Iowa State Forest Action Plan

This story was made with Esri's Story Map Journal.
Read the interactive version on the web at https://arcg.is/1aXDnX.

IOWA | Department of Natural Resources

Welcome to the Iowa Department of Natural Resources 2020 State Forest Action Plan.

This plan is best viewed on a computer rather than a mobile device and is optimized for use with the Google Chrome browser, however any web browser will work.

As a part of the 2008 Farm Bill, all states were mandated to create a State Forest Action Plan that included a statewide assessment of forests and their condition as well as 10-year goals and strategies for implementing forest practices in the state. The Farm Bill also mandated updates every 10 years. This is the 2020 update to the original 2010 State Forest Action Plan for Iowa: Iowa's Forests Today. The 2010 State Forest Action Plan can be viewed on the Iowa DNR's website.

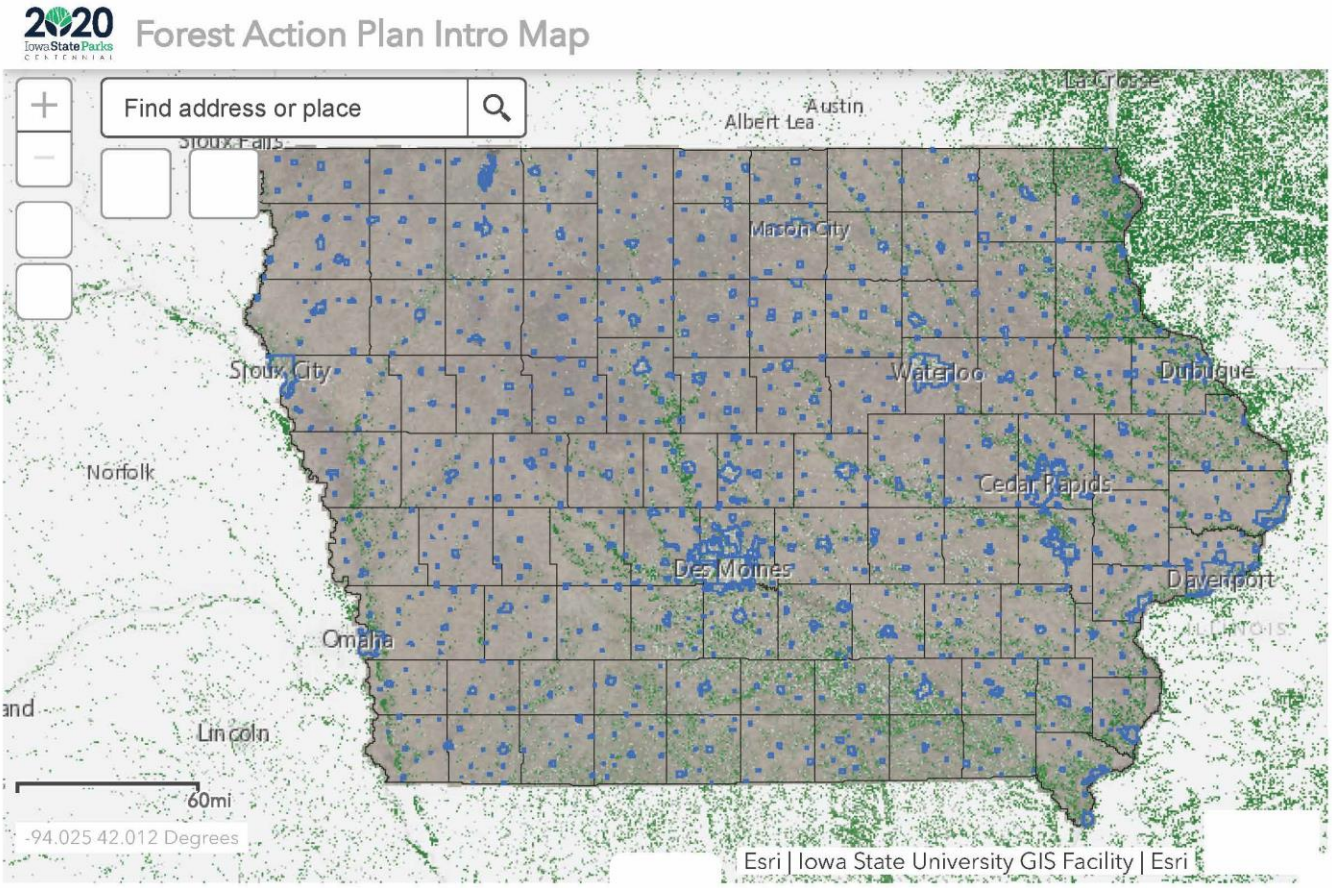
The 2020 Iowa State Forest Action Plan includes the following sections. Sections can be accessed by clicking on the bookmarks on the left side of the screen.

- Iowa's Forests
- Forest Health
- Urban Forestry
- Private Lands
- Fire Program
- Productivity
- Looking to the Future
- Goals & Strategies
- Appendix

Scrolling down to the next page will take you to a brief How-To Guide for ESRI StoryMaps, the platform used for this plan. You will learn how to interact with the maps that you will see featured in this plan as well as basic navigation tools.

Lastly there is a note of thanks to DNR staff who contributed to the creation of this Action Plan.

Optimizing the Experience in this StoryMap Platform



The 2020 Iowa State Forest Action Plan uses the ESRI StoryMap platform. This allows users to interact with static and live geospatial data. Users can zoom in on maps, click icons for more information, select which map to view, and open the map legend for more information.

This page has been created as a demonstration map to help users become familiar with ESRI StoryMap so they can easily navigate the 2020 Iowa State Forest Action Plan.

The layer (information) that is being displayed can be changed by clicking on the icon in the top left corner that looks like three squares stacked on top of each other. This will display a layer list that shows all of the layers available on that particular map. Each layer has a check box adjacent to the name of the layer. Whether or not that box is checked determines if the layer is displayed on the map. There are options within the Layer List box that allows you to search by keywords and turn all layers on and off at once.

The Legend can be viewed by clicking on the icon in the top left corner that looks like a checklist with different shapes. This will display a legend popup that has icons and text explaining the visual icons displayed on the map.

The plus and minus icons allow you to zoom in (plus) and zoom out (minus) on the visible extent of the map. Clicking the icon that looks like a house will adjust the extent of the map back to the original default extent. Clicking the circle icon in the top left corner will display your location on the map if you are using location services.

Some maps in this Iowa State Forest Action Plan will have data that you can easily see without zooming in while other maps have much more data available as you zoom in on a particular area. It is suggested to always zoom in on the maps in this Action Plan to explore more areas in greater detail. Some maps displayed in this Action Plan are used from outside sources such as the USDA Forest Service, and may take a few seconds to fully load. Please be patient, these maps will load after a few seconds and if not then please check the quality of your internet connection.

Acknowledgements & Special Thanks

A special thank you to Iowa Department of Natural Resources staff who assisted in the creation of this 2020 Iowa State Forest Action Plan.

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Every Iowa DNR forester and several other DNR staff made contributions to this document. Thank you.

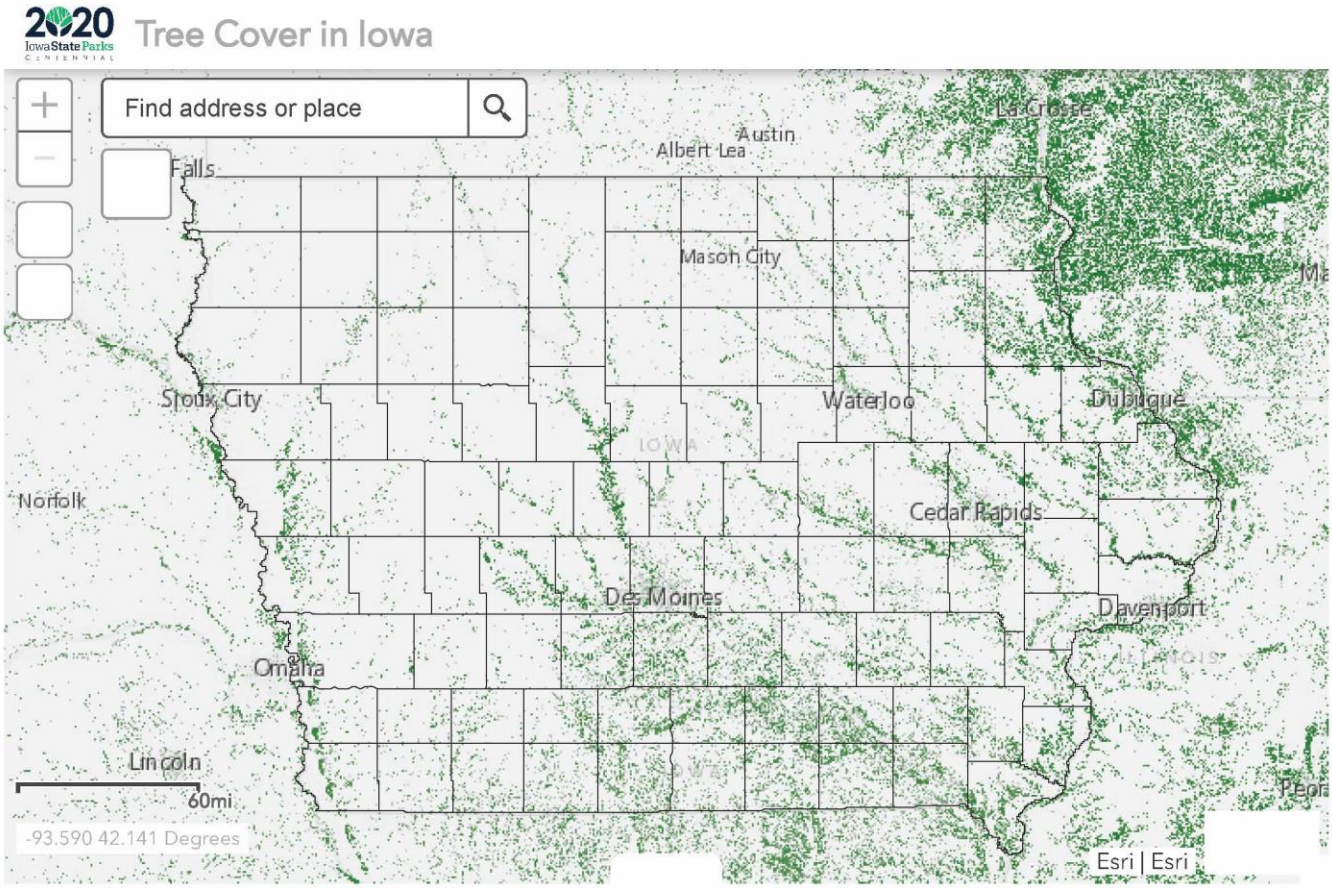
Iowa's Forests

This section includes high-level information about the forestland in Iowa, characteristics of Iowa's landscape, and additional information.

Contents:

Iowa's Forests

Foreword by Jeff Goerndt, State Forester



Map Source: U.S. Geological Survey National Land Cover Database 2016.

Most Iowans are largely unaware they can immerse themselves in some of the finest, most beautiful forests in the Midwest, usually by just taking a short drive down the road. Iowa's forests truly are unique, hidden gems in a land of farm fields and grasslands. As you read on, I hope you are captivated by the importance of the forests in Iowa and all of the opportunities they offer.

This Forest Action Plan will provide an assessment of the current condition of Iowa's forest resources, create a set of goals for sustainable forest management, and develop specific strategies to address identified resource issues. The stewardship of Iowa's nearly 3 million acres of forests is critical for providing jobs, forest products, wildlife habitat and recreational opportunities. In addition, a healthy forest resource will provide energy saving for communities, improve water quality and reduce nutrient run-off for Iowans.

Iowa's Forests have never faced more threats than today. In the past decade, Emerald Ash Borer has made its way across most of our counties, devastating the native ash population as well as leaving noticeable canopy gaps in many communities. Bur oak blight, oak wilt, and rapid white oak decline continue to threaten the sustainability of some of Iowa's most valuable tree species for wood and wildlife. Invasive plants such as oriental bittersweet and buckthorn are rapidly gaining ground and outcompeting the regeneration of our native species. This action plan provides the framework for a targeted approach to deal with some of the largest threats to Iowa's forests now and into the future.

Most of Iowa's forests thrive on productive sites capable of producing quality, commercial timber. Forest products are a critical element of Iowa's economy. They provide jobs, raw material, and finished products that support additional economic activity throughout the state. Sustainable forest management of Iowa's public and private forests not only yields valuable timber products, it promotes a healthy ecosystem that has the capacity for renewal.

More than 85% of the rural forests in Iowa are privately owned. DNR foresters engaging with private forest landowners

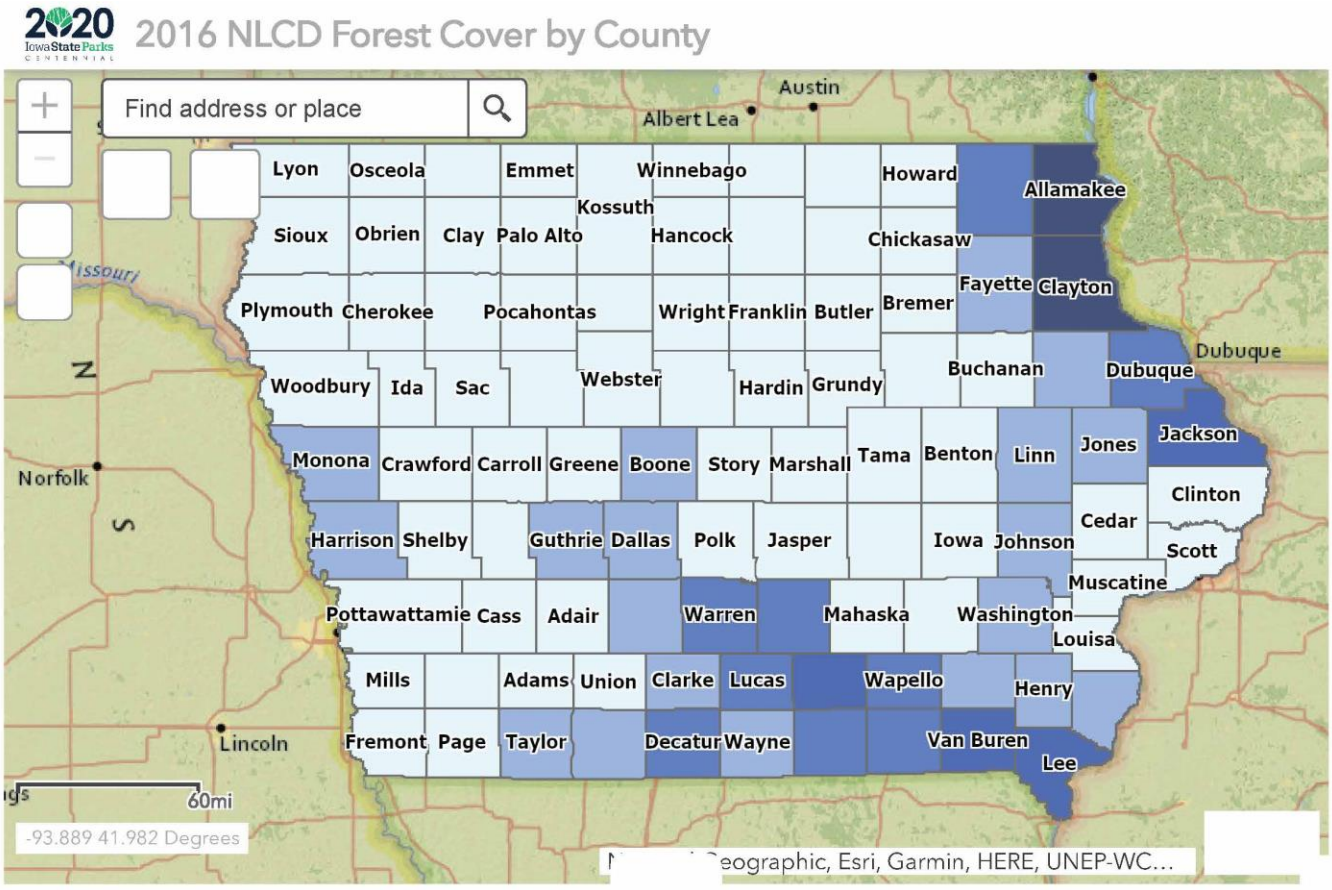
and providing technical assistance to achieve forest management goals is critically important in order to grow and sustain healthy forests in the future. Perhaps one of our most daunting forest changes being observed by foresters across the state is the loss of our native oaks. Due primarily to a lack of planning and thoughtful management, other species are slowly replacing this valuable resource. Active forest management such as harvesting, forest stand improvement and prescribed fire will ensure that our forests remain healthy, diverse, and resilient.

In addition to rural forests, Iowa's urban areas and communities are home to trees and forests that provide a variety of benefits to residents. Over 60 % of Iowans live in these urban and community areas. Trees help these residents by cleaning the air and water, providing shade, reducing energy costs, and increasing property value. With proper planning and management, we will increase canopy cover and improve species diversity in our Iowa communities.

This Forest Action Plan will show that the need for active management of Iowa's forests has never been greater. Whether you plant a tree or use your voice to advocate for the trees, I hope this plan will inspire you to do your part to ensure that future generations will profit from the important benefits Iowa's forests provide. Our people, our state, and our planet depend upon it.

Jeff Goerndt, State Forester

History of Iowa's Forests

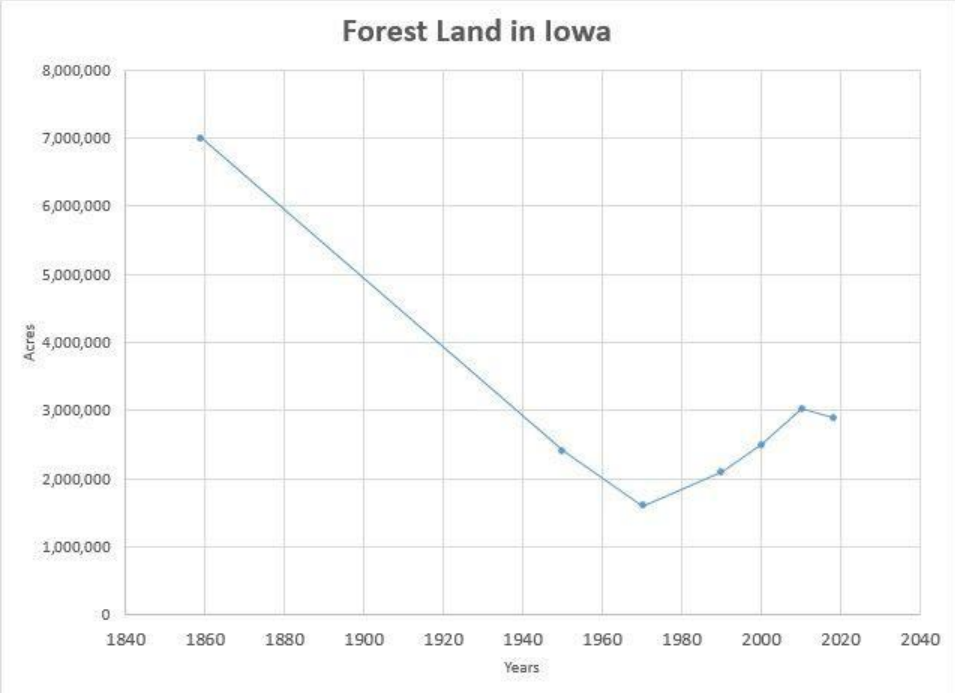


Map showing the forest cover by county as a statewide ranking. Counties that are darker blue have more forestland. This data is from the U.S. Geological Survey National Land Cover Database 2016.

The landscape of Iowa has changed drastically since European settlement. Iowa was once covered with rolling prairies, meandering rivers, prairie-pothole wetlands and other various landscape features. All of these factors combined to make the soil some of the most nutrient-rich in the world. This rich soil fertility coupled with European settlement and the need for a structured system of agriculture lead to great change in the Iowan landscape. Prairies were tilled under, wetlands were drained, drainage ditches replaced meandering streams, and woodlands were restricted to fence rows and land considered too steep or rough to farm. Around the turn of the 20th century, the Golden Age of Agriculture

arrived in Iowa turning crop production into a business venture. By this time approximately 92% of the land in Iowa had been converted to agricultural use. A more detailed description of historic conditions in Iowa pre- and post-European settlement can be found in Iowa: Portrait of the Land.

