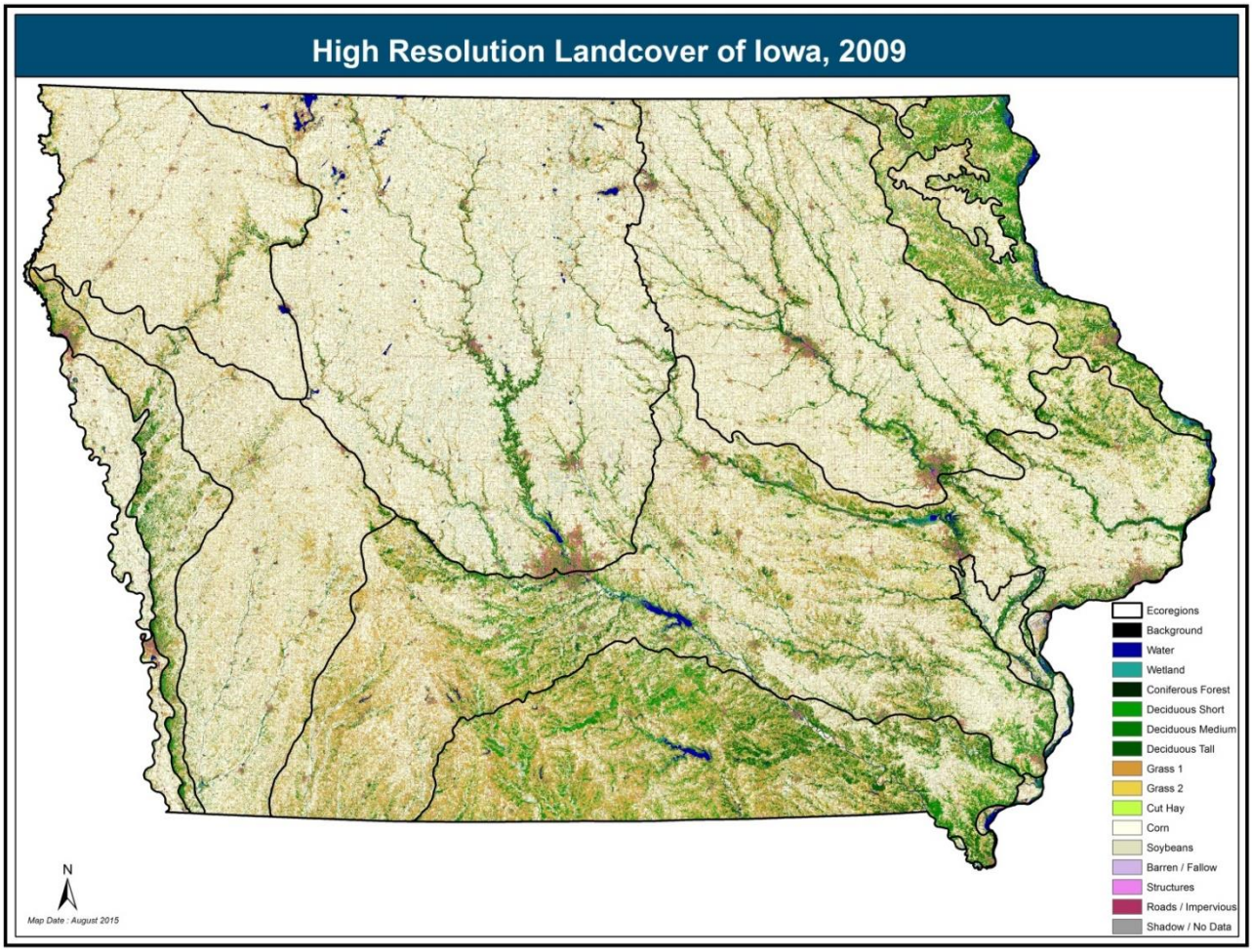
Iowa's Natural Communities Today

The result of a century and a half of change as a result of human intervention on Iowa's landscape has been a shift in the composition of Iowa's plant communities and the wildlife that inhabits them. Few undisturbed natural plant or wildlife communities exist today. Map 3 shows the land cover in Iowa in the year 2009. The majority of the state is covered with row crop, primarily corn and soybeans. Most of the remainder of the state is in grassland, often conservation reserve, road ditches or pasture, with lesser acreages of timber and other habitat types.

Approximate percentage of Iowa's natural communities remaining:

- 0.2% of Iowa's native prairies (47,000 acres including remnant, restored and reconstructed prairies)
- 5% of its wetlands (255,000 acres of wetlands estimate in 2009 HRLC)
- 37% of its forests (2,477,000 acres)

Map 3. Landcover of Iowa in 2009
(DNR High Resolution Land Cover)



Iowa Fish and Wildlife and Species of Greatest Conservation Need

The DNR is the sole agency given the responsibility to manage Iowa's fish and wildlife resources, preserve their habitats (Code of Iowa, Chapter 455A), and establish and protect state-listed endangered or threatened species (chapter 481B.4 and Iowa Administrative Code Chapter 571-77(481B)). Iowa law defines *wildlife* as any species of wild mammal, fish, bird, reptile or amphibian (Code of Iowa sections 456.24, 481A.1, 481A.38, 481A.39, 481A.48). In addition to taxonomic groups designated as *wildlife* in Iowa law, this Plan is intended to guide conservation of all Iowa's native fauna for which an adequate level of information is available to assess the conservation status and needs.

Determining the Species of Greatest Conservation Need

Taxonomic subcommittees of the IWAP Wildlife Working Group evaluated the status of all species considered for their focal group (Table 1). The same status assessment criteria were used for all species which are native to Iowa, not already extirpated from the state, not vagrant or accidental in their occurrence within Iowa, and for which there is adequate information to assess conservation status (Table 2). Until the implementation of the Wildlife Action Plan, Iowa had long lacked a systematic survey to document the distribution and abundance of most wildlife species. Therefore, varying amounts of information were available for subcommittee members to use when assessing taxonomic groups, as a whole, as well as individual species.

Table 1. Number of species evaluated by the IWAP

IWAP taxonomic subcommittees evaluated all species with validated occurrence records for Iowa (includes vagrant species, exotic/introduced species, and those which are now presumed extirpated).

Taxonomic Class	Species	List location
Amphibians	22	Appendix 3
Reptiles	46	Appendix 4
Breeding birds	201	Appendix 5
Non-breeding birds [1]	204	Appendix 6
All birds	*405*	
Butterflies	123	Appendix 7
Crayfish	8	Appendix 8
Dragonflies and Damselflies	114	Appendix 9
Fish	155	Appendix 10
Mammals	83	Appendix 11
Mussels	52	Appendix 12
Terrestrial snails	96	Appendix 13
Total species evaluated	**1,104**	

[1] Species that do not nest in Iowa but migrate through the state

We utilized 8 criteria to assess the conservation status of all native, extant Iowa wildlife species.

1. Global Range Extent (all other criteria are for Iowa only)
2. Area of Occupancy
3. Long-term Trend
4. Short-term Trend
5. Ecological Specialization (Population Concentration)
6. Dietary Specialization
7. General Ecological Specialization
8. Threat Not Addressed Above

The Wildlife Working Group developed a scoring process in which each criterion was weighted according to our understanding of the relative contribution of each factor to a species' overall conservation status. The theoretical potential score for an individual species ranges from 0 - 3.75. Calculated scores ranged from 0.57 (for the Slippershell mussel, which has not been observed in Iowa since 1984) to 3.75 (for several species of low conservation concern that have been expanding their range within Iowa). The cutoff value for SGCN designation was set at <3.0 (a species score of 3.0 or lower gave a species SGCN status). See Appendix 16 for a detailed explanation of the criteria.

Table 2. Proportion of Iowa Species Designated as SGCN.

Taxonomic Group	2012	2015			
	# of SGCN in 2012	# of SGCN in 2015	# Species Evaluated (Valid Iowa Records)	# of Species Assessed (Native Species)	% SGCN of Species Assessed
Amphibians	9	16	22	22	73%
Reptiles	23	40	46	46	87%
Birds – Breeding	67	78	201	195	40%
Birds – Non-breeding	18	34	204	113	30%
Butterflies	38	51	123	110	46%
Crayfish*	N/A	7	8	7	N/A
Dragonflies & Damselflies	28	30	114	106	28%
Fish	74	79	155	146	54%
Mammals	19	22	83	57	39%
Mussels	29	43	52	46	93%
Terrestrial Snails*	8	5	96	5	N/A
Total	**313**	**405**	**1104**	**853**	

*The entire groups of native Terrestrial Snails and Crayfish were not assessed for SGCN status due to lack of sufficient information.

Habitats

Habitat availability, quantity, and quality are primary factors influencing the viability of wildlife populations. To protect and manage for species of greatest conservation need it is essential to identify the distribution of species within the state and the natural resources critical to their survival in and around occupied areas. Categorizing Iowa's habitat types (Tables 3 and 4) and the SGCN species that depend on them will aid the design of effective management practices that will directly benefit Iowa's wildlife.

Terrestrial Habitats

The terrestrial habitat classes used in this plan were modeled after the Iowa 2009 HRLC which is described in Table 3, and provides more recently updated land cover information than those used in previous versions of the IWAP. A primary reason that this Plan utilizes a land cover classification as the basis for terrestrial habitat types is because it provides a means to more closely connect our monitoring framework with the current reality on the ground.

Table 3. Description of the land cover classes mapped in Iowa's 2009 High Resolution Land Cover dataset

Name	Description
Water	Spatial/spectral areas of open water, generally without any vegetation present. This class may occur in areas of shadow, or in recently cultivated bare ground.
Wetland	Spatial/spectral areas that are temporarily flooded or permanently wet. Some areas may be in crops in the summer NAIP imagery. This class generally reflects the presence of both a wetness signature and a vegetation signature.
Coniferous Forest	Spatial/spectral areas of evergreen forest. These areas show clearly as forest in the summer imagery, but are separated from deciduous forest by being very lush in the spring imagery. Late spring imagery, and imagery from certain sensors do not well separate conifers from other vegetation. In the 2007 and 2010 Spring imagery areas, when conifer discrimination is poor, a Landsat classification was used to coarsely separate Coniferous forest from Deciduous forest.
Deciduous Short	Spatial/spectral areas of broadleaf deciduous forest, trees or shrubs less than 3.5 meters (~15 feet) tall. (See Deciduous Tall)
Deciduous Medium	Spatial/spectral areas of broadleaf deciduous forest, or trees more than 3.5 meters (~15 feet) tall and less than 12 meters (~40 feet). (See Deciduous Tall)
Deciduous Tall	Spatial/spectral areas of broadleaf deciduous forest or trees more than 12 meters (~40 feet) tall. Lidar normalized elevation data were used to stratify the deciduous forest class into three height classes, as listed.
Grassland 1	Spatial/spectral areas of grasses. Includes rural road ditch complexes, grassed waterways, some grassland/forest edge areas, and some tracts of grasses that are spectrally separable. This is the catch-all class for grasslands that are not otherwise separable into more detailed classes.
Grassland 2	Spatial/spectral areas of grasslands that exhibit lushness in their spectral signature in the spring image. This spectral response could be indicative of the absence of a heavy layer of senesced grasses, such as in areas grazed in the previous season, or in lawns. It might also be interpreted as representing cool season grasses that are lush in spring. This class includes hay which has not been recently cut.
Cut Hay	Spatial/spectral areas free or nearly free of vegetation in the summer image, and showing lushness in the spring image. This will usually represent alfalfa or hay fields that have been recently mowed, but is sometimes spectrally confused with barren areas, especially fallow fields. Probably the majority of the alfalfa on the landscape is included in the Grass 2 class. It was not readily separable in this product due to lack of spectral content.

Name	Description
Corn	Spatial/spectral areas of row crop planted to corn in 2009. This will include small amounts of spectrally confused areas planted to soybean or other crops. This class probably also includes some areas planted to uncommon classes, such as sorghum, etc.
Soybeans	Spatial/spectral areas of row crop planted to soybeans in 2009. Will include small amounts of spectrally confused areas planted to corn or other row crops.
Barren/Fallow	Spatial/spectral areas that are free or nearly free of vegetation in the summer image, and suggestive of row crop or bare soil in the spring image. Often these areas were characterized by early harvest (or no crop planted), and presented a bare soil aspect in the summer image.
Structures	Spatial/spectral areas that represent buildings, bridges, or other structures, with a minimum elevation of 3 meters (~10 feet).
Roads/Impervious	Spatial/spectral areas that are primarily parts of major roadways, rural asphalt or crushed rock roads, paved city streets and parking areas. This class may also occur in quarries and other areas of exposed rock, and in dry barren agricultural areas, as well as in sandbars.
Shadow/No Data	Spatial/spectral areas usually representing shadow from trees or buildings. Includes areas of missing data, usually due to the presence of cloud or shadows in the imagery. Often shadow pixels, especially those from buildings, are inseparable from water bodies, and are originally assigned there by the interpreter.

Aquatic Habitats

The aquatic habitat types chosen for use in the IWAP are displayed in Table 4. In the natural world, there is no clear delineation between these aquatic habitat classes. Defining aquatic habitat classes helps describe the ecological need of aquatic species in a way that allows conservationists to focus on undertaking conservation actions in the right places for the right species. In addition, the following classes are all able to be mapped and therefore these classifications can be used to stratify the survey designs for aquatic organisms.