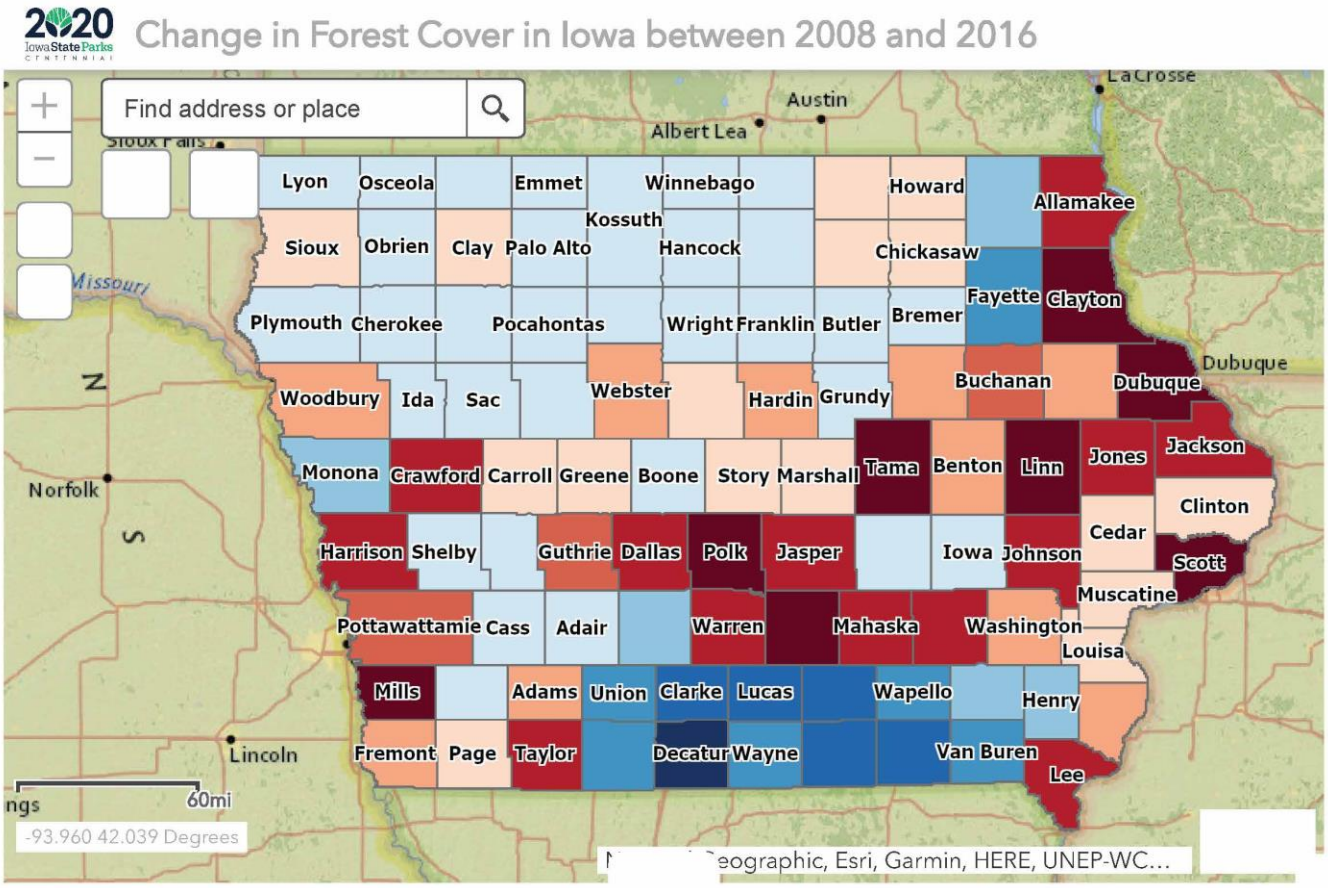
In 1986 the Iowa Department of Natural Resources (DNR) was created to protect the environment, maintain state lands and improve the quality and capacity of Iowa's natural resources. The Iowa DNR, along with other state and federal organizations, worked to restore natural ecosystems across the state. During the past 30+ years, natural resource management and restoration has become a larger priority in Iowa.



Forested Acres in Iowa, U.S. Forest Service Forest Inventory Analysis. The 1859 value is based on original land survey conducted by the General Land Office between 1832 and 1859.

Click on the links below to see a land cover map for each corresponding time listed. Some of these maps may take a few seconds to load, please be patient.

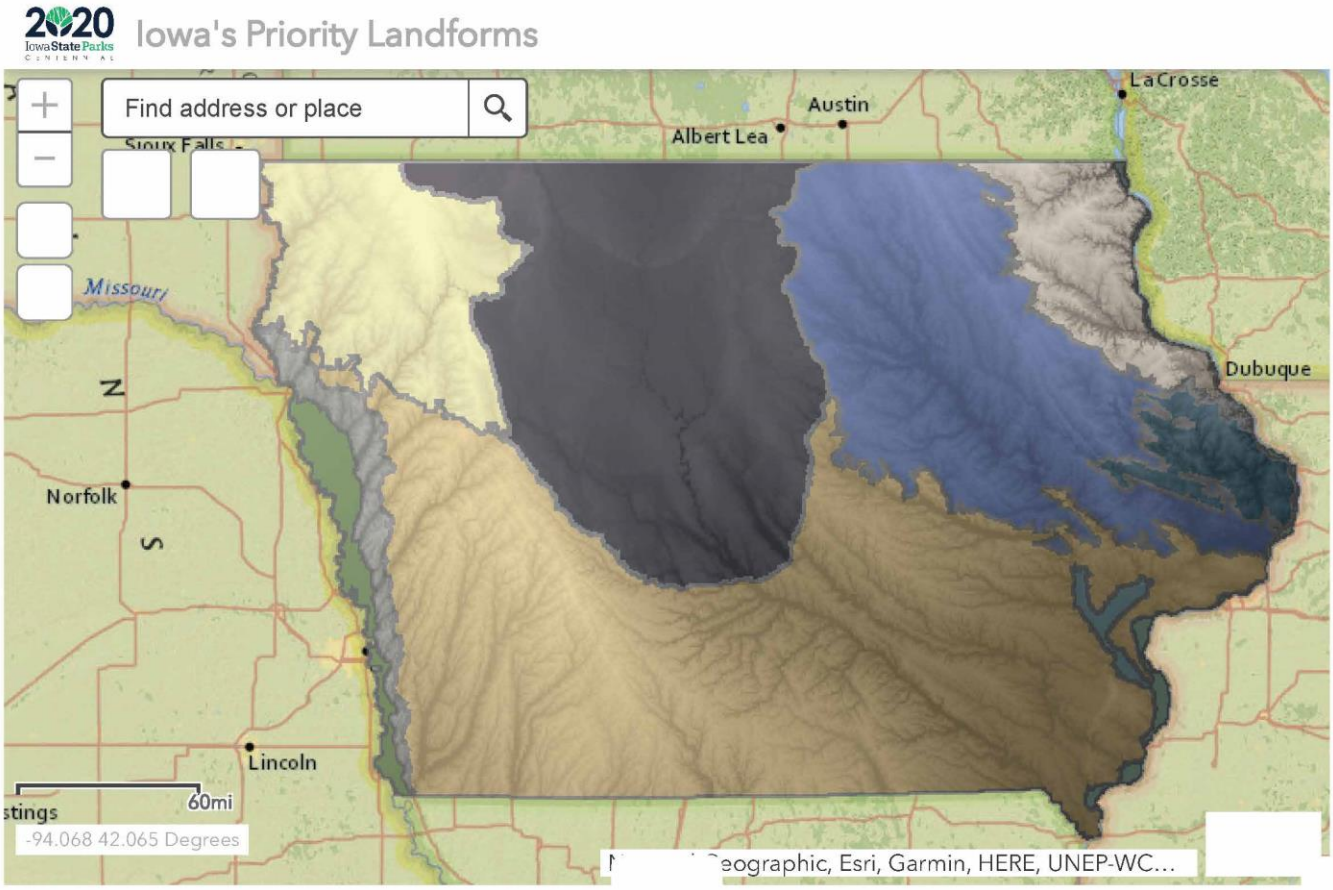
- 1836-1859 General Land Office Vegetation Survey (link available only in online story)
- 1950s Aerial Photographs (link available only in online story)
- 1970s Aerial Photographs (link available only in online story)
- 1992 Gap Landcover Map (link available only in online story)
- 2002 Iowa DNR Landcover Map (link available only in online story)
- 2010 USDA National Agriculture Imagery Program (link available only in online story)
- 2019 Summer Natural Color Orthophoto (link available only in online story)



Map showing the overall loss and gain of forestland by county in Iowa. The counties that appear the darkest red lost the most forestland while the counties that are the darkest blue gained the most forestland between 2008 and 2016. The U.S. Geological Survey National Land Cover Database developed this data.

According to the U.S. Geological Survey National Land Cover Database of 2016, between 2008 and 2016 72 of Iowa's 99 counties lost acres of forestland. Two thirds of the counties (48 counties) that lost forestland during this time lost less than 100 acres, losing on average 32 acres. The remaining 24 counties that lost forestland between 2008 and 2016 lost on average 333 acres. Dubuque County in the far eastern side of the state lost the most forestland during this time, losing a total of 680 acres of land. Referencing the population change map here [link coming soon] shows that a fair number of the counties with the most loss in forestland also experienced the highest rate of population change. In addition to population change trends, it is likely that some of this forest loss is related to the high commodity prices of corn and soybeans, leading landowners to convert more forestland to cropland to maximize profits.

While the vast majority of counties in Iowa lost forestland between 2008 and 2016, 24 counties did increase their amount of forestland. There is an even split in acres gained greater than and less than 100 acres, 13 counties gained less than 100 acres while 14 counties gained more than 100 acres. Of the counties that gained less than 100 acres of forestland during this time, they averaged a gain of 21 acres. Of the counties that gained more than 100 acres of forestland, there was an average gain of 529 acres. Decatur County in south central Iowa gained the most between 2008 and 2016, gaining 1,455 acres of forestland. In general, most south central and most north central and northwestern counties gained forestland due in part to an increase in conservation practices and tax incentive programs.



Map illustrating the ten different landforms found in Iowa.

The underlying parent material, soil structure, and glaciation history of Iowa varies widely across the state. There are ten distinct landform types found in Iowa, each with specific historical factors that shaped and molded the land into what can be seen today. These landforms affect the type and dispersion of vegetation present. By understanding the basic differences between landforms in the state one can better grasp the variation in land cover and usage.

Des Moines Lobe

The Des Moines Lobe in north central Iowa is the most recently glaciated region in the state. The last glaciers in this area melted away approximately 12,000 years ago creating a unique landscape that retains some direct impacts of glacial occupation, not seen in other portions of the state. Due to this relatively young landscape, most of Iowa's natural lakes occur in the Des Moines Lobe and there has been little natural erosion. The most distinct feature of the Des Moines Lobe is the three major end moraines, the Bemis, Altamont, and Algona moraines. These moraines are prominent on the landscape and show the stages of retreat and decomposition of the glaciers. Each moraine marks an area where the glacier sat stagnant and stationary for a long period of time before continuing its long retreat. The Des Moines Lobe is home to knob-and-kettle topography marked by numerous small prairie potholes and larger kames (isolated, gravel filled hills formed from meltwater chambers inside of the glacier). One can also find broad, till-filled flats that cover hundreds of square miles, signifying the existence of long-gone immense glacial lakes.

Loess Hills

This area is well known for the wind-blown silt and clay called loess. Loess was first generated through the processes of glaciation, glaciers would pick up large pieces of bedrock and slowly pulverize them into fine silt and clay. These fine particles were released from the glacier in meltwater and settled in floodplains. Eventually the soil particles dried out and were lifted by the wind, moving eastward just outside of the river valleys. Once beyond the flat river valley the wind was disrupted by turbulence caused by the rolling landscape and the particles fell from the air. These loess deposits blanketed the preexisting land surface and reshaped the area into a series of steep ridges and valleys. Now the landscape is covered by native prairie ecosystems and wooded back slopes. The vastness of this type of windblown,

loess dominated landscape is only found here in Iowa and in China along portions of the Yellow River. The average deposit of loess across the area is 60 feet deep, with some sites reporting 120 feet or more of loess cover. Loess is so porous and lightweight that it is extremely susceptible to erosion.

Southern Iowa Drift Plain (and East - Central Iowa Drift Plain)
The Southern Iowa Drift Plain is the largest landform in Iowa, encompassing almost all of the southern half of the state. This area was covered by glaciers as long ago as 300,000 years, but has experienced very little glaciation after that point in time, which makes the landscape quite old. The region is best known for rolling hills and steep river valleys carved by hundreds of thousands of years of erosion. Even with the rolling hills, to the roaming eye it appears that most of the hills return to a uniform peak elevation which is a reference back to previous glaciation. Periods of rapid erosion followed by periods of very slow erosion helped to shape some of the hillslopes, resulting in portions of the slope being quite steep followed by areas that gradual descend downward. In addition to these above ground variations, the below ground parent material also varies greatly as you move east to west across the landscape.

Iowan Surface
The Iowan Surface in northeastern Iowa is the least remarkable landscape in the state. There are no major landform types present like those found in the Des Moines Lobe or the Southern Iowa Drift Plain. For the most part, this region is rather flat with some gently rolling hills. The area is known for its glacial erratics, glacier deposited boulders that slowly work their way up through the soil because of seasonal freeze-thaw action. Oftentimes you will see these boulders piled up in field corners or sitting along the roadside covered in art. The southern third of the region is home to pahas, gently sloping oblong hills. Generally speaking these small hills run northwest to southeast and are historically forested.

Northwest Iowa Plains
Similar to the Iowan Surface, the Northwest Iowa Plains does not have any obvious, unique landforms. This area exhibits a fair amount of landforms similar to the surrounding regions. There are loess covered hills like the Loess Hills region, some stark, steep valleys like the Southern Iowa Drift Plain, and young landscapes like the Des Moines Lobe. Generally speaking, the Northwest Iowa Plains is the highest, driest, and least timbered area of the state.

Paleozoic Plateau
This region of the state is unlike any other location within Iowa. The Paleozoic Plateau is home to high rock outcroppings and steep, deep river valleys. Often called Bluff Country by locals, the northeastern corner of the state has high winding bluffs spread throughout the region. Here you will find rock outcroppings of various kinds including limestone, dolomite, and shale. The limestone and dolomite are hard and resistant to erosion which creates steep cliffs and crevices unique to the area. The crevices lead to ice caves and significant and relatively easily accessible groundwater reserves. The Paleozoic Plateau also contains a significant amount of karst topography which leads to sinkholes, springs and caves.

Alluvial Plains (Missouri Alluvial Plain, Mississippi Alluvial Plain, and Iowa-Cedar Lowland)
Wide, flat alluvial plains are constructed by the movement of water through rivers and streams. Rivers excavate the valleys they are in, transporting soil materials along with them and depositing that sand, silt, and clay in areas with low flow and eventually all of the way to the main river deltas. As the water flows it will undercut steep banks and deposit that sediment along shallow inner curves, creating what is known as point-bar deposits. Alluvial Plains are also composed of wide flat floodplains where water overflows seasonally and nutrient rich sediment is deposited. In Iowa most of these floodplains are farmed for agricultural crops. The Missouri and Mississippi alluvial plains stand out from other river valleys because of their immense size.

Forest Ownership

According to the United States Department of Agriculture Forest Service Forest Inventory and Analysis data, of the 3 million acres of forestland in Iowa, 85% is privately owned. The remaining 15% of forestland is publicly owned and managed by county, state, federal and other groups. More information about publicly owned land is located in the following sections. The almost 2.5 million acres of forestland that is privately owned, 95% is owned by individuals instead of corporations. This means that the vast majority of forestland in Iowa is owned and managed by private individuals across the state.

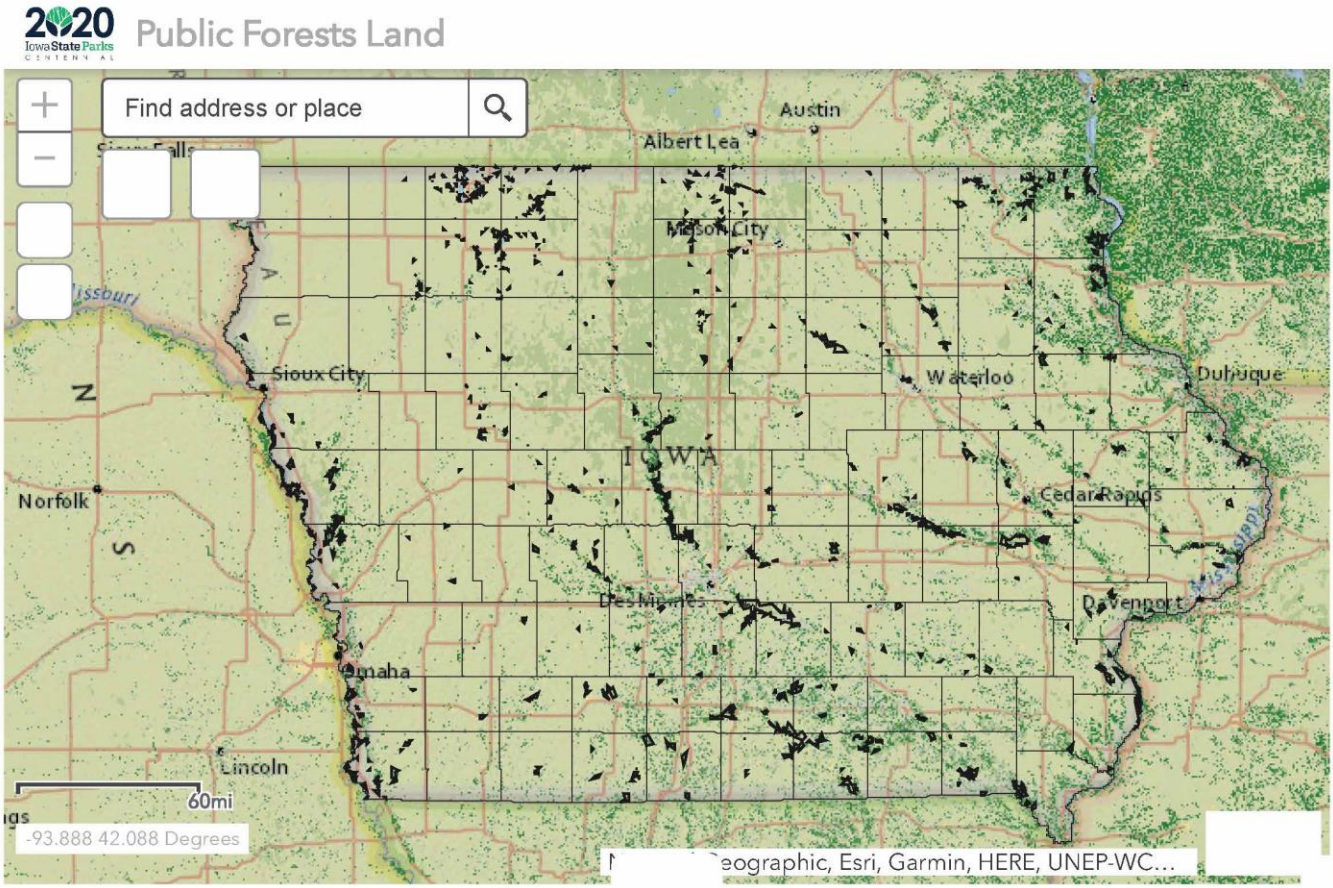
The U.S. Forest Service conducts a survey of woodland owners in each state every five years called the National Woodland Owners Survey (NWOS). The most recent 2018 NWOS data provides a picture of woodland owners in the state and their values and goals for their property. Through the NWOS 2018 (Butler, 2020) we know that 83% of family forest ownerships acquired their land through purchase with only 27% of land acquired through inheritance. The land that is acquired by new owners remains within a family about half of the time (55% of ownerships acquired from an individual outside of the family while 42% acquired the land from their parents). Of the family forest ownerships surveyed recently, 74% of owners are between the ages of 55 and 74 years old and 81% of the primary owners are male.

The NWOS also provides information about the priorities and concerns for forest landowners in Iowa. The top five reasons for owning forestland are, in increasing importance, privacy, water protection, nature protection, wildlife habitat, and beauty and scenery. More than 40% of forest landowners surveyed recreate on the land that they own, mostly with the owner and their spouse but also with children and friends. Popular recreation activities include hunting, hiking/walking, off-road vehicles, and fishing. Forest landowners surveyed are most concerned with keeping forestland intact, property taxes, and trespassing or poaching. When asked to rank conservation issues they most strongly agree with, forest landowners in Iowa selected keeping wooded land wooded, knowing the land, and having a strong emotional tie to the land.

Understanding more about the demographics, priorities and concerns of forest landowners in Iowa through resources like the National Woodland Owner Survey help to create land management strategies and resources to assist landowners.

The U.S. Forest Service has developed a useful dashboard that displays all data from the National Woodland Owner Survey.

Public Forest Land



Map showing the location of all public land used for conservation and recreation in Iowa.

Iowa has over 500 different State Parks, State Forests, and Wildlife Management Areas across the state managed by the Iowa DNR. These public lands usually are forested to some degree and total over 457,000 acres. Iowa DNR professionals actively manage these lands for recreation, wildlife, and hunting purposes.