Table 4. Aquatic Habitat Classes Used in the IWAP

Aquatic Habitat	Description
River	Large flowing bodies of water. Third order and larger. The Mississippi is a 10th order river.
Stream **A. Warm Water** **B. Cold Water**	Smaller flowing bodies of water that serve as tributaries to rivers. The stream class includes first and second order streams. Also referred to as headwater streams.
On-stream Impoundment	Slowly flowing bodies of water formed from artificial damming of a river, or stream, generally less than 500 acres in size and having a watershed to lake ratio >80:1.
Federal Flood Control Reservoirs	Iowa has 4 federal flood control reservoirs: Saylorville, Red Rock, Coralville, and Rathbun.
Mississippi River Pools	Pools on the Mississippi River caused by the construction of the lock and dam system.
Backwater	Slow flowing bodies of water associated with larger river systems. Back-channel low-lying areas filled with water during high flow events but may be completely isolated from the river during low flow and may exhibit no flow during these periods. They are especially prevalent on the Mississippi River.
Oxbow	A sub-class of backwaters, they are water bodies formed in old river channels that are now cut off from the main channel and flow of a river.

Aquatic Habitat	Description
Lake **A. Natural** **B. Constructed**	Large bodies of water exhibiting little or no flow with emergent vegetation over less than 25% of the surface area. "Publicly owned lake" means any constructed or natural lake having a watershed acreage-to-lake surface area ratio of less than 80 to 1 and owned by an Iowa county or municipal government or by the state of Iowa. (IAC 571 Chapter 31)
Shallow lake	Open freshwater systems where maximum depth is less than 10 feet. Normally in a permanent open water state due to the altered hydrology of watersheds and unmanaged outlet structures that maintain artificially high water levels. May be fringed by a border of emergent vegetation in water depths less than 6 feet. When clear, they are dominated by emergent and submergent vegetation.
Pond	Smaller standing body of water, less than 10 acres in size.
Surface Mines	Surface mines are artificial water bodies in excavated basins, often the result of sand and gravel mining operations, or resulting from excavations to provide fill materials for roadway construction like overpass ramps on major highways.

Habitat Preferences of SGCN

The Wildlife Working Groups' Taxonomic Subcommittees assigned each SGCN to a habitat class or classes (summarized in Table 5.) Habitats preferences are taken from the existing literature and do not necessarily include all of the terrestrial and aquatic habitat classes listed in this Plan. Habitat preferences for individual SGCN are found in Appendix 18. Appendix 19 displays SGCN with common habitat preferences grouped into the habitat classes used in this Plan. Species with more than one preferred habitat were listed in each class. Groupings of SGCN by habitat class give a very general overview useful for identifying habitat protection or restoration priorities at the landscape level. Detailed habitat management plans for SGCN must consider their entire individual habitat needs.

Flowing water aquatic habitats had the greatest number of SGCN of any habitat class, followed by wetlands (Table 5). The number of aquatic SGCN nearly equals the number of terrestrial species, yet surface water covers just 1% of Iowa. Aquatic and semi-aquatic taxa had the highest percentage of their species listed as SGCN.

Table 5. Summary of Habitat Preferences of SGCN by Habitat Class.

Individual species are assigned to more than one habitat type if appropriate, so the total number of species exceeds the total number of SCCN.

Habitat Class	Amphibians	Reptiles	Birds	Butterflies	Crayfish	Dragonflies & Damselflies	Fish	Mammals	Mussels	Terrestrial Snails	Total
Terrestrial Habitat Classes	**28**	**55**	**149**	**56**	**2**	**8**	**2**	**35**	**0**	**5**	**340**
Forests	7	10	29	11	-	-	-	12	-	5	74
Shrubland	1	3	14	-	-	-	-	2	-	-	20
Grasslands	8	21	34	26	1	-	-	11	-	-	101
Wetlands	8	13	47	13	1	8	2	6	-	-	98
Agricultural Lands	4	8	25	6	-	-	-	4	-	-	47
Aquatic Habitat Classes	**23**	**47**	**88**	**5**	**9**	**46**	**126**	**10**	**54**	**0**	**408**
River	4	13	34	-	3	9	48	5	34	-	150
Stream	5	10	29	5	5	17	38	5	14	-	128
Lake, Reservoir, Impoundment	6	8	23	-	-	6	18	-	2	-	63
Backwater/Oxbow	2	7	-	-	-	1	16	-	-	-	26
Pond	6	9	2	-	1	13	6	-	4	-	41
Total	**51**	**102**	**237**	**61**	**11**	**54**	**128**	**45**	**54**	**5**	**748**

Priorities for Habitat Protection

Given the lack of natural areas remaining in Iowa, general strategies for prioritization of habitat protection tend to focus on enlarging the size of habitat complexes, reducing fragmentation, and increasing connectivity between larger areas of habitat. However, there are many species that have very specific habitat requirements, and some of those specialist species require habitats that are rare in Iowa or particularly sensitive to human disturbance. Thus, conservation of wildlife will require an approach that addresses both coarse-scale as well as fine-scale habitat needs.

Landscape-Scale Prioritization

Land protection not only provides habitat for wildlife and recreational opportunities for people, but also offers opportunities to maintain and restore ecosystem functions such as water filtration, flood abatement, carbon storage, etc. Intact ecosystems tend to provide more benefits and are more resilient to outside stressors. Therefore, land protection efforts in Iowa should continue to focus on the following principles:

1. Development of functional landscapes – adding parcels to existing protected areas to create core areas of fish and wildlife habitat.
2. Decreasing fragmentation – using land protection to decrease the number of edges between habitat and non-habitat areas.
3. Increasing connectivity – protecting and/or managing for wildlife use of areas between existing habitat core areas to facilitate movement between these areas.

4. Protection of native sod – protecting and/or managing for remnant prairies or other areas which have not been previously plowed. (See Iowa Tallgrass Prairie Working Group, 2013 for more information on this principle and how it's applied.)

Rare and Sensitive Communities

Land protection and management efforts in Iowa should also continue to focus on preservation of rare and/or sensitive ecological communities, which in turn support rare wildlife species. Some of Iowa's unique landforms or natural communities are of global significance. For example, the Loess Hills of western Iowa comprise one of the most extensive Loess deposits in the world. Important rare and sensitive communities in Iowa are listed below. For descriptions of these communities, see Chapter 4.

1. Sand Prairies
2. Fens
3. Algific Talus Slopes
4. Goat Prairies
5. Prairie Remnants
6. Prairie Potholes
7. Oak Savannas

Conservation Challenges Facing Iowa's Wildlife and Habitats

Standard Lexicon for Threats and Conservation Actions

In 2002, a coalition of global conservation practitioners joined together and formed the Conservation Measures Partnership (CMP). In 2004, CMP developed the first edition of the "Open Standards for the Practice of Conservation" which has since been updated in 2007 and 2013. One outcome of this partnership that is also a building block for increasing collaboration is the development of a "standard lexicon" for conservation, including a taxonomy, or hierarchy, of threats and conservation actions (Salafsky et al. 2008). Adopting the use of the standard terminology allows conservationists operating at any spatial scale to share information and experiences, facilitating learning and improvement among conservation practitioners. The 2015 revision of the IWAP makes use of this standard lexicon for the classification of threats and actions in order to increase the ability of our threats and actions to be compared across state lines or other political boundaries. This helps make clear how the IWAP fits in as one piece of regional, national, or even global efforts to conserve wildlife.

The items on the list represent *potential* threats, which require interpretation based on the biology of the species or habitats being evaluated. The list of threats should not be interpreted as a list of things that are bad for wildlife. Rather, it is a framework from which to evaluate potential threats, stresses, or conservation challenges for wildlife for the purpose of identifying the most effective means of conserving healthy wildlife populations.

DNR fisheries and wildlife biologists, and Implementation Committee and Working Group members that had the appropriate expertise and experience identified and evaluated the most important problems facing Iowa's wildlife today. Four threat impact levels – Low, Medium, High, or Very High – were used to evaluate the relative importance of each threat, taking into account both the scope and the severity of each threat. Table 6 summarizes threat impacts for Iowa's terrestrial wildlife and Table 7 summarizes threat impacts for Iowa's aquatic wildlife.

Table 6. Threats to Terrestrial Wildlife (including all habitat classes).

Impact level: **L** = Low, **M** = Medium, **H** = High, **VH** = Very High (Negligible threats demarked with a dash)

Level I Threats	Amphibians	Birds	Butterflies	Land Snails	Mammals	Reptiles
1. Residential & Commercial Development	H	H	M	M	M	H
2. Agriculture & Aquaculture	VH	VH	VH	M	VH	VH
3. Energy Production & Mining	L	H	L	L	M	M
4. Transportation & Service Corridors	H	VH	M	M	H	VH
5. Biological Resource Use	M	H	L	H	H-L	VH
6. Human Intrusions & Disturbance	VH	H	M	L	H	VH
7. Natural Systems Modification	VH	VH	VH	M	VH	VH
8. Invasive & Other Problematic Species & Genes	VH	VH	H	M	H	VH
9. Pollution	H	VH	H	L	VH	VH
10. Geological Events	-	-	-	-	-	-
11. Climate Change & Severe Weather	VH	VH	VH	H	H	H

Table 7. Threats to Aquatic Wildlife (including all habitat classes)

Impact level: **L** = Low, **M** = Medium, **H** = High, **VH** = Very High (Negligible threats demarked with a dash)

Level I Threats	Crayfish	Dragonflies & Damselflies	Fish	Mussels
1. Residential & Commercial Development	M	H	H	M
2. Agriculture & Aquaculture	M	VH	H	VH
3. Energy Production & Mining	L	M	M	L
4. Transportation & Service Corridors	L	M	L	H
5. Biological Resource Use	L	L	L	M
6. Human Intrusions & Disturbance	-	L	-	M
7. Natural Systems Modification	VH	VH	VH	VH
8. Invasive & Other Problematic Species & Genes	H	M	H	M
9. Pollution	M	VH	M	H
10. Geological Events	-	-	-	-
11. Climate Change & Severe Weather	H-M	VH	H	H

A Vision for the Future

To establish a focus for future wildlife conservation activities, the Advisory Committee to the original Iowa Wildlife Action Plan – a group of fish and wildlife professionals, educators, researchers, private conservation organizations, concerned citizens and representatives of the agricultural community - developed a vision for the status of Iowa's wildlife in 25 years. The vision statement has six elements that include benefits to fish and wildlife, the citizens who enjoy and support them, and the private landowners who must embrace them if the vision is to be realized. With each vision element the Advisory Committee developed specific conservation actions that need to be implemented to reach the Plan's goals in a 25-year framework. When the comprehensive review and revision process began, the Implementation Committee identified that the six vision elements that were initially identified by the Advisory Committee should remain in place as the cornerstone of the Plan's conservation strategy. Progress on implementation of the Visions over the first 10 years of the Plan is discussed in Chapter 11.

These vision elements, conservation strategies and conservation actions are not specifically designed to be implemented by DNR. They are designed to provide a broad framework of actions that can be undertaken by conservationists at all levels of government, by private conservation organizations and by private citizens. The conservation actions identified in the following pages will require a broad array of funding sources, skills and expertise. Extensive coordination will continue to be necessary between these stakeholders to make the vision a reality.

A Vision for Iowa's Wildlife

By 2030 Iowa will have viable wildlife populations that are compatible with modern landscapes and human social tolerance.

Goals:

- Common species will continue to be common.
- Populations of species of greatest conservation need will increase to viable (self-sustaining) levels.
- The abundance and distribution of wildlife will be balanced with its impact on the economic livelihood and social tolerance of Iowans.

A Vision for Wildlife Habitats

By 2030 Iowa will have healthy ecosystems that incorporate diverse, native habitats capable of sustaining viable wildlife populations.

Goals:

- The amount of permanently protected wildlife habitat in Iowa will be doubled to 4% of the state's land area.
- Protected habitats will be diverse, representative, native plant communities in large and small blocks on public and privately owned land and waters.

A 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.

Goal:

- Wildlife and fisheries management will be based on science.

A Vision for Wildlife-Associated Recreation

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.

Goals:

- The number of Iowans participating in wildlife-associated recreation (wildlife viewing, photography, hiking, outdoor classrooms, hunting, fishing etc.) should increase 50 percent by 2030;
- Wildlife-associated recreation will be available to all Iowans on public lands near their home.

A Vision for Wildlife Education

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

Goal:

- Iowans will understand the relationships of:
    1. land use, and its impacts on wildlife diversity & abundance
    2. land use, and its impacts on quality of life for all citizens
    3. land use, and its impacts on Iowa's economic sectors related to wildlife recreation
    4. wildlife diversity & abundance, and its impacts on quality of life in Iowa
    5. wildlife diversity & abundance, and its impacts on Iowa's economy
    6. quality of life for all citizens, and its impacts on Iowa's economy
    7. Iowa's economic decisions and their impacts on wildlife-based contributions to quality of life for all citizens

A Vision to Fund Wildlife Conservation

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

Goals:

- Government (Federal, state, and county) and private conservation spending will be increased so that the goals of this Plan are reached by 2030.
- Funding will be dependable, secure, and appreciated as a powerful economic and social investment.