Iowa's state forest system consists of four major and six smaller units totaling 43,917 acres and are managed for multiple benefits. The primary emphasis is on demonstrating good woodland management and providing forest products, wildlife habitat and a variety of outdoor recreational opportunities.

Iowa's Major State Forests

Loess Hills State Forest

Loess Hills State Forest is 11,484 acres in size. It is located in Harrison and Monona Counties in west central Iowa. It is the newest state forest with the first land acquired in 1986. Acquisition plans for the forest include a total size of 20,000 acres. This state forest offers a unique mixture of forests, savannas, and prairies on the steep and fragile Loess soils above the Missouri River.

Visitors will likely see active land management while hiking the nearly 75 miles of natural surface trails. Land management goals are aimed at preserving and restoring Iowa's rare and declining habitats including nearly 2,000 acres of remnant native prairie and 3,000 acres of bur oak forest. Staff frequently implement prescribed fire to assist in accomplishing preservation and restoration efforts. Common recreational activities include hiking, hunting, wildlife viewing, primitive camping and fishing. Please stop by the Brent S. Olson Memorial Visitor Center located in Pisgah, Iowa to view interpretive displays and to gather more information during your trip.

Shimek State Forest

Shimek State Forest is 9,412 acres in size. It is located in Lee and Van Buren Counties in Southeast Iowa. Shimek State Forest is one of the largest remaining single pieces of contiguous forest in Iowa. Its large unbroken tracts of oak-hickory forest mixed with nearly 650 acres of Civilian Conservation Corps planted pine stands make Shimek a truly unique natural resource.

Shimek State Forest is named in honor of Dr. Bohumil Shimek who was an early conservationist and head of the University of Iowa Botany Department. Shimek is a multiple use forest that incorporates forest management and recreational opportunities. The number one goal of Shimek is to manage the forest resource as a demonstration to all citizens.

Stephens State Forest

Stephens State Forest is 15,554 acres in size and covers the largest geographical area of any state forest. The forest is spread out over five counties in south-central and southeast Iowa: Lucas, Clarke, Monroe, Appanoose and Davis. Stephens State Forest offers a diversity of habitats and recreational opportunities.

Stephens State Forest serves Iowans as an example of active forest management with demonstration sites, research areas, and educational opportunities. A majority of the forest is upland oak timber that provides quality habitat for game and non-game wildlife. Large tracts of forest offer a wilderness feel with primitive, low impact recreational opportunities such as hunting, fishing, hiking, non-modern camping, and wildlife watching.

Yellow River State Forest

Yellow River State Forest is 8,850 acres in size and located in Allamakee County in far northeast Iowa. It is located in the beautiful Driftless Area landform region. This region consists of karst topography with shallow soils and bedrock formations that contain many sinkholes, springs and rock outcroppings. These unique features give rise to miles of clear running trout streams. Yellow River State Forest contains one of the largest contiguous blocks of forest in Iowa including many acres of oak/hickory and several stands of native white pine.

Iowa's Minor State Forests

There are six smaller state forests ranging in size from 34 to 314 acres. These are Backbone State Forest in Delaware County, White Pine Hollow State Forest in Dubuque County, Holst, Barkely, and Pilot Mound State Forests all in Boone County, and Gifford State Forest in Pottawattamie County.

Recreating in Iowa's Forestland

An excerpt from the 2018-2023 Statewide Comprehensive Outdoor Recreation Plan:

Benefits of Outdoor Recreation
Park and recreation areas are natural gathering places for people who like to spend time with family and enjoy the outdoors. Open spaces primarily offer protection for Iowa's plant and animal species through conservation or restoration of critical habitats, but also provide room for outdoor recreational pursuits. All areas contribute to environmental, physical, emotional and social well-being while bolstering local economies.

Environmental benefits: People with greater connection to the outdoors also support conservation and preservation of natural resources, contributing to a healthier environment through daily choices and actions.

Physical benefits: Walking, hiking, biking and other outdoor recreation activities keep Iowans active and healthy throughout their life.

Emotional benefits: Spending time outdoors, disconnected from technology, work and everyday tasks reduces stress and re-energizes us to take on the tasks of the day.

Social benefits: Natural Resource, parks and outdoor recreation areas are natural draws for people to come together

and spend time with family and friends. Many communities rely on these areas for festivals and events as hubs of social structure.

Economic benefits: People who participate in outdoor recreation contribute to their communities through local spending. Potential employees also make job choices based on the availability of close-to-home outdoor opportunities, such as Iowa's lakes, waterways and trails.

The Statewide Comprehensive Outdoor Recreation Plan in Iowa, provides a framework for outdoor recreation priorities and plans that will enhance Iowa's natural resources while contributing to the well-being and enjoyment of all Iowans. This document is updated every five years and the full document can be found on the Iowa DNR's website.

The interactive Iowa DNR Recreation Atlas can be found on the Iowa DNR's website. This Recreation Atlas displays all recreation areas in the state.

Trees Value to Wildlife

Trees play a vital role for Iowa's wildlife. They provide shelter, food, nesting locations, high perches to attract mates, protection from predators, safe and warm homes during the winter, and so much more. Trees also create less tangible benefits for wildlife such as shading streams to keep the water cool, adding organic matter back into the soil and water to grow more nutrient-rich food, mitigating floodwaters, and cooling the local air.

Wildlife also benefit trees. Small invertebrates like worms cycle organic matter throughout the topmost layer of soil, speeding the decomposition process to make important nutrients available.

Insects like bees and beetles pollinate flowers enabling the tree seed fertilization. Birds and mammals eat the fruit of trees and transport the seeds far away, increasing the tree's reproductive success.

Similar to this State Forest Action Plan, the Iowa Department of Natural Resources also has a 25-year strategy document for wildlife conservation, updated in 2015. Developed by a coalition of scientists, sportsmen and women, conservationists, and members of the public, this plan can help us protect wildlife and the places they live for future

generations. If the steps in the action plan are successfully carried out, Iowa will have cleaner water and air - a healthy environment for people and wildlife.

This State Forest Action Plan was created in close partnership with the Iowa Wildlife Action Plan. The Iowa Wildlife Action Plan, The Securing a Future for Fish and Wildlife: A Conservation Legacy for Iowans can be found on the Iowa DNR's website.

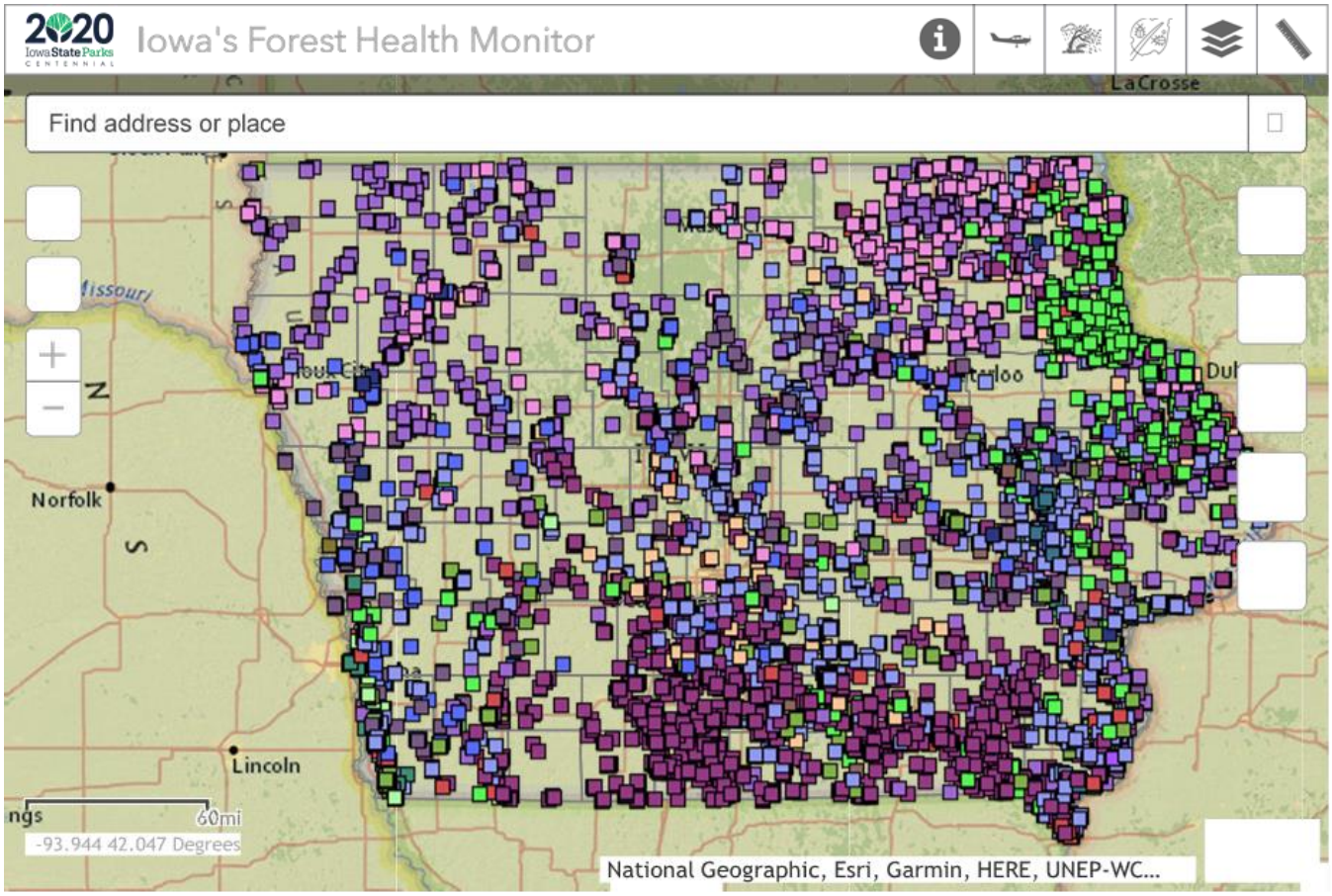
Forest Health

This section explores forest health within Iowa.

Contents:

- Forest Health Overview
- Gypsy Moth
- Emerald Ash Borer
- Bur Oak Blight
- Thousand Cankers Disease
- Asian Longhorned Beetle
- Invasive Plants
- Additional Pests
- Useful Links and Contacts

Forest Health Overview



Map showing current pest, disease, invasive plant, and other forest health information that is tracked across the state. The data are collected using field surveys, aerial surveys, and through remote detection to determine the spread of forest pests within the State of Iowa.

Forest health is a description of the overall condition and vigor of the trees in the forest. Many factors affect forest health and the tree's ability to tolerate stress. Generally, forest health issues are broken into two categories, biotic (living) and abiotic (non-living).

Biotic forest health issues are commonly separated into native and non-native organisms. Native insects and pathogens help recycle trees by breaking them down to simpler organic compounds that are usually beneficial. However, even the native insects and pathogens can go beyond the pest threshold and cause damage to the forest.

Non-native insects, diseases, and plants can compromise or kill a single tree species or multiple species. Uncontrolled native and non-native forest pests can cause significant economic and environmental harm. Other biotic impacts such as wildlife (e.g., deer browse), lack of forest management, lack of species diversity, and changes in land use can impact the overall long-term health of a forest ecosystem.

Here are some examples of abiotic issues: flooding, drought, wind, chemical damage, tornados, and climate change. Damage from these events may cause drastic immediate changes in the forest (e.g., natural disasters, storms), or can create an environment for pathogens that were once not an issue to become a key pest as the climate changes.

Proper forest management, forest diversity, pest monitoring, and pest control or eradication will help preserve Iowa's forests for future generations. For more information, see the yearly Forest Health Highlights that keeps landowners updated on the pests that the DNR is monitoring.

Gypsy Moth

Map from the Slow the Spread Program showing the progression of gypsy moth across the country and areas of active treatment to slow the spread.

Background

The gypsy moth (*Lymantria dispar*) is a European insect species introduced near Boston, MA in 1869 as an experiment to help provide silk for the textile industry. This exotic insect has continued to spread west defoliating native forests.

Establishment of gypsy moth in Iowa will affect the survival of mature trees. Larvae of this insect will feed on the leaves of over 300 host species during the important summer growing season, a time when a trees leaves are converting sunlight to energy. Repeated defoliation that occurs several years in a row on the same tree will deplete stored nutrients, leading to the tree's decline. Gypsy moths are monitored annually with detection trapping. Male moths are captured in detection traps, and isolated populations are treated to prevent the establishment of additional populations.

Gypsy moth larvae, Karla Salp, Washington State Department of Agriculture, Bugwood.org.jpg

Economic Impacts:

- The total estimated impact of gypsy moth to Iowa's forest landowners and wood products businesses is over $551 million, or an annualized loss of over $22 million in perpetuity for Iowa's economy.
- Other economic losses include non-timber products such as seed production, reduced wildlife habitat and a $6.8 billion loss of benefits from community trees including energy savings, property value, storm water retention, carbon sequestration, and tree removal and replacement costs. Communities and homeowners will bear the cost burden of removing dead trees caused by gypsy moths.
- The loss of oaks and other preferred tree species by gypsy moth will negatively impact the economic contribution of $1.5 billion that fish and wildlife recreation provides to Iowa's economy.

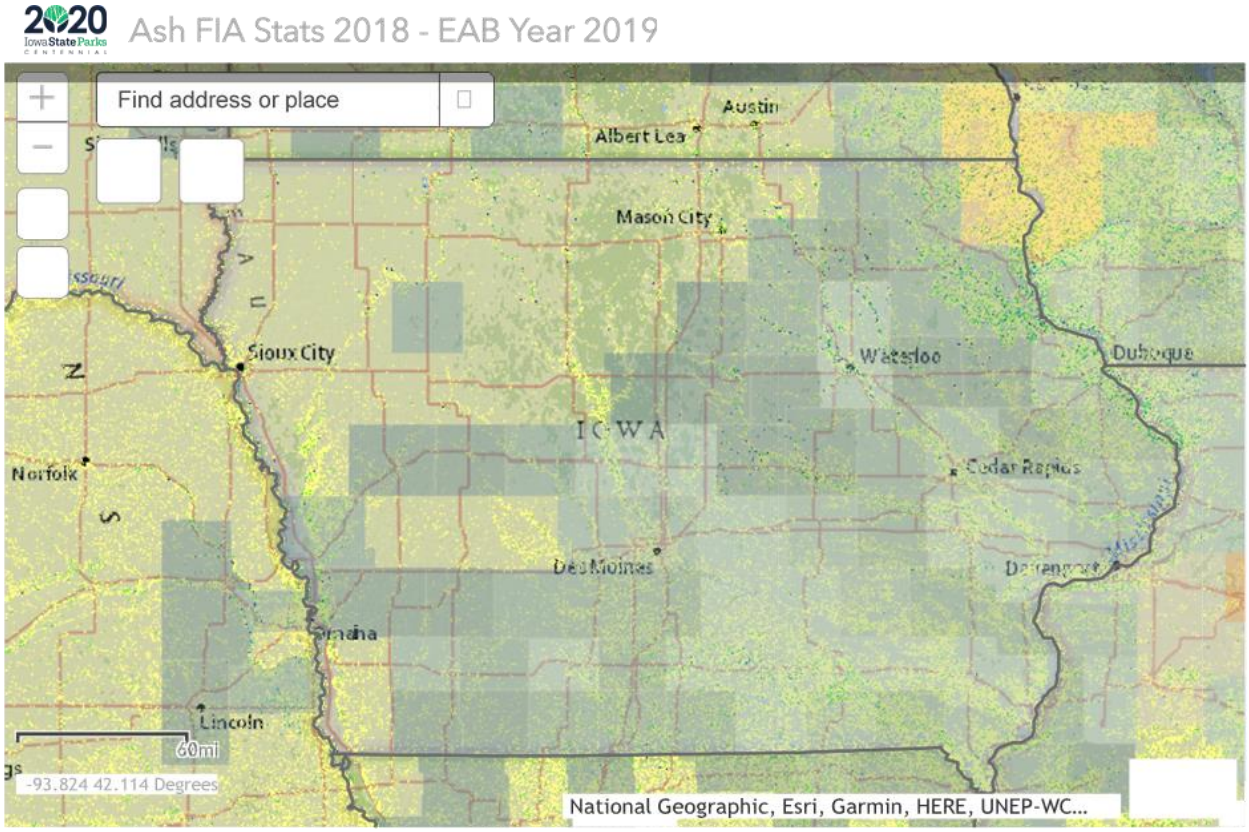
Wildlife Impacts:

Oak leaves are a preferred food source for gypsy moth caterpillars. Acorns produced by oaks are eaten by many species of birds and mammals. A reduction in the number of oak trees in Iowa's forests caused by repeated defoliation from gypsy moth caterpillars will affect a wide variety of game and non-game species of wildlife. A primary fall and winter food for deer is acorns, composing around 54% of a deer's yearly diet during years when acorn seeds are available - otherwise the next preference is corn.

Management Solution

Proper woodland and community tree management have critical roles in establishing healthy trees. The best insurance policy a landowner can have when managing their woodlands is to maintain a diversity of tree species, while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist are the best defenses against all forest health threats. Information about current treatment methods can be found at the Iowa Tree Pests webpage.

Emerald Ash Borer



Background

Emerald ash borer (EAB; *Agrilus planipennis*) is a small, green, invasive wood boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees feeding on leaves during the summer months. The larvae look similar to white grubs and feed on the living plant tissue (phloem and cambium) underneath the bark of ash trees. Trees are killed by the tunneling activity of larvae under the bark, which disrupts the flow of water and nutrients.

EAB is a highly invasive forest pest that has the potential to kill nearly 100 percent of the native ash trees of any size, age, or stage of health. Over 50 million ash trees outside of Iowa have been killed where EAB is present. Much of Iowa's forestland is populated with ash trees, and Iowa's community street trees are heavily planted with ash. The U.S. Forest Service 2019 inventory indicates that there are 52 million woodland ash trees (live trees at least 1 inch in diameter) and 3.1 million urban ash trees in Iowa. Trees attacked by EAB can die within two years. Once EAB-killed trees are discovered in a community, nearly all ash trees in that community will be dead in five to six years.

Emerald Ash Borer Feeding Gallery and Adult Insect, Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org.jpg

Economic Impacts

- The total impact of emerald ash borer to Iowa's forest landowners and wood products businesses is over $27 million to date, or an annualized loss of $1 million in perpetuity for Iowa's economy.
- Other economic losses include non-timber products such as reduced wildlife habitat, and over $4.1 billion in losses of community tree derived benefits such
- as energy savings, property value, storm water retention, carbon sequestration, and tree removal and replacement costs. Communities and homeowners will bear the cost burden of removing dead trees caused by EAB.

Wildlife Impacts

Ash has moderate importance to wildlife as a food source. Seeds are known to be eaten by wood ducks, finches, and cardinals.

Management Solution

Proper woodland and community tree management has a critical role in establishing healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species; while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have

a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats. Information about current treatment methods can be found at the Iowa Tree Pests webpage.

The map on the right is from the U.S. Forest Service Forest Inventory Analysis in 2018. This map is updated annually to show the spread of EAB across the country. For a more up to date source of information about EAB in Iowa, click on the link to be taken to the EAB Iowa Tree Pests page.

Bur Oak Blight

Background

Bur oak (*Quercus macrocarpa*) is common across Iowa. In 2019, bur oak ranked second among all tree species as measured in total sound volume (at least 5 inches in diameter) on forest land. Bur oak provides substantial value for wood products and is an important source of wildlife habitat and mast (acorns) to many wildlife species. Bur oak blight (BOB) is a newly named disease that can cause severe defoliation, leading to mortality of branches or entire trees. Bur oak blight is caused by an undescribed species of the fungus *Tubakia*.

- Based on reports of BOB to the Iowa State Plant Insect and Disease Clinic in 2016, 91 counties in Iowa reported the presence of the disease. Within these counties there were over 8.7 million bur oaks documented with BOB, out of Iowa's over 32 million bur oak trees. However, symptoms of the disease have been observed by DNR foresters across the state. Therefore, the number of bur oaks with this disease is likely higher than what was diagnosed in 2016 by Iowa State.

Economic Impacts

- The total impact of BOB to Iowa's forest landowners and wood products businesses is more than $19 million to date, or an annualized loss of close to $770,000 in perpetuity for Iowa's economy.
- Other economic losses include non-timber products like nut production, reduced wildlife habitat and a $964

million loss of community tree derived benefits such as energy savings, property value, storm water retention, carbon sequestration and tree removal and replacement costs. Communities and homeowners will bear the cost burden of removing dead trees caused by BOB.

- The loss of bur oak within the oak-hickory forest type will negatively impact the economic contribution of $1.5 billion that fish and wildlife recreation provides to Iowa's economy.