Monitoring

The lack of species-specific information on the abundance and distribution of SGCN was one of the greatest challenges faced when initially developing this Plan. In some cases species were added to the list simply because information was outdated or unavailable. This continues to occur today despite much progress being made over the past decade, which is why this 2015 version of the Plan identifies Data Deficient species. Because of the dearth of information for the majority of Iowa species, inventory and monitoring for fish and wildlife species became the top priority for implementation of this Plan.

On the other hand, Iowa is fortunate to have a strong spatial data program. The amount and distribution of potential wildlife habitat is comparatively well known. As we continue to implement this Plan, and have more wildlife data to relate to our spatial datasets, we will become better equipped to identify qualitative differences among habitats and track qualitative changes over time.

Statewide Wildlife Inventory – Iowa's Multiple Species Inventory and Monitoring Program

When this Plan was initially developed in 2005, the Steering Committee and the Monitoring Working Group sub-committee agreed that the first priority for monitoring and research was to inventory Iowa's permanently protected wildlife habitats and a sample of habitat on private lands within the state. In addition, virtually all wildlife specialists involved in developing this Plan agreed that inventories, surveys, and monitoring of SGCN to guide habitat and population conservation actions was an essential component for managing Iowa's wildlife into the future. Therefore, in order to meet these needs, the Multiple Species Inventory and Monitoring Program (MSIM) was established in a partnership between Iowa DNR and Iowa State University (ISU). This program, which was launched in 2006, incorporates permanent sampling sites situated on public (federal, state, and county owned) as well as private lands. The design of this program is based on the US Forest Service's "Multiple Species Inventory and Monitoring Guide" (Manley et al. 2005).

Long Term Effectiveness Monitoring of Conservation Actions

In addition to biological monitoring, monitoring the effectiveness of conservation strategies described within the Plan is an important component of implementation. Tracking the accomplishments of the IWAP so that political and financial support can be maintained over the 25-year implementation period is a priority of the Plan. A system for tracking accomplishments has been developed by DNR. In addition, for Plan Implementation projects funded through the Wildlife and Sportfish Restoration Program, Iowa has begun tracking programmatic accomplishments through the USFWS's system, called Tracking and Reporting Actions for the Conservation of Species (TRACS). It is our current understanding that the TRACS system will continue to maintain a public viewer online for stakeholder review and use.

Having information about what has been accomplished is important, but only one component of effectiveness monitoring. A working group formed by The Association of Fish and Wildlife Agencies developed an Effectiveness Measures Framework, which was designed specifically for effectiveness monitoring of projects funded through the State and Tribal Wildlife Grants (SWG) Program. The Effectiveness Measures Framework serves as a very helpful basis for tracking the effectiveness of all activities undertaken in support of SWAPs. The theoretical basis for the framework lies in the Open Standards for the Practice of Conservation, developed by the Conservation Measures Partnership.

The Effectiveness Measures Framework makes use of *results chains* to display the *theory of change* which links conservation actions through outcomes to ultimate impacts (Figure 1). Clearly identifying the theory of change for

conservation actions is the key to measuring effectiveness. This is a key component of the Adaptive Resource Management cycle as explained above.

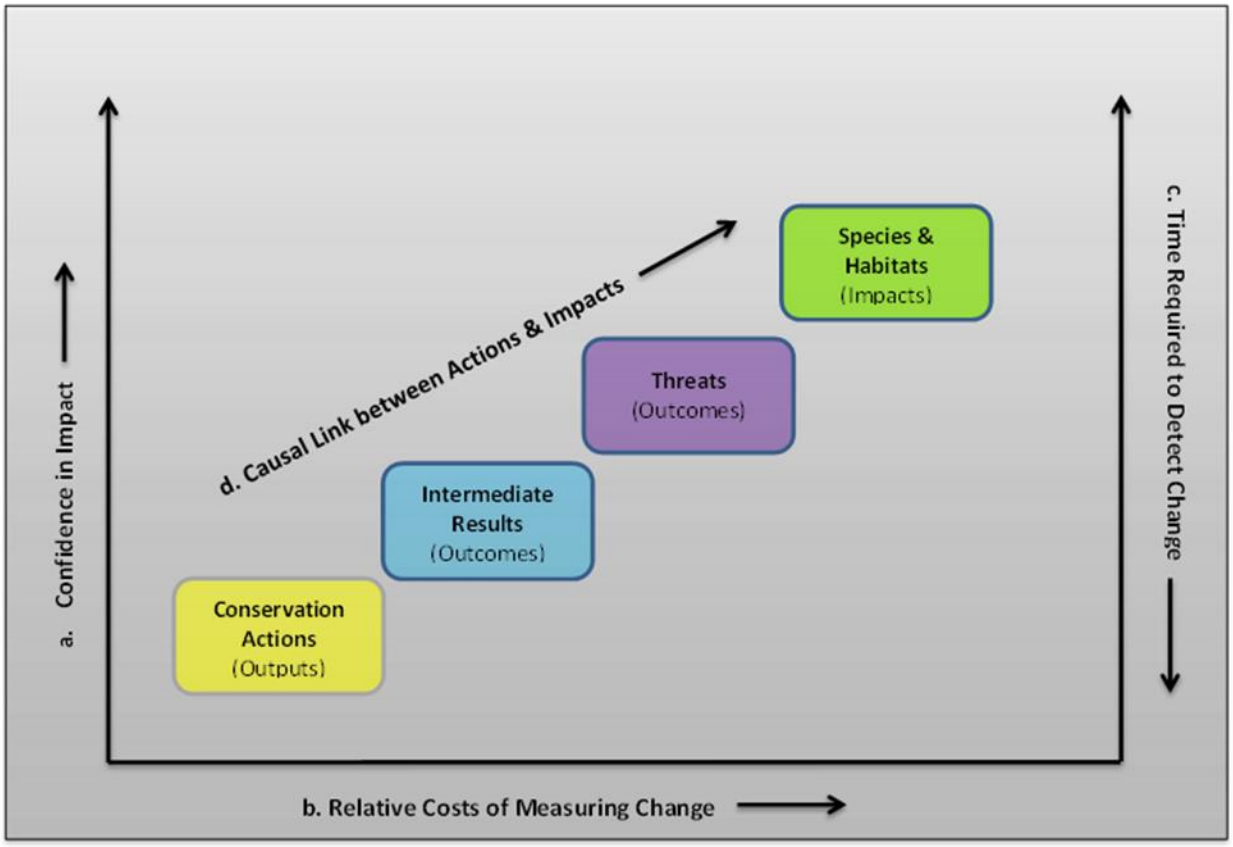


Figure 1. Adapted from AFWA (2011) and the 2008 version of the Open Standards for the Practice of Conservation. This diagram illustrates the *theory of change* which links conservation actions to impacts.

Table 8. Research Needs for implementation of Iowa's Wildlife Action Plan

Topic	Further Description
Taxa-Specific	**Life history information, occurrence within Iowa, population trends, habitat associations for species**
Examples:	- Crayfish, terrestrial snails, dragonflies & damselflies o These taxa need more initial survey work to complete an inventory and establish basic distributions of species within Iowa o These taxa also need more research to inform population assessment, status, and habitat use of SGCN
	- Data Deficient Species o Species listed as Data Deficient in all taxonomic groups need initial survey work to complete an inventory and establish basic distributions of species within Iowa o Population assessment, status, and habitat use information for all Data Deficient Species
	- All SGCN o Identifying habitat requirements, limiting factors, effective conservation strategies

Topic	Further Description

	- Taxonomic Groups to Potentially Add to IWAP
	  o Basic information is needed for several taxonomic groups of conservation concern (e.g., bees, moths, aquatic snails, etc.)
	  o Within a given taxa, more initial survey work is needed to complete an inventory and establish basic distributions of species within Iowa

Issue-Specific	**Effects of the following items on species occurrence, density, or reproductive success or other demographic factors**

Examples:	- Habitat Management
	  o Methods or techniques
	  o Management regimes (i.e., timing, duration, or frequency)

	- Habitat Restoration or New Habitat Projects
	  o Pre-and-post effects of restoration
	  o Feasibility assessments for species re-introductions or re-locations

	- Landscape Ecology
	  o Evaluating connectivity between core habitat areas
	  o Evaluating landscape permeability
	  o Quantifying ecosystem functioning

	- Land Use
	  o Renewable energy development
	  o Farming practices
	  o Effects of urbanization on species

	- Climate Change
	- Invasive species
	- Farm Bill Programs
	- Wildlife diseases
	- Environmental contaminants
Area-Specific	**Research or monitoring projects which rely on spatial datasets**
Examples:	- Identifying critical habitat components o Landscape factors affecting species of greatest conservation need (structural features, landscape configurations, and amounts of habitat)

	- GIS and landscape modeling
	  o Continued development of the Bird Conservation Area and Amphibian and Reptile Conservation Area models to identify geographic focus areas for habitat protection, restoration, and management
	  o Continued predicted species distribution map development
	  o Assessments of land use and/or land cover change
	  o Monitoring amount, location, and quality of habitat

Human Dimensions	**Sociological research relating to wildlife and wildlife habitat**

Topic	Further Description
Examples:	- Sociological research to evaluate Iowan's values, behaviors, or attitudes with regards to wildlife conservation programs - Studies to enhance understanding of patterns of participation in wildlife-associated recreation (e.g., barriers or opportunities to overcome barriers to participation) - Development and improvement of methods for stakeholder engagement

Priorities

This Plan was developed 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.

The geographic priorities of this plan culminate in Map 4 "High Opportunity Areas for Cooperative Conservation." Iowa needs to build 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.

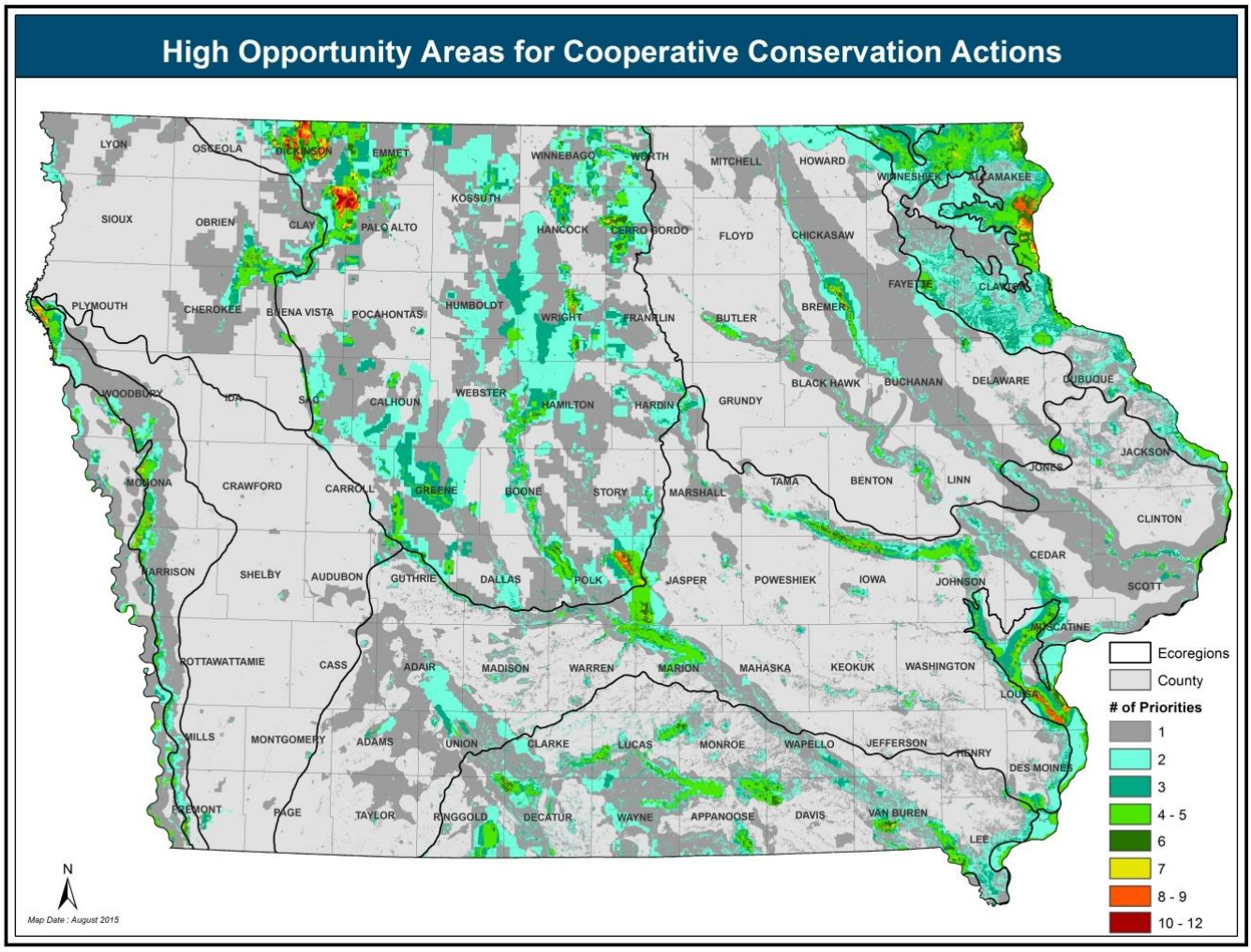
2) **Develop new habitats for SGCN in areas where these habitats do not exist**. This approach would provide new habitat for SGCN but at a higher cost. Establishing new habitats and restoring populations will extend the range of these species, provide the potential for greater genetic diversity and interaction 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).