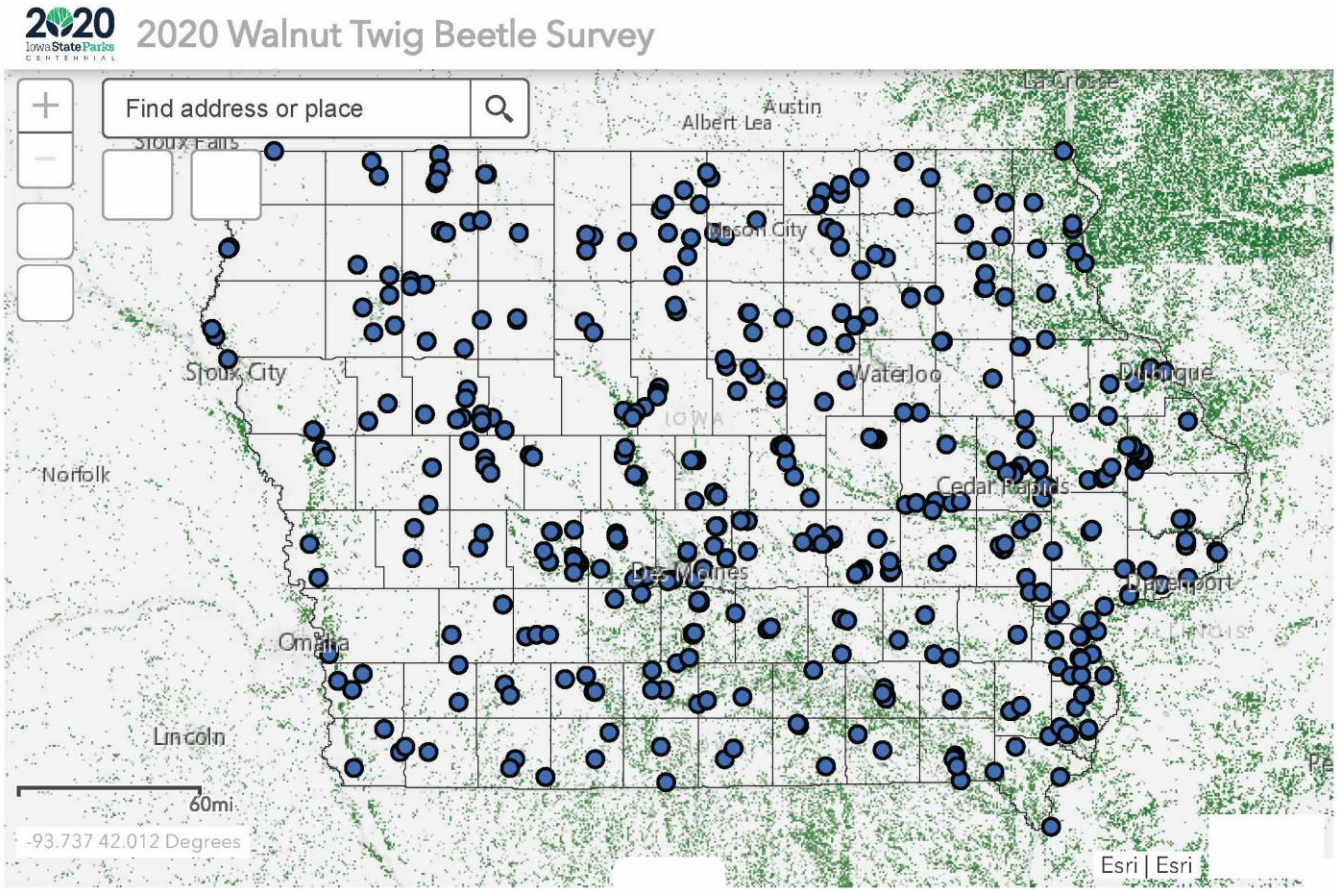
Wildlife Impacts

Acorns produced by bur oaks are eaten by many species of birds and mammals. A reduction in the number of bur oak trees in Iowa's forests caused by bur oak blight will affect a wide variety of wildlife species. A primary fall and winter food for deer is acorns, composing around 54 percent of a deer's yearly diet during years acorn seed is available - otherwise the next preference is corn.

Management Solution

Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species; while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats.

Thousand Cankers Disease of Black Walnut



Map showing the annual Walnut Twig Beetle Survey conducted in Iowa. The blue dots show trapping locations across the state.

Background

Since the 1990s, black walnut (*Juglans nigra*) has been dying in the Western U.S. The deaths are caused by a walnut twig beetle (*Pityophthorus juglandis*) that carries a fungus (*Geosmithia morbida*) which is spread as the beetle tunnels through tree tissues. The insect disease complex has been named thousand cankers disease (TCD).

The introduction of TCD into Iowa would have disastrous effects economically to the wood industry in the state and the

rest of the nation. Iowa has the third largest volume (979 million board feet) of saw log-size black walnut in the world. Some experts believe that TCD has the potential to decimate black walnut in the same ways Dutch elm disease, emerald ash borer, and chestnut blight have destroyed their respective hosts.

Walnut Twig Beetle, Steven Valley, Oregon Department of Agriculture, Bugwood.org.jpg

Economic Impacts

- The estimated total impact of TCD to Iowa's forest landowners and wood products businesses is more than $547 million to date, or an annualized loss of $43 million in perpetuity for Iowa's economy.
- Other economic losses would include non-timber products like nut production, reduced wildlife habitat, and $1.3 billion in losses of benefits derived from community trees including energy savings, property value, storm water retention, carbon sequestration, and tree removal and replacement costs. Communities and homeowners will bear the cost burden of removing dead trees caused by TCD.

Wildlife Impacts

Black walnut has moderate importance to wildlife as a food source. Seeds are eaten by woodpeckers, foxes, and squirrels.

Thousand Cankers Disease Symptoms, Troy Kimoto, Canadian Food Inspection Agency, Bugwood.org.jpg

Management Solution
Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance policy a landowner can have when managing their woodlands is by maintaining a diversity of tree species; while ensuring an appropriate number of trees are growing on each acre. The best course of action for communities is to have a tree inventory and a community tree resource plan. Good woodland and tree care under the direction of a forester or an arborist is the best defense against all forest health threats. Information about current treatment methods can be found at the Iowa Tree Pests webpage.

Asian Longhorned Beetle

Background
Asian Longhorned Beetle (ALB) is an exotic pest native to China. The larva of this beetle kills trees by tunneling through the tree, which girdles stems and branches, cutting off the flow of nutrients and water.

ALB most likely traveled to the United States inside wood packaging materials from China. It has been intercepted at various ports of entry and warehouses throughout the country. In the United States the beetle prefers to attack maple species (*Acer* spp.), such as: boxelder, sugar, Norway, silver and red. In high concentrations, or if there is not enough maple present, ALB will also attack birch, elm, horsechestnut, and Ohio buckeye. It occasionally attacks ash, London planetree, mimosa, poplar, and European mountain ash.

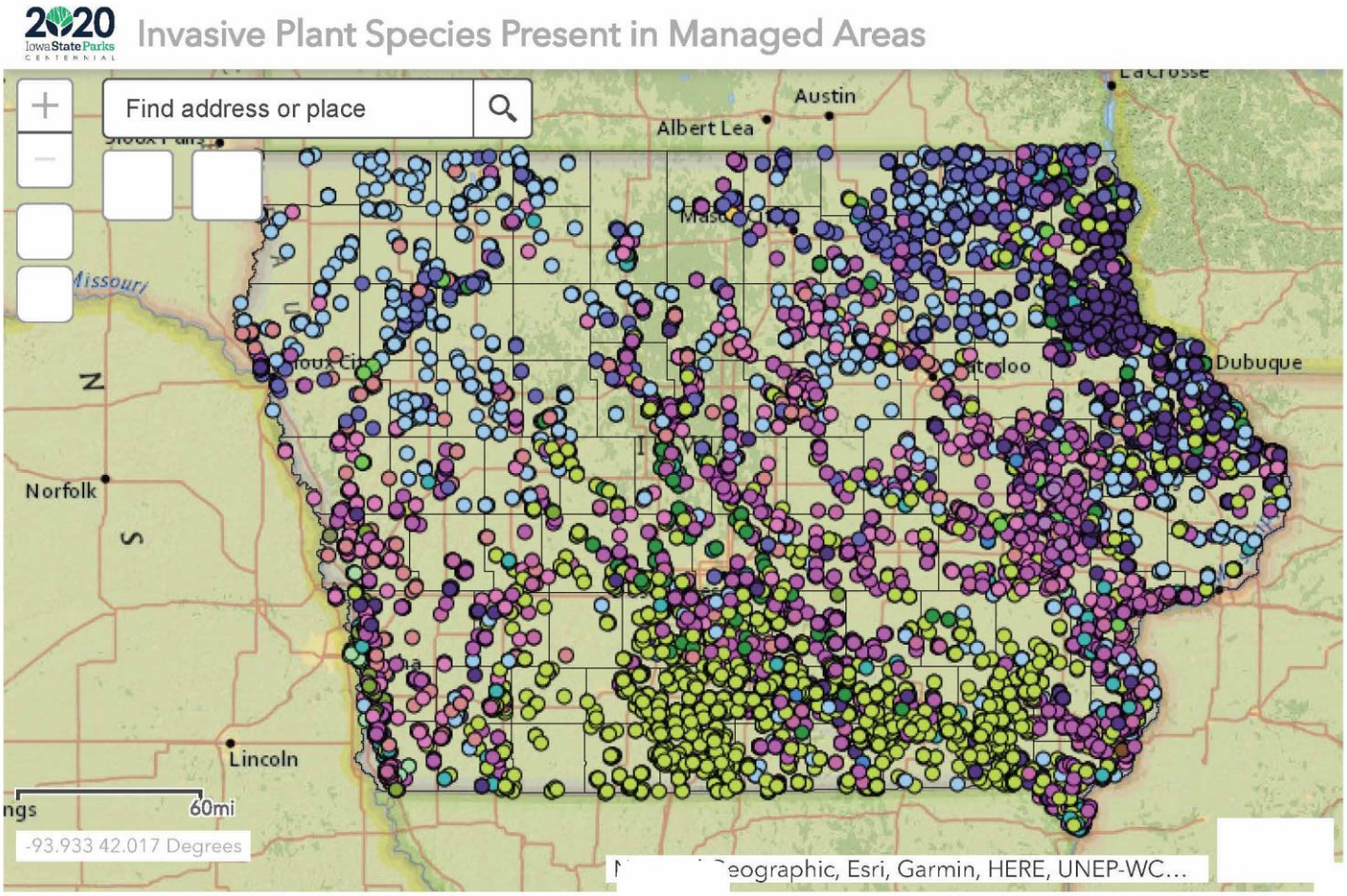
Maple, the beetle's host of choice, is a tree extremely common in urban settings. An infestation of ALB would be devastating for many communities throughout Iowa. However, with monitoring ALB can be detected early and eradicated.

Economic Impacts
- The total economic impacts of ALB to Iowa's forest landowners and wood products industry is over $222 million to date.
- Other economic losses would include non-timber products such as reduced wildlife habitat as well at a cost of nearly $13 billion to communities in lost benefits like energy savings, property value, storm water retention, and carbon sequestration. Communities and homeowners will bear the brunt of the cost burden for removing dead trees cause by ALB.

Wildlife Impacts
Maple trees have moderate importance to wildlife as cover and food. Seeds are eaten by birds and small mammals and the buds are eaten by birds, squirrels and deer. The trees are used for nesting sites by many birds.

Management Solutions
Proper woodland and community tree management have a critical role in creating healthy trees. The best insurance a landowner can have when managing their woodlands is to maintain a diversity of tree species; while ensuring an appropriate number of trees are growing on each acre. The best management plan for communities is to create diversity by not having more than 10 percent of any one species represented. These simple management plans provide the best defense against emerging forest health threats. Information about current treatment methods can be found at the Iowa Tree Pests webpage.

Invasive Plants



Map showing known locations of non-native invasive forest plants that the Iowa DNR tracks. More details about several plants can be found at www.iowadnr.gov/invasive.

Plants introduced into areas where they do not naturally occur are considered alien, exotic, or non-native. They are carried in by animals, and on vehicles, ships, commercial goods, produce, and even clothing. Non-native species have been used to prevent erosion, as ornamental plants, and as forage. Occasionally, an alien organism flourishes, quickly dominating its new surroundings. The terms “invasive” or “nuisance” are used to describe such species. New environments may affect rates of reproduction, susceptibility to disease, and other features that can impact a species’ success. Consequently, a plant or animal that causes little damage to agriculture or natural ecosystems in one area may cause significant problems in another.

Certain introduced species are very successful in their new habitats because they out-compete native plants or animals, and have no natural controls (e.g., predators, diseases, etc.) in the new area. At least 200 well-known, high-impact alien

species currently exist in the United States. They range from nuisances like crabgrass, dandelions, and German cockroaches, to species annually costing millions of dollars to agriculture and forestry, such as the European gypsy moth.

Additional Pests

Several other pests are monitored throughout Iowa but are not classified as key or emerging threats to our forests at this time. Information about other pests and diseases that are being monitored can be found in the Iowa's Forest Health Highlights document, which is updated annually.

If you see a pest that is not listed here or in the Forest Health Highlights, please contact either the Iowa DNR Forest Health Specialist Tivon Feeley or the Iowa State University Plant and Insect Diagnostic Clinic.

Useful Links and Contacts

The Iowa DNR Forest Health program is lead by:
Tivon Feeley tivon.feeley@dnr.iowa.gov 515-725-8453

- Iowa Department of Natural Resources Forestry Section Forest: https://www.iowadnr.gov/programs-services/forestry-resources/forest-tree-health
- Iowa Department of Natural Resources Emerald Ash Borer: http://www.iowadnr.gov/EAB
- Iowa Department of Natural Resources Urban Forestry: https://www.iowadnr.gov/programs-services/forestry-resources/urban-forestry
- Iowa Department of Natural Resources Landowner Assistance: https://www.iowadnr.gov/programs-services/forestry-resources/forestry-landowner-assistance
- Iowa Department of Agriculture and Land Stewardship Tree Health: http://iowatreepests.com/
- Iowa State University's Pest Management and the Environment: http://www.extension.iastate.edu/pme/
- The Iowa State University Plant Disease Clinic: phone number 515-294-0581, https://hortnews.extension.iastate.edu/pidc
- National Invasive Species Information Center: http://www.invasivespeciesinfo.gov/
- Emerald Ash Borer General Information: http://www.emeraldashborer.info/
- General Pest Information: http://www.aphis.usda.gov/

Urban and Community Forestry

This section explores urban and community forestry within Iowa.

Contents:

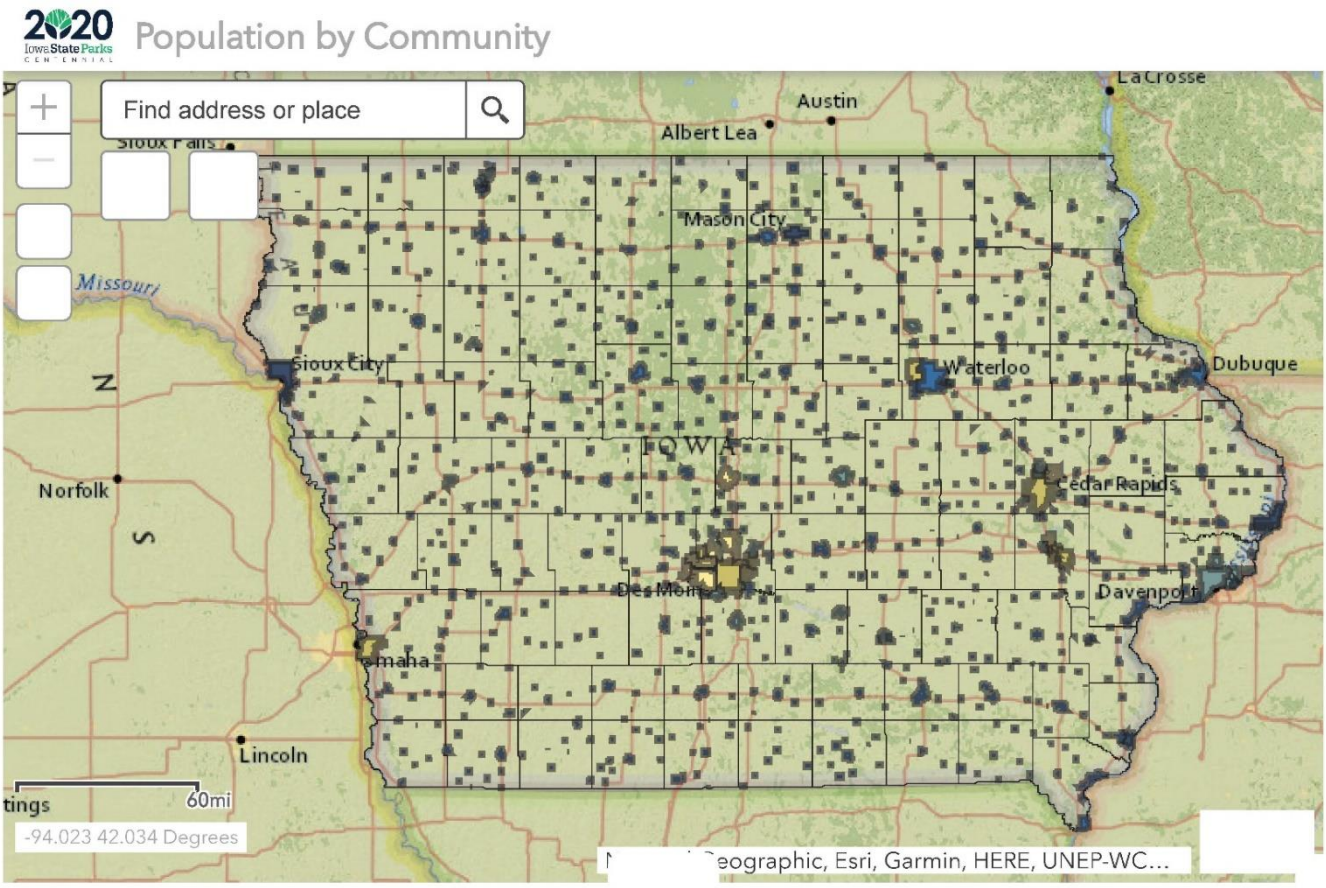
- Urban Forests
- Population of Iowa
- Tree Cover
- Managing the Urban Forest Resource
- Natural Resources
- Development of the Urban Rural Interface
- Partners
- Threats to the Urban Forest
- Urban Forest Priority Areas

Urban and Community Forests

Urban Forests are trees in towns, cities, suburbs or neighborhoods. Urban Forests come in many shapes and sizes including large natural woodlands, parks, street trees, neighborhoods, gardens to yards. They are composed of both private and public ownership. In Iowa, it is estimated that there are about 253,056 acres of urban forests.

Urban Forests are dynamic ecosystems that provide vast environmental, economic and social benefits. They help to clean air, slow and filter stormwater, provide animal habitat, and conserve energy. They increase property values, supply renewable wood products, and provide jobs. Urban forests beautify our communities, lower crime, provide places to recreate and improve our mental and physical health. In Iowa 64% of people live in urban areas. While forests provide benefit regardless of location, benefits can be maximized within close proximity of people. For example, forests clean the surface water we drink, reduce energy use by shading our homes, and lower stress by providing green space outside of our window.