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.

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.

Map 4. 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.



Coordination, Implementation, and Review

No single entity – government conservation agency, private conservation organization or research institution – can implement all conservation actions in this Plan even if full funding is achieved. To access all the energy, expertise and enthusiasm that will be needed, an IWAP Implementation Committee with representatives from all stakeholder organizations was formed. The mission of this Committee is to identify common priorities and interests, solidify working agreements, and focus members on conservation actions that meet the goals of the IWAP in a financially efficient and timely manner. The Committee and its Working Groups also review progress toward IWAP visions, goals, and actions, identify barriers to progress, and seek solutions that cross agency and organization lines.

Working Groups and their Subcommittees provide the level of deliberation and expertise necessary to develop operational plans to fulfill the goals and visions of the IWAP. Members should continue to include wildlife, recreation and outdoor education scientists; land and water managers, and experts in implementing programs in these fields. Working Group members should continue to have the technical expertise to:

- Review and explore program and planning options;
- Develop conceptual operational plans for conservation agencies, NGOs and private citizens to participate in;
- Develop and critically review technical proposals;
- Provide peer review for cooperating agencies operating plans;
- Develop conservation action and funding priorities for the Implementation Committee to consider;
- Identify strategic and operational plan shortcomings and recommend improvements.

Interagency Cooperation

Cooperation between agencies and organizations that manage public conservation lands in Iowa is essential to the successful implementation of IWAP. Federal, State, and local agencies which manage significant conservation land and water areas within Iowa include DNR, Iowa County Conservation Boards (CCBs), US Army Corps of Engineers (USACOE), and U.S. Fish Wildlife Service (USFWS). All have working relationships at both the state and local levels.

Many of the recommended conservation actions must be carried out on private land. The US Department of Agriculture (USDA) provides funding and technical assistance to landowners for land conservation projects through its Natural Resource Conservation Service (NRCS) and Farm Services Agency (FSA). Farm conservation programs and projects in Iowa are often delivered through partnerships involving agencies such as USDA, DNR, Iowa Department of Agriculture and Land Stewardship (IDALS), Soil and Water Conservation Districts (SWCDs), as well as non-profit organizations such as Pheasants Forever. DNR has permanent positions on Iowa's USDA State Technical Committee and subcommittees that provide input into wildlife-friendly programs like WRE, CRP, and EQIP. Traditionally, NRCS and DNR have jointly funded DNR's Private Lands Program, which uses USDA funding to establish wildlife habitat on private land. DNR Private Lands Wildlife Biologists are co-located in NRCS offices to promote close interaction between the DNR, USDA staff and private landowners. All of these avenues should continue to be utilized to promote the concepts and management recommendations identified in this Plan.

Wildlife Action Plan Review and Revision

Comprehensive review/revision is required at least every ten years. In addition, more frequent and/or less comprehensive revisions can be conducted at any time. Too-frequent revision cycles can stress the capacity of the Implementation Committee and its working groups, but changing conditions may necessitate updates to the Plan at points between required ten-year revisions.

The Costs and Benefits of Sustaining Iowa's Biodiversity

The costs of reaching the goals outlined in this Plan exceed the historic levels of conservation funding in Iowa. Hunters and anglers have funded most wildlife conservation. National and state trends indicate that the number of participants in hunting and fishing is declining. To reach the goals established in this Plan a broader spectrum of Iowans must invest in conservation. Supporting the Wildlife Action Plan will benefit the health of wildlife and people. Investing in cost-effective conservation will safeguard Iowa's natural resources for the generations to follow.

Annual Costs

The annual cost to double the amount of permanently protected acres to 4% of Iowa by 2030 is estimated to be $88 million (Table 9). Costs to implement the habitat management, research and surveys and other activities needed to implement the Plan are listed in Chapter Ten. Combining habitat protection, habitat management, survey and research costs brings the total funding needed annually for implementation of this Plan to approximately $133 million. The annual funding shortfall for implementation of this Plan is about $104 million (Table 9).

Table 9. Estimated funding needs over next 15 years (2015-2030) for full implementation of Plan.

Combined Annual Costs	Dollar Amounts
Needs – Land Protection	$88,000,000
Needs – Habitat Management & Science	$45,000,000
Annual Needs Combined	$133,000,000
Funds Available – Land Protection	$18,640,000
Funds Available – Habitat Management & Science	$10,500,000
Annual Funds Available Combined	$29,140,000
Annual Shortfall – Land Protection	$69,360,000
Annual Shortfall – Habitat Management & Science	$34,500,000
New Funds Needed Annually:	
Total	$103,860,000

Benefits of Sustaining Biodiversity in Iowa

Economic Benefits

Outdoor recreation opportunities are important to Iowans. Iowa State Parks receive over 25 million visits annually, and County Parks are estimated to receive a comparable number of visits (Otto et al. 2007). Outdoor recreation is also an important economic sector. A report that includes a wide variety of outdoor recreation types, compiled by the Outdoor Industry Association, estimates that outdoor recreation generates $6.1 billion in consumer spending in Iowa, supports 75,000 jobs, generates $1.7 billion in salaries and wages, and $433 million in state and local tax revenues (OIA 2012).

A 2013 analysis conducted by Southwick & Associates called "The Conservation Economy in America" estimated the total direct investment in fish and wildlife conservation, and the resulting economic contributions for each state in the nation. Based on 2010 spending levels, this report estimated Iowa's total direct investment to be $534.6 million (which includes all fish and wildlife conservation-related expenditures by federal state and local governments and private organizations). Iowa's economic output was estimated to be $689 million. In other words, a dollar spent on fish and wildlife conservation in Iowa yielded $1.29 in economic activity. In addition, an estimated $62 million in tax revenues to local, state, and federal coffers resulted from economic activity generated by the initial investment.

Whether the analysis focuses on fish and wildlife expenditures or outdoor recreation more broadly, the resulting message is consistent: conservation is a solid investment in Iowa.

Other Benefits

Nature provides many benefits and services to people (clean air, clean water, food, crop pollination, medicine, aesthetics, relaxation, recreation, etc.), some of which cannot easily be translated into monetary values.

These benefits are sometimes referred to as "ecosystem services." The values of ecosystem services are not regularly captured in monetary terms. Hopefully, future analyses of the return on investment for conservation expenditures will incorporate more ecosystem services, in order to more accurately capture the costs and benefits of conservation investments.