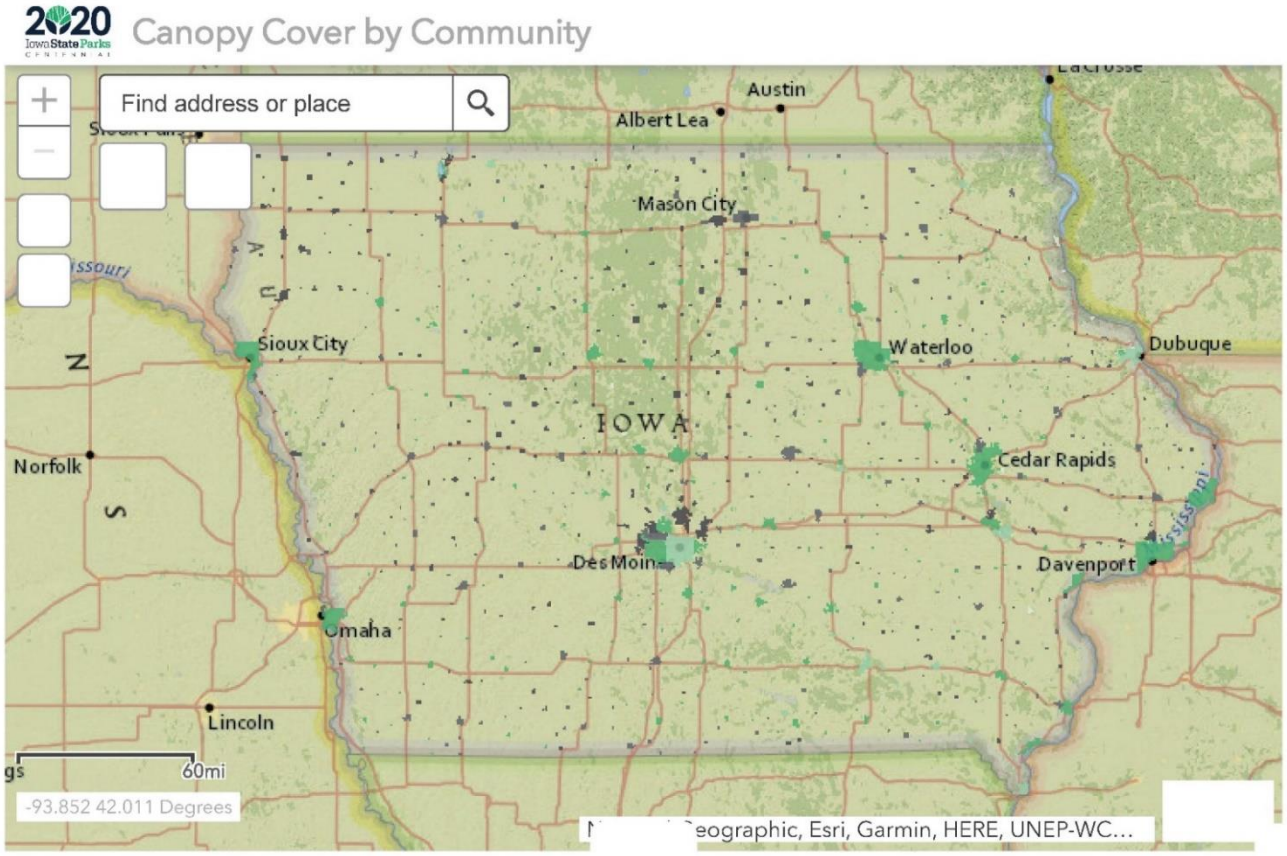
Population of Iowa



Iowa's population in the 2010 census was 3,046,455. The population has been increasing slowly. The 1990 population was 2,776,755 and 2,927,147 in 2000. The growth has not been uniform throughout the state. The map depicts population change with the lightest being the least cumulative population change and the darkest blue the most change for both county and incorporated communities.

For an interactive population dashboard with more details on population trends in Iowa visit the Iowa DNR's website.

Tree Cover



Map showing the percent canopy in each incorporated community (2009).

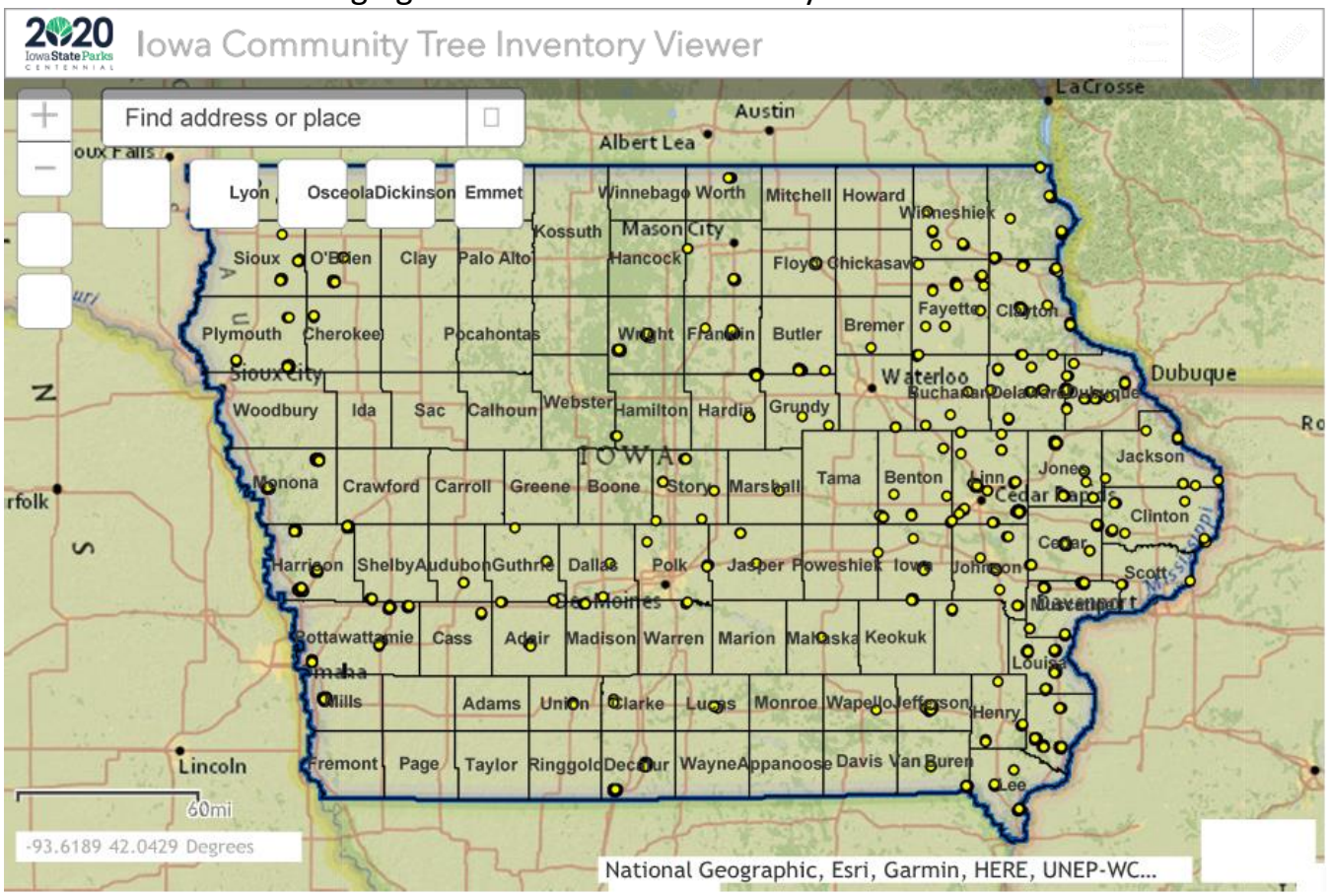
Urban tree canopy, defined as the layer of leaves, branches and stems in a community that cover the ground when viewed from above, is a simple way for a community to get an overall picture of both residential and public trees. Canopy benefits community residents by cleaning air and water, reducing energy costs and increasing property value. Urban tree canopy cover assessments can increase these benefits by providing a foundation of data from which to base improvement goals.

The State of Iowa ranked 10th in the nation for urban and community tree canopy loss in a recent Forest Service study (Nowak, 2018). Since most communities are just beginning to see the impacts of Emerald Ash Borer (EAB) and the data compiled for this study was collected in past years, very little of the loss can be attributed to EAB. When canopy loss from EAB is recognized, Iowa is poised to face a devastating increase in tree canopy loss. In addition to these complicated tree loss issues, Iowa is a state that suffers from poor water quality, and we have a need to act immediately to strategically increase canopy cover.

In partnership with the Iowa Urban Tree Council the state has set a goal to increase canopy cover by 3% by 2050; this means in addition to replacing normal tree loss we need to plant an additional 3 million community trees. Three million trees roughly equates to one tree for every person in the state.

Urban Planting Priority Areas: To meet these goals, planting priorities for the state have been established by using a weighted scale using tree cover, impervious surface, and population. The map in the next section depicts medium priority in yellow and high priority in red.

Understanding canopy cover and equity of urban tree canopy cover in Iowa is important as we work within the field of environmental justice. This is a complex field and cannot be depicted fully in a map, however below are some starting points depicting the relationship of Canopy Cover and Iowans in Poverty and Canopy Cover and Non-White Iowans with iTree Landscape data.



The Department of Natural Resources Iowa Urban and Community Forestry (IUCF) program provides technical, educational and financial assistance to communities, individuals and organizations. Program activities result in improved awareness of urban forestry and the benefits of managing for a sustainable and healthy natural resource. With 64 percent of Iowa's population in urban areas (census defined as over 2,500 people), there are strong environmental, social, and economic cases to be made for the conservation of green spaces to guide growth and revitalize city centers and older suburbs. IUCF responds to the needs of urban areas by maintaining, restoring, and improving urban forest ecosystems. The IUCF program combines federal, state, and other funds to provide support and technical assistance to over 350 Iowa communities annually. Grants are offered to communities throughout the state to increase tree canopy and improve urban forest resources. Partnerships with cities, counties and non-profit organizations enhance and broaden the impact of the IUCF program.

One way to maximize benefits is through establishing an urban forest management plan. Management plans and the information gathered through an urban forestry inventory provide the tools to move from a reactive position of responding to storm damage, invasive pests such as emerald ash borer (EAB), and other catastrophes after they occur, to a proactive position where it can potentially minimize the harm these events are capable of before they happen. The Iowa DNR, in cooperation with Iowa forestry professionals and USDA Forest Service, conducts inventories and completes management plans for Iowa communities of 5,000 residents or less on an ongoing basis. Inventories are depicted on the interactive map. Zoom in on a community to see the community forest and information about individual trees.

Some large communities have their own tree inventory viewer: Ames, Burlington, Cedar Rapids, Des Moines, and Iowa City.

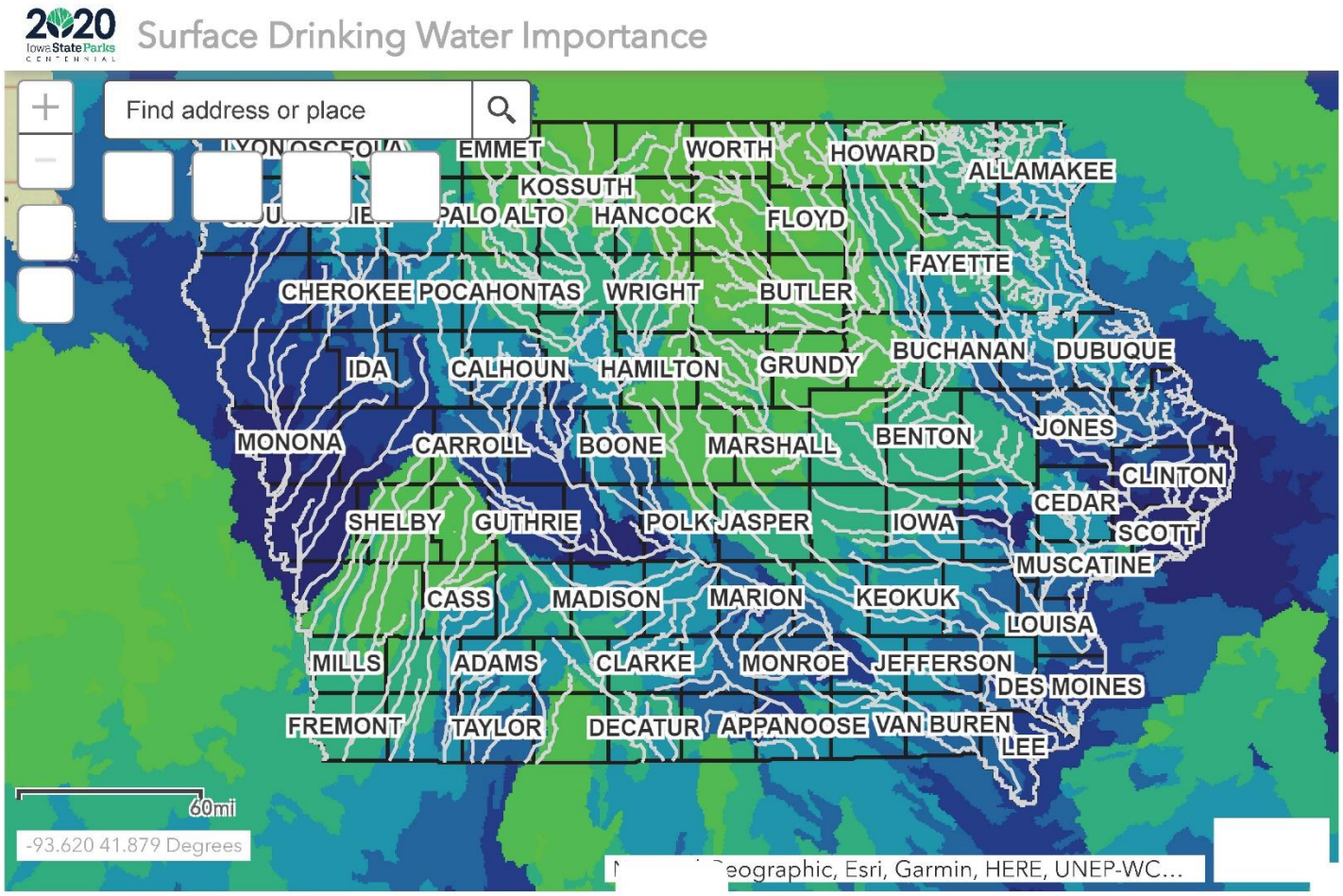
The Iowa DNR IUCF program is a partner with The Arbor Day Foundation on the Tree City USA, Tree Campus USA and Tree Line USA recognition programs with the goal to enhance Iowa's Urban Forests. To be recognized communities, campuses or utilities must meet core standards aimed to promote healthy urban forests. Click the following link for a

map showing Iowa's Tree City USA communities, Tree City and Tree Campus.

Tree Line USA includes: Alliant Energy, ITC Midwest, MidAmerican Energy, and Waverly Utilities

Another gauge of urban forest management is the USDA Forest Service Community Forest Accomplishment Reporting System. The goal is to capture urban and community forestry participation using 4 criteria: an active forest management plan, professional forestry staff, ordinances or policies that focus on planting, protecting and maintaining their urban and community trees and forests, and advisory organization. Additionally, it captures if state assistance was provided to the community. Developing programs have between one and three of the criteria, while managing programs have all four. Last year Iowa had 270 communities developing, 28 communities managing and 358 communities were provided assistance.

Natural Resources



Water Quality - Trees slow rainwater runoff, allowing for more canopy interception and infiltration into the soil and ground water recharge. This decreases the amount of runoff and lowers the frequency of local stream flash flood and streambank erosion. Trees are vital to providing good soil health. Economic analysis is needed to compare the costs of stormwater runoff to the costs of green infrastructure to give stakeholders, city planners and engineers a more complete picture of the overall benefits of maintaining a healthy urban forest canopy. In Iowa 2,095,059 people are ground water consumers from 2,786 intakes and 972,748 people are surface water consumers from 189 intakes. The map on the right show the Surface Drinking Water Importance Index from the USDA

Forest Service *National Forests to Faucets* 2.0 Assessment. More information on water quality can be found in the Looking to the Future section.

Air Quality - There are many communities in the region that have reduced air quality because of emissions from a variety

of sources. More trees are needed to address air quality concerns, improve aesthetics and sequester carbon from the variety of polluting sources found within communities. Trees remove particulate matter from the atmosphere as well. These small particles are a major health hazard in air pollution that increase respiratory disease. A map of daily air quality from monitoring stations across the United States and the national forecast can be found in the Looking to the Future section.

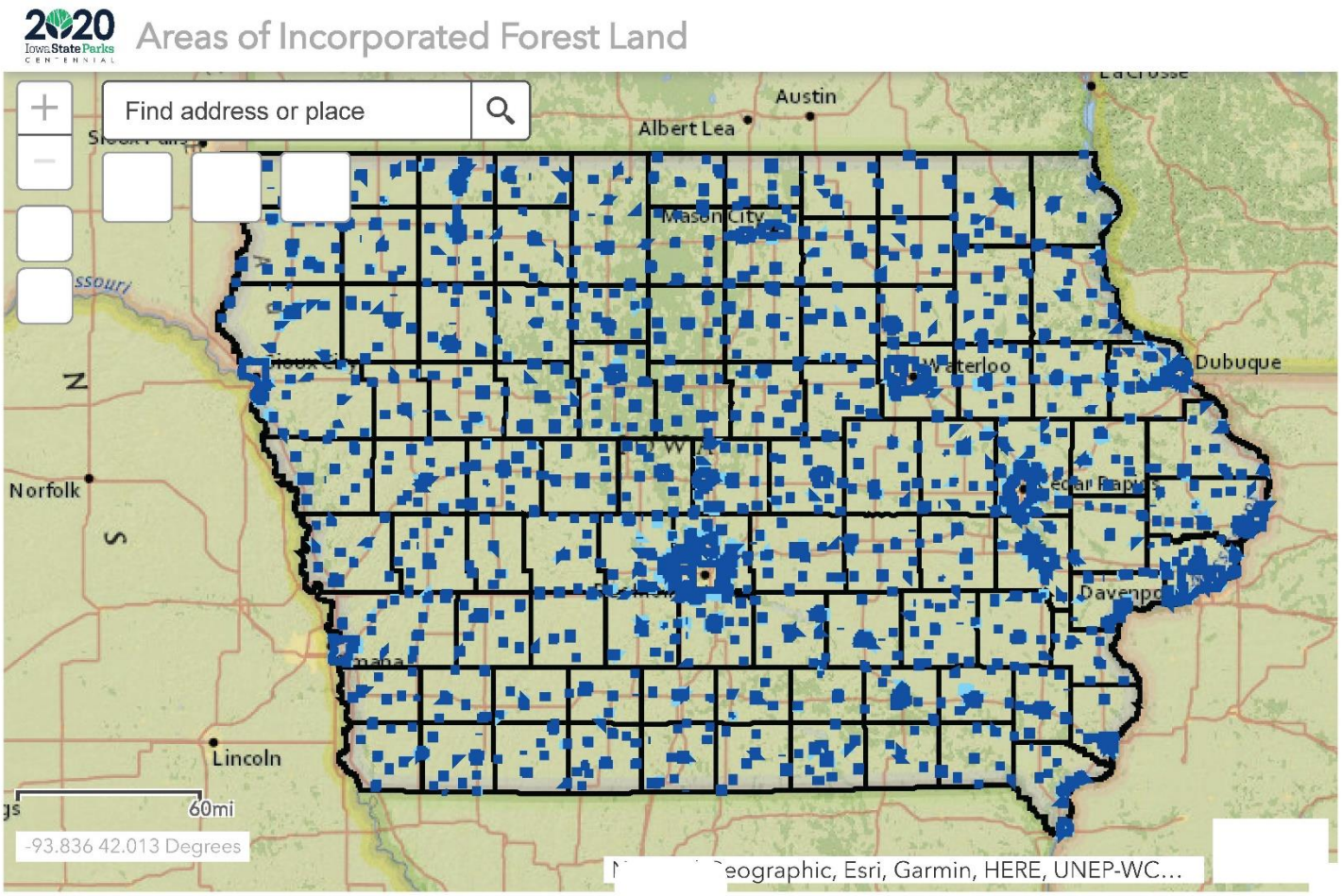
Reduced Emissions and Energy Consumption - Trees reduce energy demands throughout the year. Trees reduce the need for energy for both heating and cooling. This means less fossil fuels are used in turn reducing carbon dioxide emissions. Trees store carbon as well. Using urban wood for long lived products allows that carbon to be stored and not released back into the atmosphere. Heat islands occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. The effects of the urban heat island and its higher temperatures can increase energy costs, air pollution levels, and heat-related illness and mortality. More information can be found in the Looking to the Future section.

Products and Wood Use **-** Wood is an abundant, renewable resource, however this is not the case for many communities' trees. According to the Urban Wood Network the US could utilize nearly 4 billion board feet annually to cushion local economies, reduce expenses for communities, and provide a sustainable, renewable resource to beautify our homes and neighborhoods.

Outdoor Recreation - Trees provide natural beauty within a community that enhances the experiences of the people in the area. Trees improves mental health and social cohesiveness and well-being. The number of trees strongly predicts the amount of time spent outdoors and increase recreation.

Wildlife Habitat and Species of Greatest Conservation Need - protecting and creating wildlife habitat in our communities is critical to wildlife conservation. Urban habitat can connect people with nature which broadens the support for conservation. Urban forests are needed to connect green space, to feed, and to provide homes for all types of wildlife.

Development of the Urban-Rural Interface



Urban areas, like population, have had an increase in land area over the last ten years. These added areas both contain existing forest land at risk of development, as well as potential to convert nonforest land to urban forests. Forest Resource and Analysis data for the state estimate a net loss of 3% of Iowa's Forests. Of that 3% loss, 4% of was due to development, however there was a 6% forest gain from development in that same 5 years.

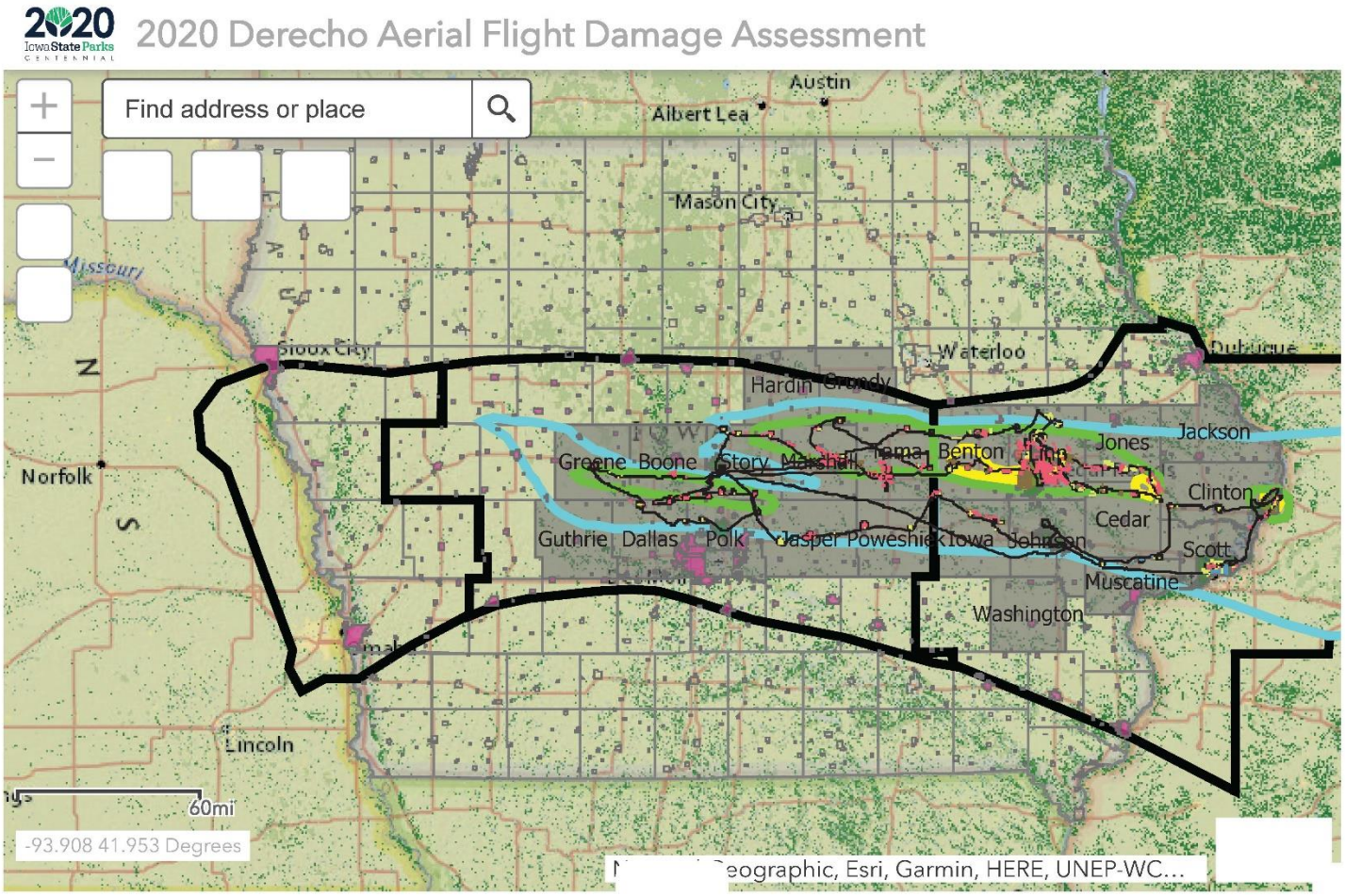
The map shows the changes in incorporated community boundaries from 2000 to 2010 and tree cover within those incorporated areas. These areas are both at risk of forest loss and have large planting potential.

These growing areas in the urban-rural interface do have risk of wildfire. To learn more about the Community Wildfire Protection Plan visit the Fire Program section of this Action Plan.

Partners

Partnership is a key component of urban and community forest management. From the community volunteer, private tree boards, nonprofit organizations, cooperate partners, and governmental agencies, joint goals of improving the urban forest are key. Some nonprofit partners include:

- Trees Forever
- Iowa Urban Tree Council
- Arbor Day Foundation
- Vibrant Cities Lab
- Iowa Arborist Association
- International Society of Arboriculture
- Society of Municipal Arborists
- American Forests



There are many pressures on the urban forest. Some of these pressures threaten the urban forest or their associated benefits. Here are some of the top threats to Iowa's urban forest:

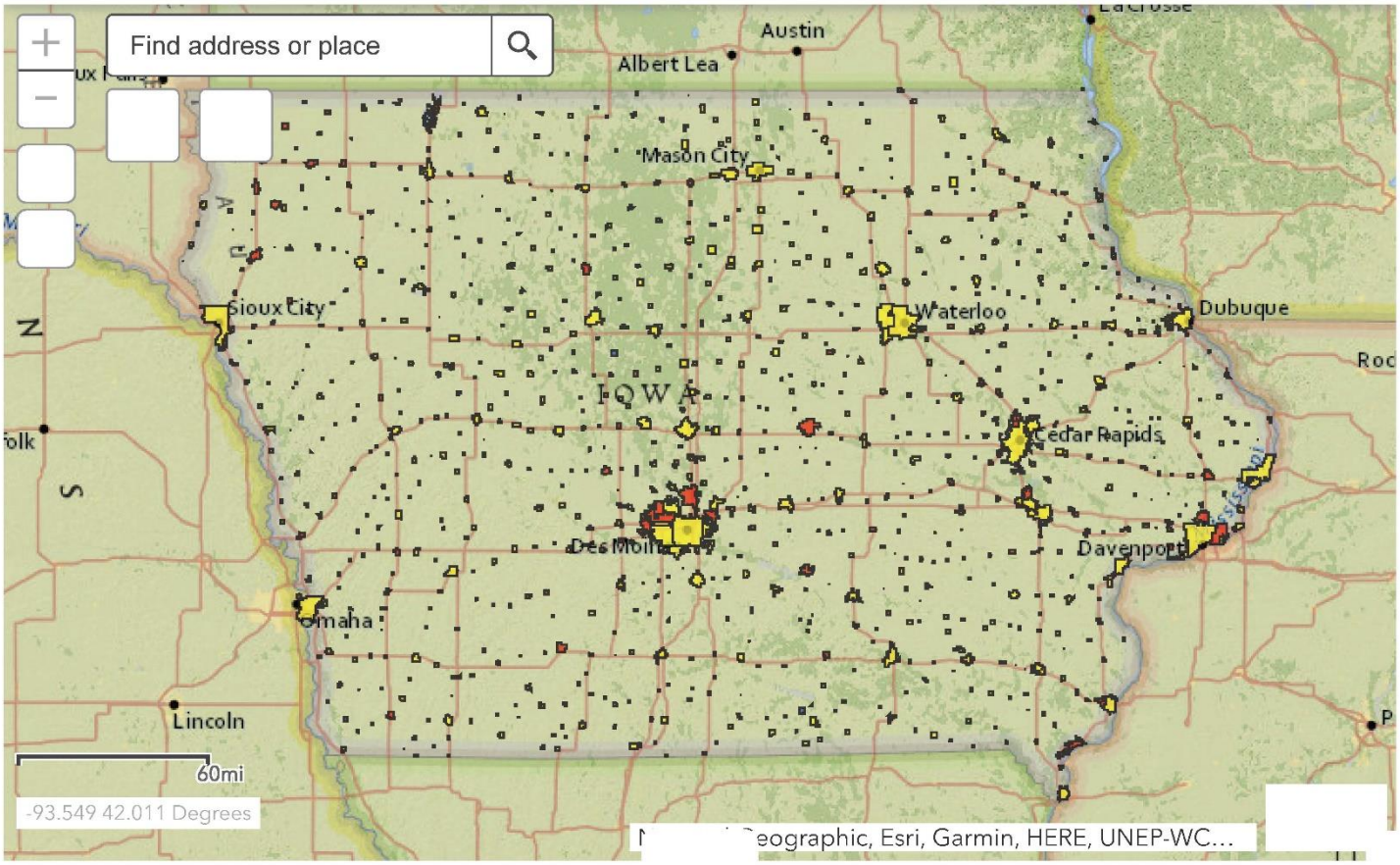
Canopy cover loss

- Changing climate - for more information visit the Looking to the Future section of this Action Plan.
- Flooding and other natural disasters - the map depicts the 2020 derecho.

Forest fragmentations and parcelization

- Insufficient availability of professional forestry technical assistance
- Lack of awareness of the value trees provide
- Lack of forest diversity Lack of forestry education
- Lack of funding for urban forestry programs
- Lack of locally adapted landscape nursery stock
- Lack of management within the urban forest resource
- Lack of policies or laws to encourage better management of forest land
- Non-native insects, diseases, and plants
- Pollution
- Wildfire

Urban Forest Priority Areas



The map depicts the urban forest priority areas. This map is a composite map using the following factors: Tree City participation, source water, percent canopy cover, population, and impervious surface. The point is not to draw the focus away from other areas but to provide more attention and resources to these communities.

Private Lands Forestry

This section explores forest stewardship, forest management strategies, the Forest Reserve Program and the Forest Legacy Program within Iowa

Contents:

- Forest Stewardship in Iowa
- Iowa's Forest Types
- Forestry Landowner Assistance
- Forest Management Plans
- Cost Share Programs for Forest Development and Management
- Iowa's Resource Enhancement and Protection (REAP) Fund
- Forest Stewardship Program Priority Lands
- Private Land Partners
- Forest Reserve Program
- Forest Legacy & Assessment of Need
- Multi-State Priority Areas & Partnerships

Forest Stewardship in Iowa

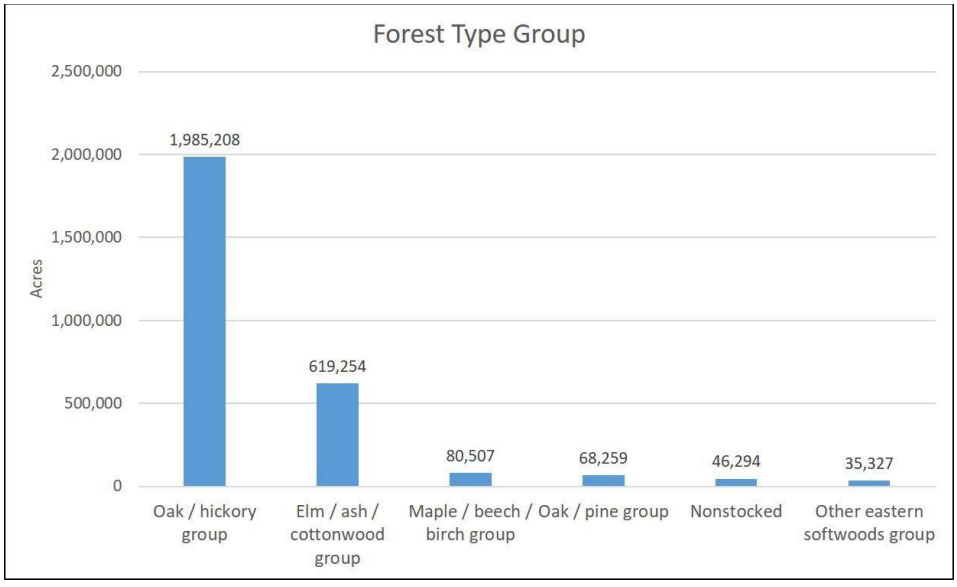
The Forest Stewardship Program connects Iowa's 138,000 private woodland owners with professional foresters to help them meet management goals on their properties while addressing critical issues including wildlife habitat, biodiversity, watershed protection, declining songbirds and pollinators, and Iowa's rural economy.

Privately owned family forests comprise over 85% of Iowa's forest resource - nearly 2.5 million acres. Iowa's privately owned forests can harbor over 300 unique plant species and provide habitat to over 150 wildlife Species of Greatest Conservation Need. They are some of the richest intact ecosystems

remaining in Iowa. Privately owned family forests in Iowa store 146 million tons of carbon (U.S. Forest Service FIA data), intercept 2.3 million ac-ft of rainfall annually (total acres of private forest land multiplied by average annual rainfall), and protect over 4,000 miles of stream banks through the Natural Resources Conservation Service's Conservation Restoration Program Riparian Buffer program (this estimation is based on the number of acres in the NRCS CP22 Riparian Forest Buffer program and is under representative of the total number of stream banks protected by trees and forests in Iowa).

Iowa's Forest Types

According to the U.S. Forest Service, Iowa has approximately 2,875,700 acres of forestland, which equates to about 8% of the state. Trees outside of forests, primarily along fencerows and streams, account for an additional 1 million acres (USDA Forest Service, Forest of Iowa, 2018). U.S. Forest Service Forest Inventory Analysis (FIA) data suggests approximately 69% of Iowa's forests (1,985,208 acres) are oak/hickory forest type with elm/ash/cottonwood in a distant second at 22%. A canopy consisting mostly of oaks (red and white subgroups) as well as hickory species characterizes the oak/hickory forest type. Common species found in this forest type group are red oak (*Quercus rubra*), white oak (*Quercus alba*), bur oak (*Quercus macrocarpa*), shagbark hickory (*Carya ovata*), bitternut hickory (*Carya cordiformis*), and shellbark hickory *(Carya laciniosa*). Dozens of other species can be found in these ecosystems including maples, black cherry (*Prunus virginiana*), basswood (*Tilia americana*) and many more. Oak/hickory forest types are often some of the most diverse forest ecosystems for both plants and animals.

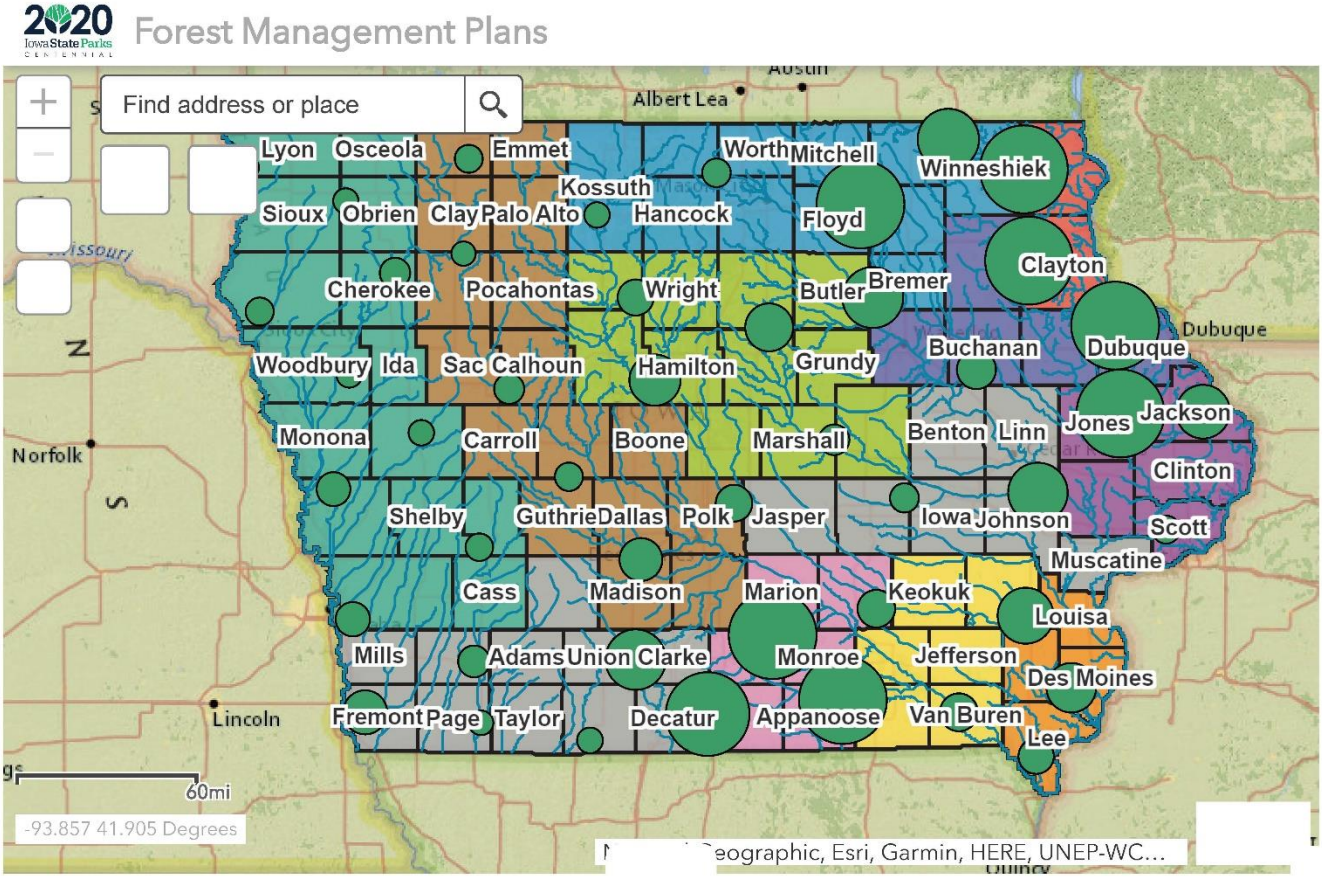


Forest Type Group 2019, U.S. Forest Service Forest Inventory Analysis

Over the past several decades, DNR Foresters and other natural resource professionals have noticed a decline in the number of oak/hickory forests in Iowa. A considerable amount of these ecosystems are transitioning to more shade tolerant species such as maple, basswood, and ironwood. This shift is likely due to lack of burning, a natural process integral to the oak/hickory forest type. Prescribed burns aid natural oak regeneration while also keeping shade tolerant, and thinner barked, species from gaining dominance in the ecosystem. The decline of oak/hickory forest types has also negatively affected wildlife populations as their preferred food source becomes scarcer (McShea, 2007).

Active management of forests in Iowa help to restore oak/hickory forest types. Prescribed burning, crop tree release, timber stand improvement and other forestry practices promote natural regeneration of oaks and hickories. Iowa DNR Foresters and other natural resource professionals highly encourage active management of forests in Iowa to maintain the oak/hickory forest type.

Forestry Landowner Assistance

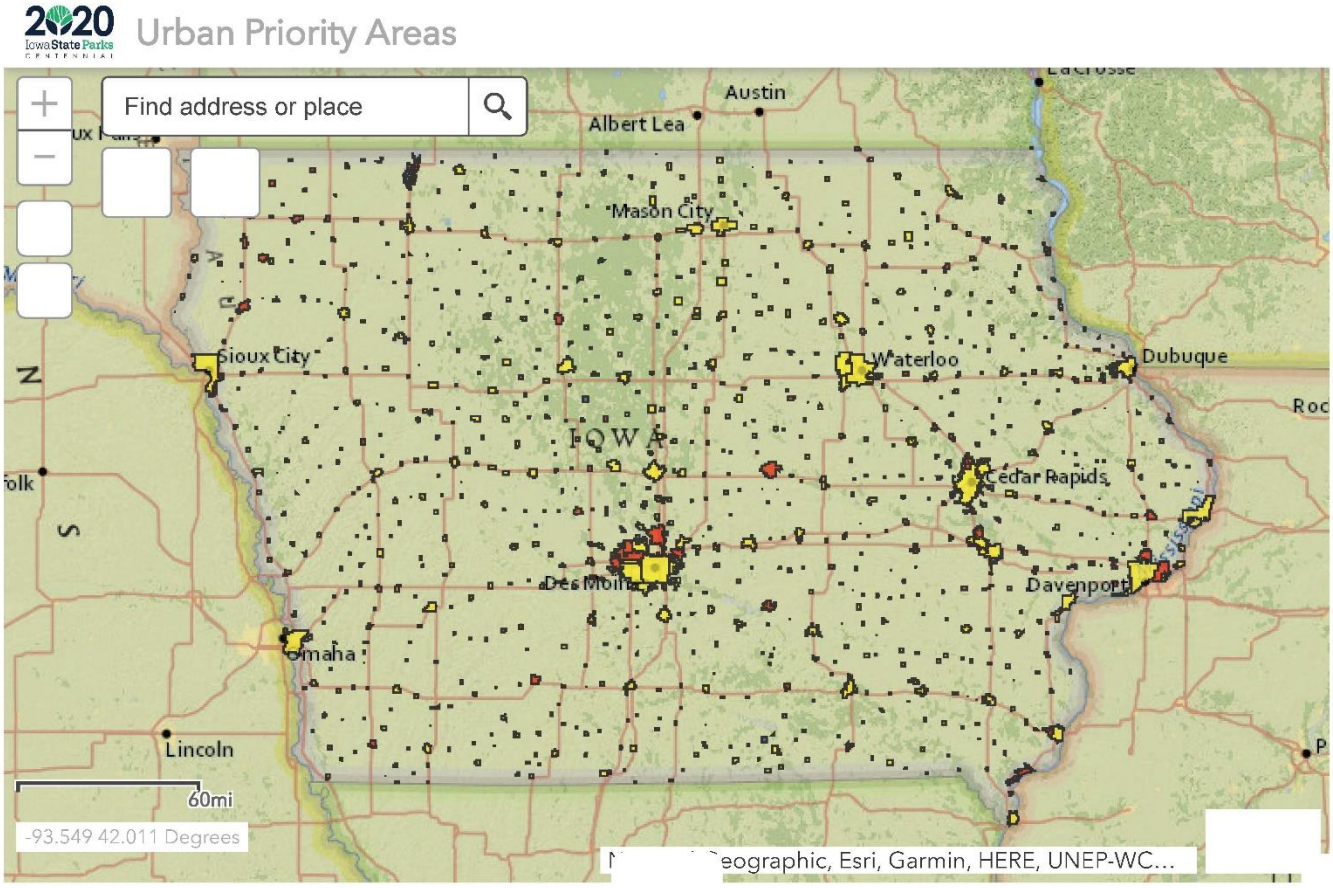


Map showing the territories of each professional Forester in Iowa.