Conclusion

Iowa citizens are strongly in favor of investments in conservation. In a 2013 bipartisan, statewide survey of voters, 97% of respondents agreed (76% strongly agreed) with the following statement (Weigel and Metz, 2013):
"We need to ensure that our children and grandchildren can enjoy Iowa's land, water, wildlife and natural beauty the same way we do."

Plan Implementation – Example Projects

The ultimate purpose of this Plan is to improve the status of wildlife populations and their habitats, allowing people to continue enjoying Iowa's natural resources for years to come. This effort requires cooperation between many stakeholders, including private land owners, conservation entities, educators, policy makers, and more.

The Multiple Species Inventory and Monitoring Program

The largest effort directed towards increasing knowledge about the status of Iowa's non-game wildlife is the Multiple Species Inventory and Monitoring (MSIM) program. Seasonal field technicians are employed each year through a partnership between Iowa State University and the Iowa Department of Natural Resources to survey for fish, mussels, crayfish, amphibians, reptiles, dragonflies, damselflies, birds, butterflies, and mammals, as well as to conduct habitat assessments across the state (see Chapter 7 for a more detailed description of the program). The MSIM program has produced 10 years of data thus far, and continues to inform wildlife experts on the status of Iowa's wildlife populations. This information helps ensure that conservation management is appropriate and effective.

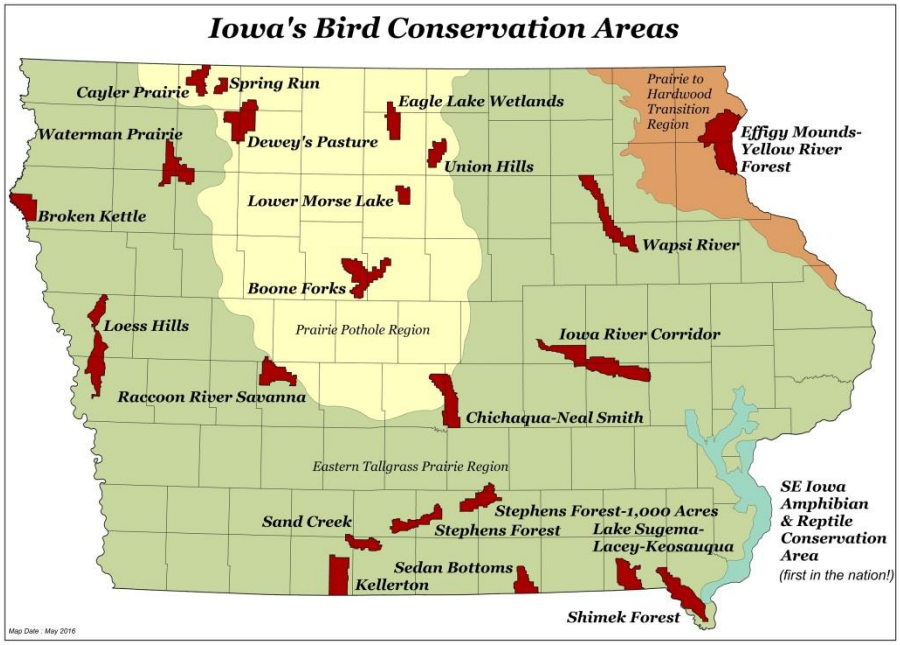
Citizen Science: The Volunteer Wildlife Monitoring Program

A second way that wildlife is being monitored in the state is through the Volunteer Wildlife Monitoring Program. This program gets citizens who are interested in Iowa's wildlife involved in the monitoring effort and makes it possible to track a larger number of species than the DNR would be able to keep up with on its own.

Iowa's Bird Conservation Areas

The Bird Conservation Area (BCA) program (see Map 5) was established in 2001 by the Wildlife Diversity Program of the DNR as part of the North American Bird Conservation Initiative (NABCI). NABCI is a broad collective of national and international bird conservation efforts directed towards reducing the serious declines in North American avian species that have been observed over the last two decades. Although the BCA program was established before the Plan was written, it has been an exemplary mode of Plan implementation, serving to achieve multiple Plan goals.

Map 5. Iowa's Bird Conservation Areas



There are no legal regulations that come with establishment of a BCA. Rather, these places serve to encourage and focus protection in areas where birds and other wildlife are most likely to benefit. The BCA model was adapted from the Wisconsin Department of Natural Resources and Midwest Partners-In-Flight Working Group large-scale landscape recommendations. This model is based on research suggesting that viable bird populations require habitat spread across a large landscape. Under this model a BCA must be at least 10,000 acres in size, with a minimum area of 2,000 acres at the core being permanently protected. In addition to the core area, blocks of habitat greater than 40 acres need to be scattered throughout the complex.

Cooperation with private land owners is an important part of successful wildlife conservation. Public education and assistance efforts are often conducted in high priority areas in order to help interested individuals increase the quality of wildlife habitat on their land. These education efforts are conducted by a variety of conservation entities.

Wildlife Viewing

The Education and Recreation working group of the IWAP Implementation Committee was established to help achieve visions four and five. Working group member Jim Pease, retired Iowa State University Extension Wildlife Specialist, participates in a radio show called Wildlife Day hosted on Iowa Public Radio that shares interesting facts about a wide variety of wildlife species in Iowa. While appealing to naturalists and outdoor recreationists alike, this radio show also reaches those who may not be able to participate in outdoor recreation. Working group member Pat Schlarbaum, a staff member in the DNR's Wildlife Diversity Program, has helped get viewing platforms installed at bird conservation areas to help draw people to watch wildlife in the area (Figures 2 & 3). As of 2015 there were six platforms in existence or being built. The view from the platforms also fosters an appreciation for the landscape within wildlife management areas. These platforms are constructed through cooperation with various conservation partners.

Figure 2. One of the most popular viewing platforms is at the Kellerton Wildlife Management Area, in the Kellerton BCA. Here, people gather to hear Greater Prairie-chickens booming in the early mornings of the springtime mating season.

Figure 3. The viewing platform at Otter Creek Marsh was built in the shape of a soaring eagle.

Although Iowa is an agricultural state, it also hosts thousands of vertebrate and invertebrate species. Continuing to develop a diverse base of native habitats and movement corridors for wildlife is essential for the preservation of Iowa's wildlife populations. Maintaining Iowa's rich natural resource legacy also creates a wide variety of enjoyable recreational opportunities for Iowans and visitors alike, thereby improving public health and contributing to the state's economy. This chapter highlights just a few of the many projects that are being conducted across the state to preserve and restore Iowa's natural resources as well as provide opportunities for people to enjoy them. As implementation of the Iowa Wildlife Action Plan continues, more benefits will be seen across the state for wildlife as well as for the people who enjoy outdoor recreation and who value wildlife and wild spaces.

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