The Iowa DNR employs 12 professional District Foresters. The Iowa DNR partners with other organizations to hire professional contract forests to assist these DNR District Foresters. Iowa DNR District Foresters provide education, woodland management advice, and written plans for qualifying private landowners through both one-on-one assistance and formal programming. Private woodland owners who apply for cost-sharing programs to plant trees or improve health, productivity, or wildlife habitat diversity (more information in the Cost Share Program section of the Landowner Assistance page of the Iowa DNR's website, or in the Cost Share section below) for their forests may receive assistance from Iowa's District Foresters in developing written plans that meet cost share requirements. District Foresters also help deliver forestry field days, webinars, written articles, and other media available to the public to assist landowners in promoting conservation.

These Foresters provide one-on-one technical assistance to over 2,000 private landowners annually. The results of their work include 300 written Forest Stewardship Plans covering 15,000 acres of woodland annually.

Forest Management Plans



Map showing the general location and relative size of forest stewardship and forest management plans created for Iowa woodlands. For privacy, data will disappear when the map zoomed in too far. If this happens, zoom out and data will reappear.

A written Forest Stewardship Plan created by a professional Forester enables landowners to quality for cost-sharing programs offered by the U.S. Department of Agriculture or collaborating state agencies. Forest Stewardship Plans also ensure sustainability and protection of lands governed by conservation easements.

Based on statistical sampling by the Forest Service, U.S. Department of Agriculture, over 85% of Iowa's private woodland owners with a written Forest Stewardship Plan take actions to enhance their property and implement their plan.

Cost Share Programs for Forest Development and Management

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) offers landowners several different cost-share programs to support the conversion of land to forests, forest enhancement, and forest management. These are all voluntary conservation programs.

Conservation Reserve Program (CRP)
The Conservation Reserve Program (CRP) is administered through the Farm Service Agency (FSA) in your county. This program helps to protect highly erodible land with tree plantings and several other conservation practices. An annual rental payment is made to landowners for up to 15 years and land can be enrolled in the CRP program through either general or continuous enrollment. For more information about CRP cost share funds available, contact your local FSA office.

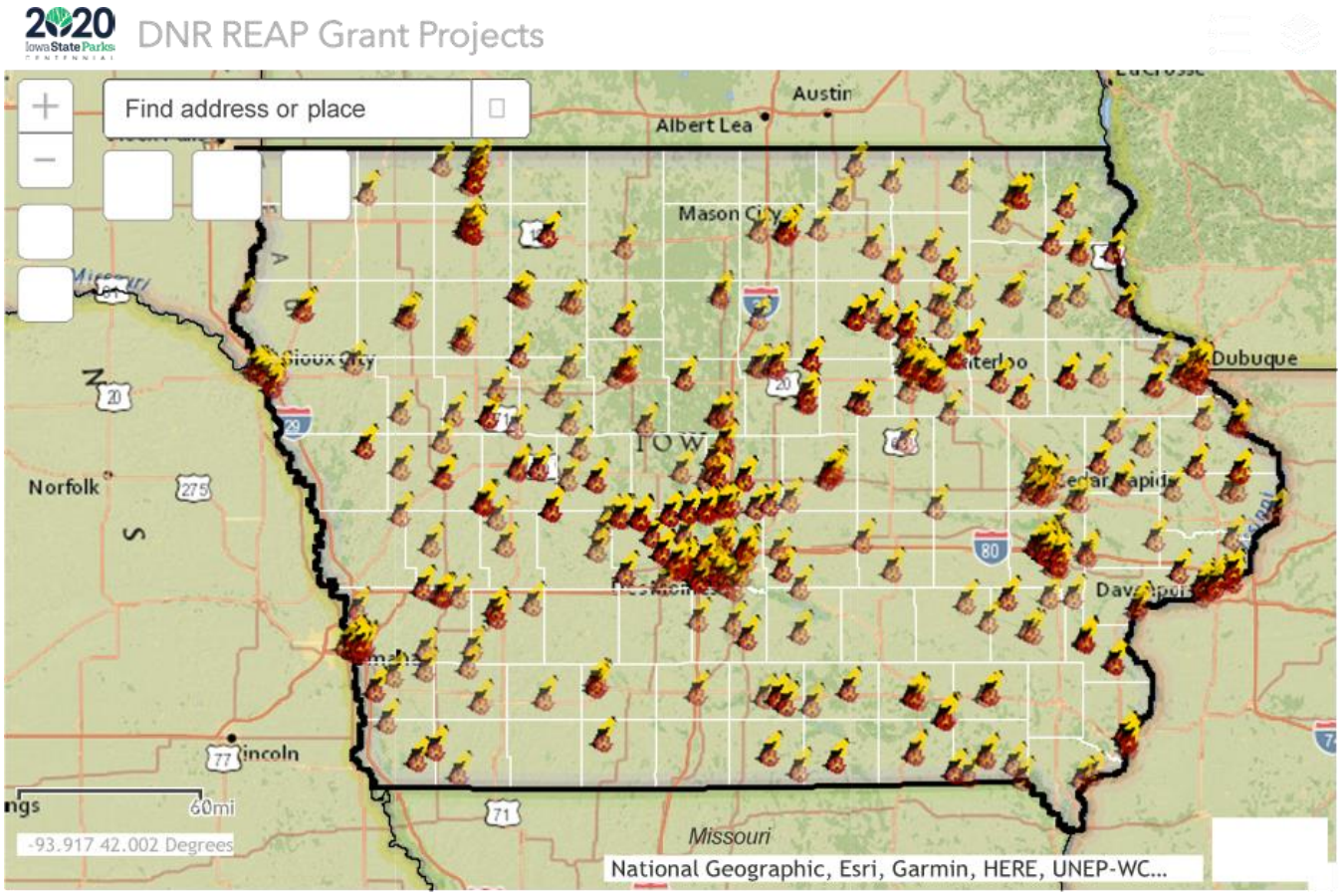
Tree Planting (CP-3) and Hardwood Tree Planting (CP-3A) practices are great ways to increase tree cover in many different locations around the state. CP-3 allows a mixture of soft and hardwood trees while CP-3A focuses primarily on hardwood trees. The Bottomland Timber Establishment (CP31) practice allows landowners to enroll some or all of their bottomland fields in continuous CRP. Planting hardwood trees and shrubs on land prone to flooding is an excellent way to control sheet, rill, scour and other erosion, among other benefits. Bottomland hardwood plantings provide financial incentives over the life of the CRP contract through annual rental payments; they also acts as living retirement accounts that continually gain value, and which can ultimately be capitalized upon 50 or more years after planting.

Forested riparian buffer strips of perennial vegetation promote sustainable agriculture by reducing soil loss, improving water quality, stabilizing stream banks, increasing wildlife habitat and improving aesthetics. Known as CP22, the installation of such buffers allows landowners the maximum amount of land that can be enrolled in continuous CRP of any available program, up to one-third more than other options.

Environmental Quality Incentives Program (EQIP)
The Environmental Quality Incentives Program (EQIP) provides landowners with financial resources to help protect and conserve their land. Some conservation practices covered through EQIP are Forest Stand Improvement, prescribed burning, tree/shrub site prep, woody residue treatment, fire breaks, silvopasture and more. More information about the EQIP program can be found on the NRCS website. For county specific information, contact your local FSA office.

Conservation Stewardship Program (CSP)
The Conservation Stewardship Program (CSP) provides financial resources for landowners to maintain existing conservation activities and adopt new ones. CSP is for working lands working to protect natural resources while improving business operations. Some CSP practices include Forest Stand Improvement, Integrated Pest Management, herbaceous weed control, prescribed burning and more. More information about the CSP program can be found on the NRCS website. For county specific information, contact your local FSA office.

Iowa's Resource Enhancement and Protection Fund

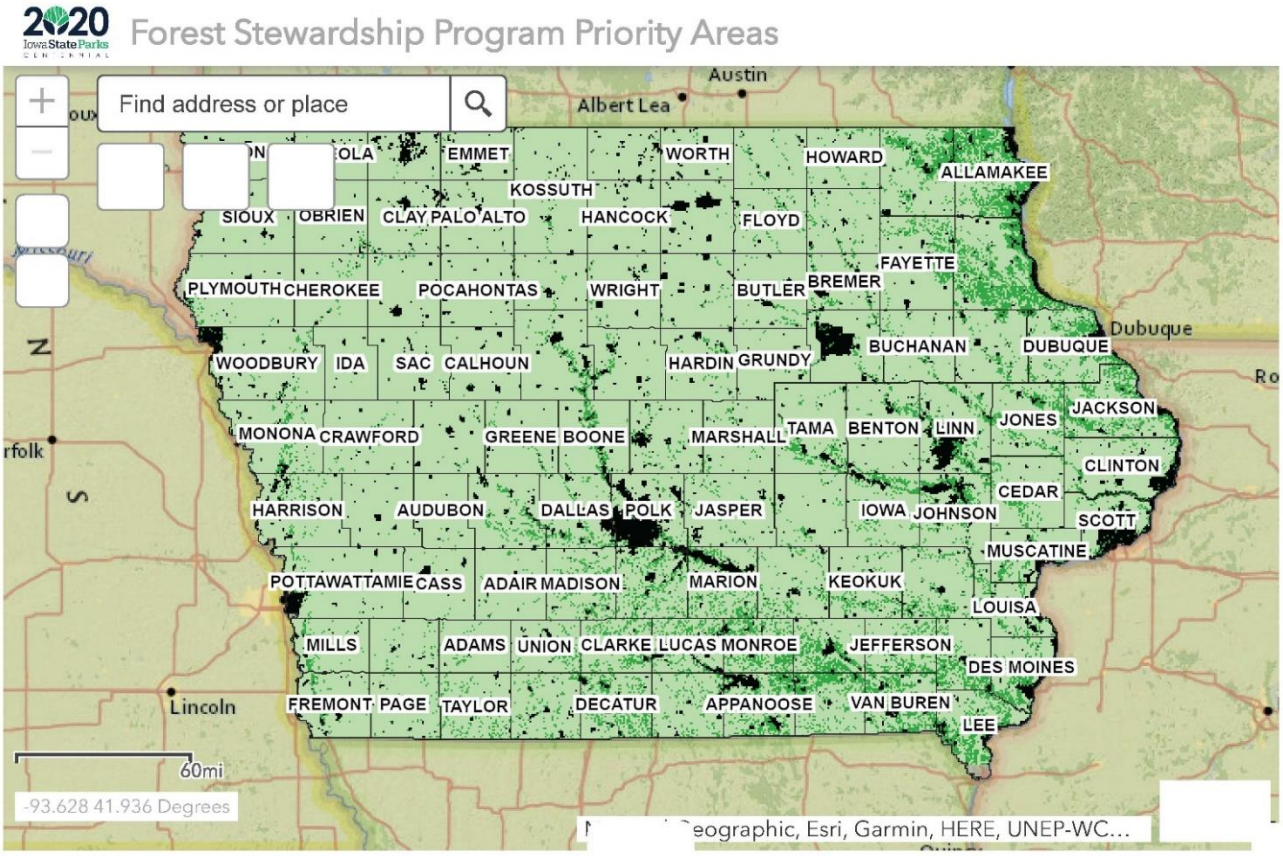


Map showing all REAP funded projects, their type and location in the state.

The Resource Enhancement and Protection (REAP) Fund is a program that the State of Iowa invests from the Environment First Fund and is authorized to receive $20 million annually until 2021. However, each year the Iowa legislature sets the annual amount of reap funding, for instance, REAP was appropriated $12 million for 2019. More information about Iowa's REAP fund can be found on the Iowa DNR's website.

Since 2010, Iowa's REAP program has provided funding to over 5,000 forest landowners for reforestation or improvement projects on 41,000 acres of Iowa woodlands.

Forest Stewardship Program Priority Lands



Map showing lands in concert with the nationwide modernization of the Forest Stewardship Program.

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 impacts in terms of 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

The following variables were included in the development of Iowa's FSP Priority Lands coverage:

- Private forested lands (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 Species of Conservation Need are known to exist using Natural Areas Inventory (NAI) database
- 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

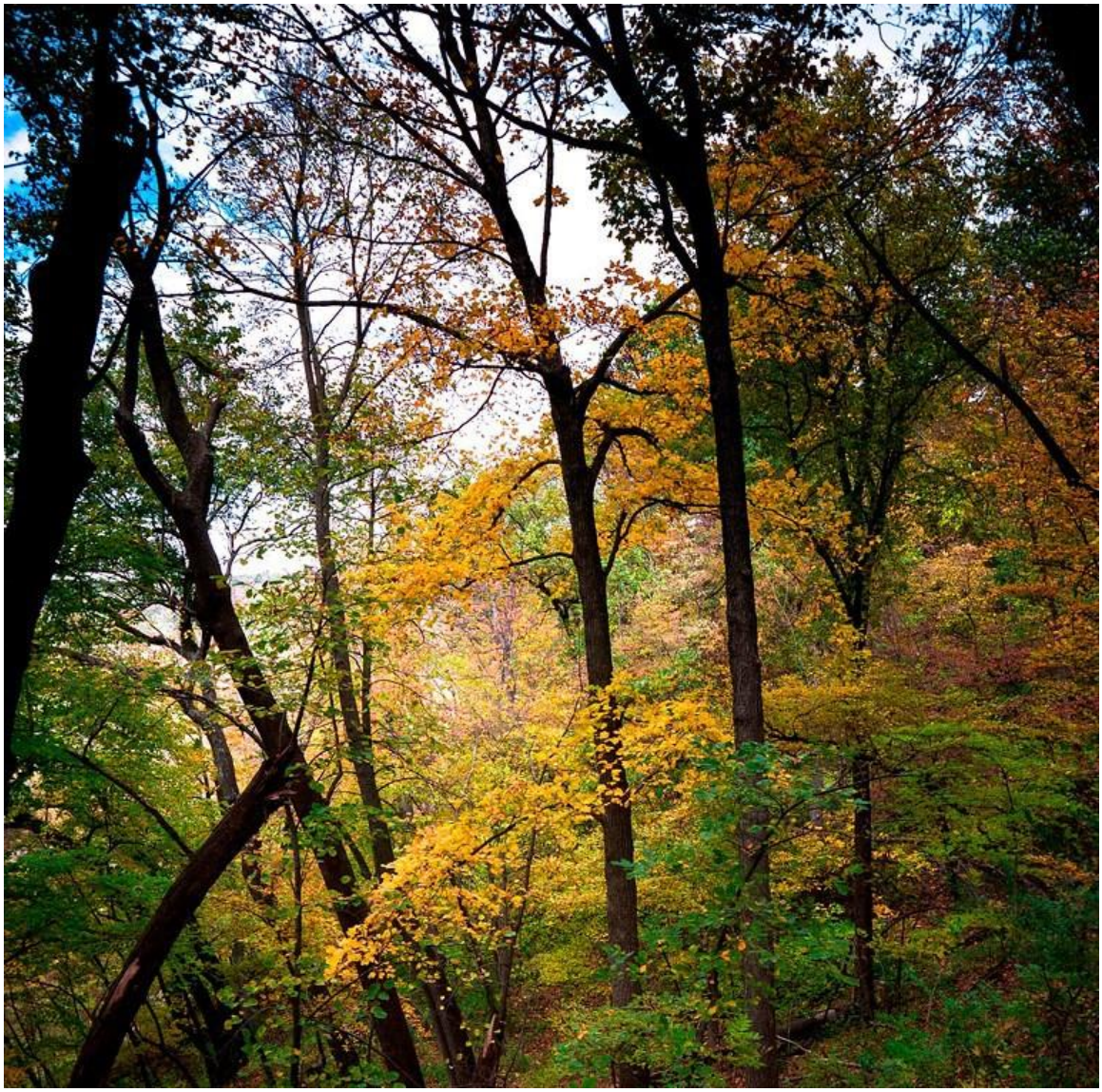
At least half of Iowa's FSP services are delivered in the Priority Lands areas, per U.S. Forest Service protocol. In turn, the U.S. Forest Service uses Iowa's Priority Lands map and associated on-the-ground activities and outcomes to calculate and provide performance-based funding allocations back to the state.

Private Lands Partners

The Iowa Department of Natural Resources collaborates with several different government, non-governmental, and public groups to increase impact and conservation statewide. A few of these groups are listed below; this is not a comprehensive list. Click the links for each group to be directed to their web pages.

- Conservation Districts of Iowa
- Iowa Department of Agriculture and Land Stewardship
- Iowa Natural Resources Conservation Service
- Iowa State University Extension and Outreach
- Iowa Tree Farm Committee
- Iowa Woodland Owners Association
- National Wild Turkey Federation
- The Walnut Council
- The Wildlife Management Institute
- Trees Forever

Forest Reserve Program



In 1906, the Iowa Legislature passed the Forest and Fruit Tree Reservation Act, more commonly known as the Forest Reserve Program. This is a property tax incentive program to encourage landowners to protect forestland from conversion into agricultural land. The original purpose of the program was to “reduce or eliminate property taxes to induce landowners to hold their poorer lands in timber not only as a source of farm income but also for erosion control, watershed protection and game cover.”

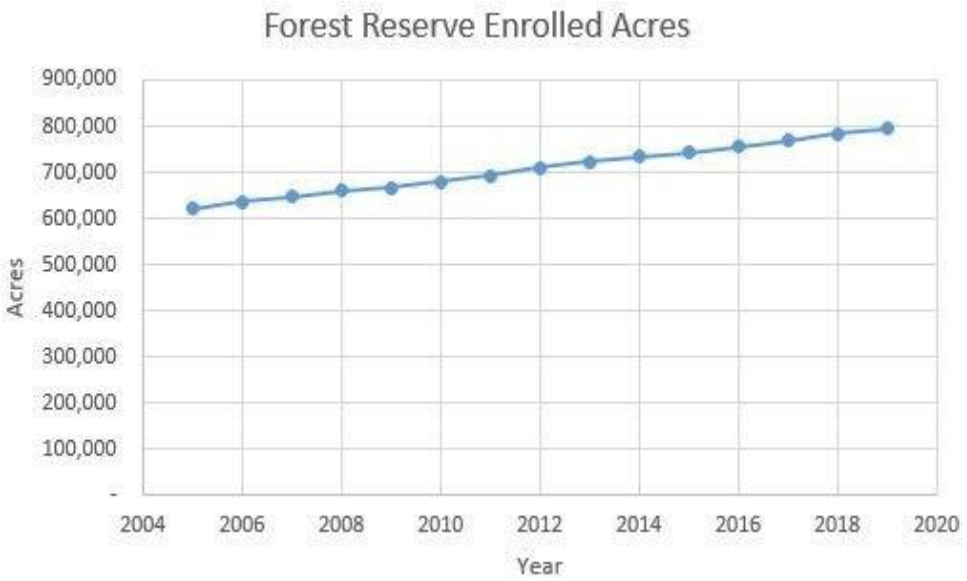
In order for land to be eligible for this tax incentive program, it must meet the following criteria:

1. At least 2 contiguous acres in size and generally not less than 66 feet wide or a fruit tree reservation not less than 1 or more than 10 acres in total area.
2. Shall not contain less than 200 growing trees, on a fruit tree reservation at least 40 apple trees per acre and other fruit trees reservations at least 70 trees per acre.
3. Forest trees are defined as ash, black cherry, black walnut, butternut, catalpa, honeylocust, Norway and Carolina poplars, mulberry, the oaks, sugar maple, cottonwood, soft maple, osage orange, basswood, black locust, European larch, and other coniferous trees, and all other forest trees introduced in the state for experimental purposes.
4. In forest reservations which are artificial groves, willows, boxelders and other poplars shall be included when protecting borders not exceeding two rows in width around a fores reservation or when used as nurse trees not to exceed 100 on each acre.

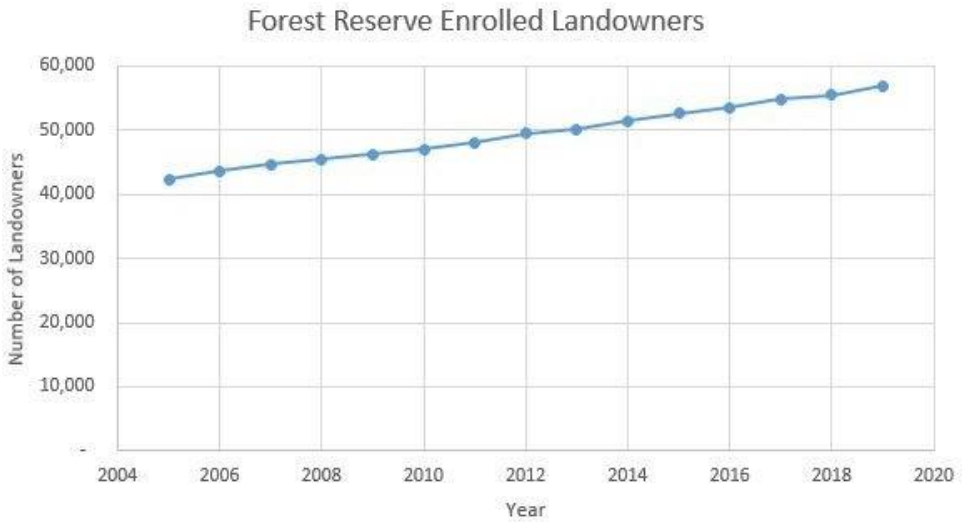
5. No cattle, mules, horses, sheep, goats or hogs are permitted on forest reservations.
6. Not more than 1/5 of the total number of trees in the forest reservation may be removed in any single year unless the trees die of natural causes. When the number of trees falls below 200 trees on each acre, the owner shall within one year restore the number of trees to not less than 200 trees per acre.
7. If any buildings are standing on an area selected as a forest reservation, one acre of that area shall be excluded from the tax exemption. However, the exclusion of that acre shall not affect the area's meeting the acreage requirement.

Private forestland owners must make an application with the county assessor's office from January 1 to February 1 of the year for which they are claiming exemption. For more information on the application process, please contact your county assessor's office.

As of 2019, there are currently 793,761 acres and 56,923 landowners enrolled in the Forest Reserve Program. Both of these values have steadily increased over time as shown in the charts below. This increase is due to several different factors including tax benefits and a higher priority placed on conservation of land.

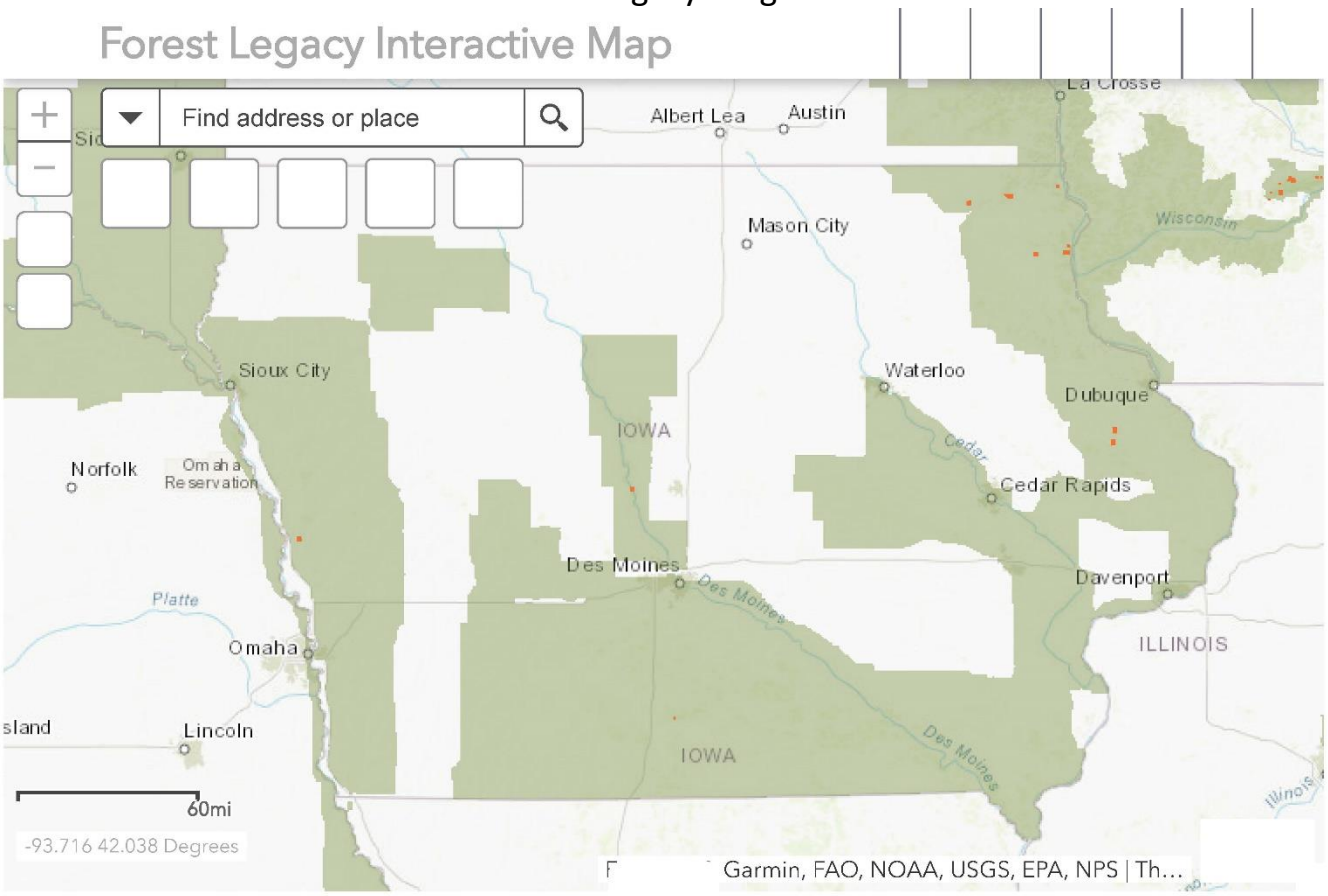


Iowa Forest Reserve Program Enrolled Acres 2005 to 2019



Iowa Forest Reserve Program Enrolled Landowners 2005 to 2019

Forest Legacy Program



The purpose of the Forest Legacy Program in Iowa is to identify and assist willing landowners with conserving Iowa's most important forest areas that are threatened by conversion to non-forest uses. This is a nationally competitive, federally funded conservation program. Priority areas in Iowa have been identified and landowners within those areas are eligible to apply to be enrolled in the Forest Legacy Program. There are many different attributes within these forests that are considered when evaluating a tract of land for protecting into the future. Characteristics considered when deciding if a property is eligible for enrollment include:

Forest Legacy is a voluntary program that pays owners of high-quality forestland to keep their forests from being developed and encourages sustainable forest management practices into perpetuity.

Owners are able to continue activities that are consistent with traditional forest uses, including timber management, hunting, fishing, and similar recreational uses that do not change the essence of their property. Iowa DNR foresters are available to provide free assistance to landowners to help ensure their goals for the property are identified and a plan

for achieving those goals is developed. In exchange for limiting development of the property and placing a conservation easement that protects the forest resources into perpetuity, these landowners receive a financial payment.

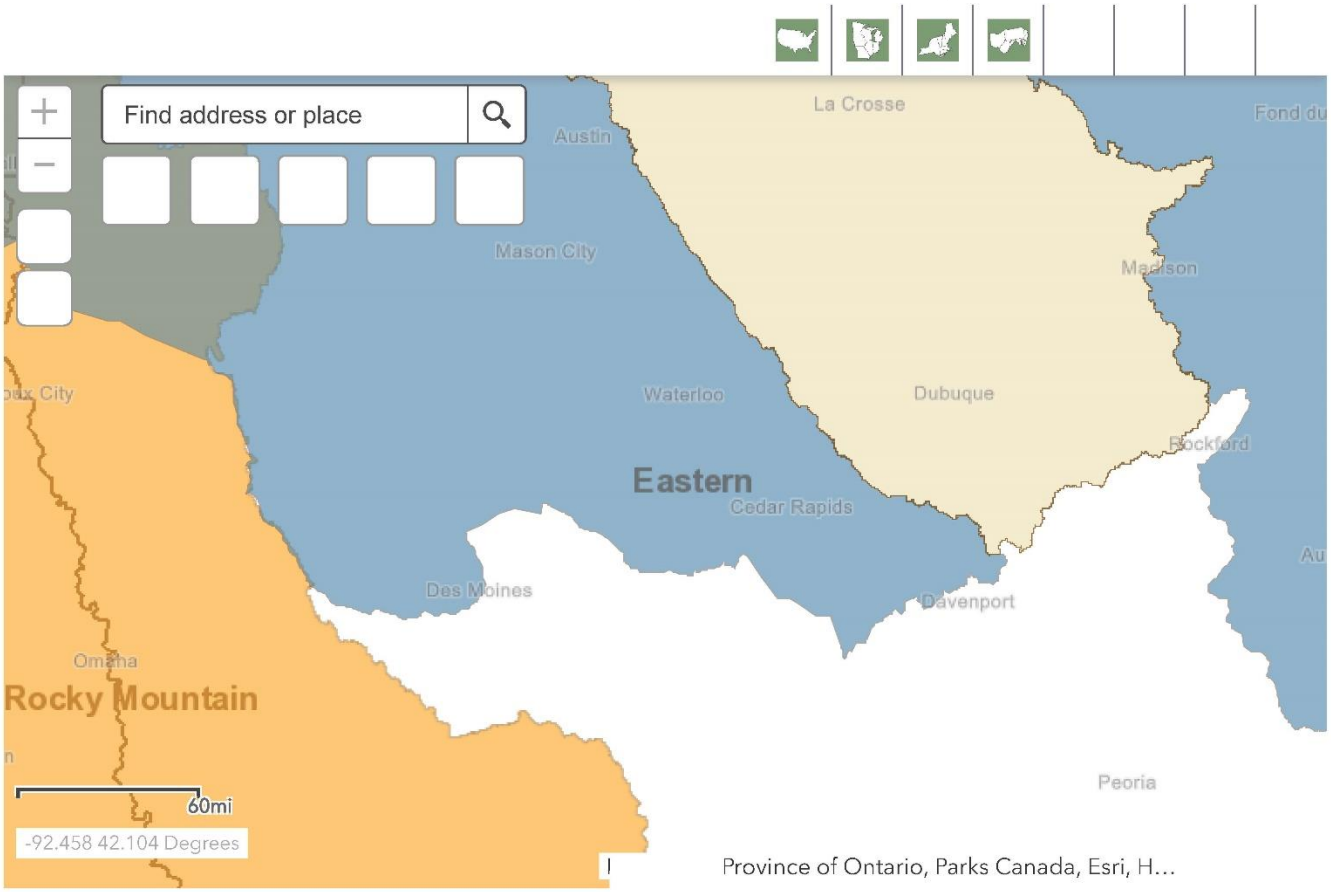
Goals of the Forest Legacy Program in Iowa:

1. To protect environmentally important private forests that are threatened by conversion to non-forest uses, such as conversion to agriculture, gravel pits/ mining, and residential or commercial development.
2. To protect Iowa's publicly owned or permanently protected forested tracts from environmental threats caused by the development of nearby forest areas.
3. To prevent and reverse the fragmentation/parcelization of Iowa's contiguous forests by reconnecting parcels of land and keeping forests in contiguous parcels.
4. To preserve the beauty and public enjoyment of Iowa's forested landscape.

Iowa has a total of 4,774 acres of land in conservation easements as of June 2019; 1,650 acres are within the Forest Legacy Program, which represents 34% of Iowa's total. The map to the right shows where Iowa's current Forest Legacy properties are located along with a description of them.

Iowa's Forest Legacy Assessment of Need can be found on the Iowa DNR's website.

Multi-State Priority Areas & Partnerships



In addition to priority areas identified elsewhere in this Action Plan, there are several Multi-State Priority Areas and regional partnerships that Iowa is included in. These priority areas identify ecosystems, watersheds, or other geographical regions that offer significant impact or value to be preserved.

Click on the links below to learn more about each multi-state or regional initiative. Some of the priority areas listed below are mapped above.

- Driftless Area Landscape Conservation Initiative
- Driftless Area Restoration Effort

- Eastern Tallgrass Prairie and Big Rivers Landscape Conservation Cooperative
- Fishers & Farmers Partnership for the Upper Mississippi River Basin
- Karst Topography Areas
- Loess Hills Alliance
- Midwest Glacial Lakes Fish Habitat Partnership
- Mississippi River Basin Healthy Watersheds Initiative
- Mississippi River Basin Panel on Aquatic Nuisance Species
- Missouri River Corridor and Watershed
- Plains and Prairie Potholes Landscape Conservation Cooperative
- Prairie Pothole Joint Venture
- Prairie Pothole Wetland and Grassland Retention Project
- Upper Mississippi River and Great Lakes Region Joint Venture
- Upper Mississippi River Forestry Partnership
- White Oak Initiative

Fire Management

This section explores fire management within Iowa.

Contents:

- Fire Program Overview
- Fire Training
- Prescribed Fire
- Wildland Fires
- Fire Prevention
- Volunteer Fire Assistance
- Federal Excess Personal Property
- Department of Defense - Firefighter Property
- Community Wildlife Protection Plans

Iowa DNR Forestry - Fire Program Overview

Per 456A.24 (9) of the Code of Iowa, Iowa DNR Forestry - Fire Program's responsibilities include:

"Provide for the protection against fire and other destructive agencies on state and privately owned forests, parks, wildlife areas and other property under its jurisdiction, and cooperate with federal and other state agencies in protection programs approved by the department, and the consent of the owner, on private owned areas."

Iowa DNR Forestry - Fire Program, in cooperation with the USDA Forest Service and other federal, state, and local partners, provides organizational, operational, training, and technical support regarding wildland and prescribed fire management.

Outcomes Include:

- Life, personal property, and natural resources are protected
- Rural fire service is supported in the areas of fire prevention, pre-suppression, and suppression
- Rural fire service and statewide natural resource management agencies are supported with grant access, training, equipment, technical transfer, and other services
- Fire as a resources management tool continues to gain acceptance, excess fuels are reduced, fire-dependent plant communities are rejuvenated, and risks of wildfire are reduced

Fire Training

The DNR Forestry - Fire Program staff work to provide both general and National Wildfire Coordinating Group (NWCG) wildland fire and prescribed fire training to volunteer fire department personnel, natural resource managers, and other interested individuals.

Iowa DNR Forestry is a member of the Big Rivers Forest Fire Management Compact. The compact has been integral in helping Fire Program staff to expand NWCG training.

Fire Program staff have been able to annually provide base-level (100 and 200 level) NWCG firefighter training and annual refreshers, as well as fitness and endurance testing.

The Fire Program maintains a resource list of qualified NWCG agency and volunteer personnel for use on interagency, out-of-state assignments and compact activations.

To find a listing of on-line and scheduled classes, please visit the Fire Management Training page of the Iowa DNR's website.

The following general courses are available to departments and agencies upon request:

- ATV/UTV - Fire Operations & Tactics
- Volunteer Fire Department Wildland Fire Operations
- Volunteer Fire Department Wildland Fire Engine Operations & Tactics
- Basics of Prescribed Fire
- Basic Chainsaw Safety and Operations

For additional information, contact one of the Cooperative Fire Specialists.

Iowa DNR Forestry - Fire Management Training Data 2009 to 2018

Federal Fiscal Year	Number of Courses	Number of Students	Seat Hours	Estimated Value of Seat Time (using the FFY Basic FFT2 AD Rate)
2009	27	572	6,015	$83,970
2010	27	545	6,628	$115,327
2011	33	469	6,951	$120,947
2012	29	425	4,980	$86,652
2013	35	530	6,159	$107,166
2014	42	813	8,488	$149,389
2015	31	540	7,214	$126,966
2016	27	547	6,859	$123,462
2017	30	560	6,228	$114,097
2018	33	640	8,830	$161,766

Prescribed Fire

Iowa's native oak woodlands, savannas, and prairies are fire-dependent ecosystems. Natural resource managers have developed a renewed interest in utilizing prescribed fire to maintain, enhance and restore these systems.

Use of prescribed fire as a management tool can expand the restoration of fire-dependent ecosystems, reduce invasive species advancement, and reduce and manage excess fuels.

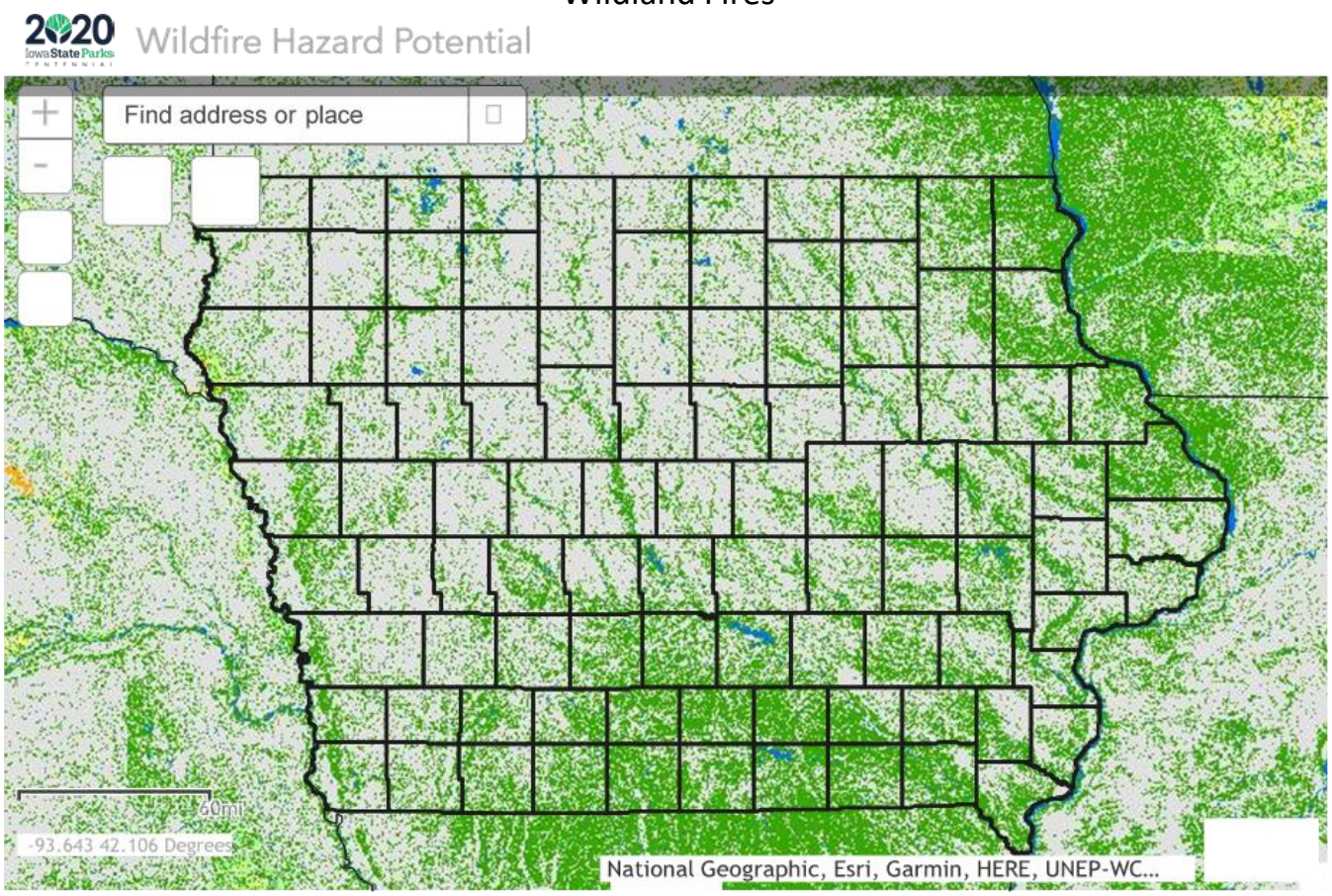
Iowa DNR land managers embrace prescribed fire as a valuable tool. The DNR Fire Policy has been established to guide our land managers with the planning, implementation and follow-up monitoring of land managed with prescribed fire.

How-To publications and YouTube videos have been produced to aid others in adding prescribed fire to their land management toolbox. To see these resources, please visit the Fire Management page of the Iowa DNR's website. Prescribed fire report forms are also found on that page.

Reported Prescribed Fires in Iowa 2009 to 2018

Federal Fiscal Year	Number of Prescribed Fires Reported	Acres of Prescribed Fires Reported
2009	587	22,635
2010	288	13,566
2011	417	23,613
2012	373	23,506
2013	315	19,310
2014	390	17,170
2015	391	21,983
2016	373	21,410
2017	403	18,580
2018	320	20,578

Wildland Fires



Map showing the Wildfire Hazard Potential rating from the U.S. Forest Service. This map shows predominately agricultural lands classified as "Non-burnable", however each year there are several large wildfires within and around crop fields. While this risk is missing from the U.S. Forest Service map, the Iowa DNR Fire Program recognizes wildfire potential within agricultural lands.

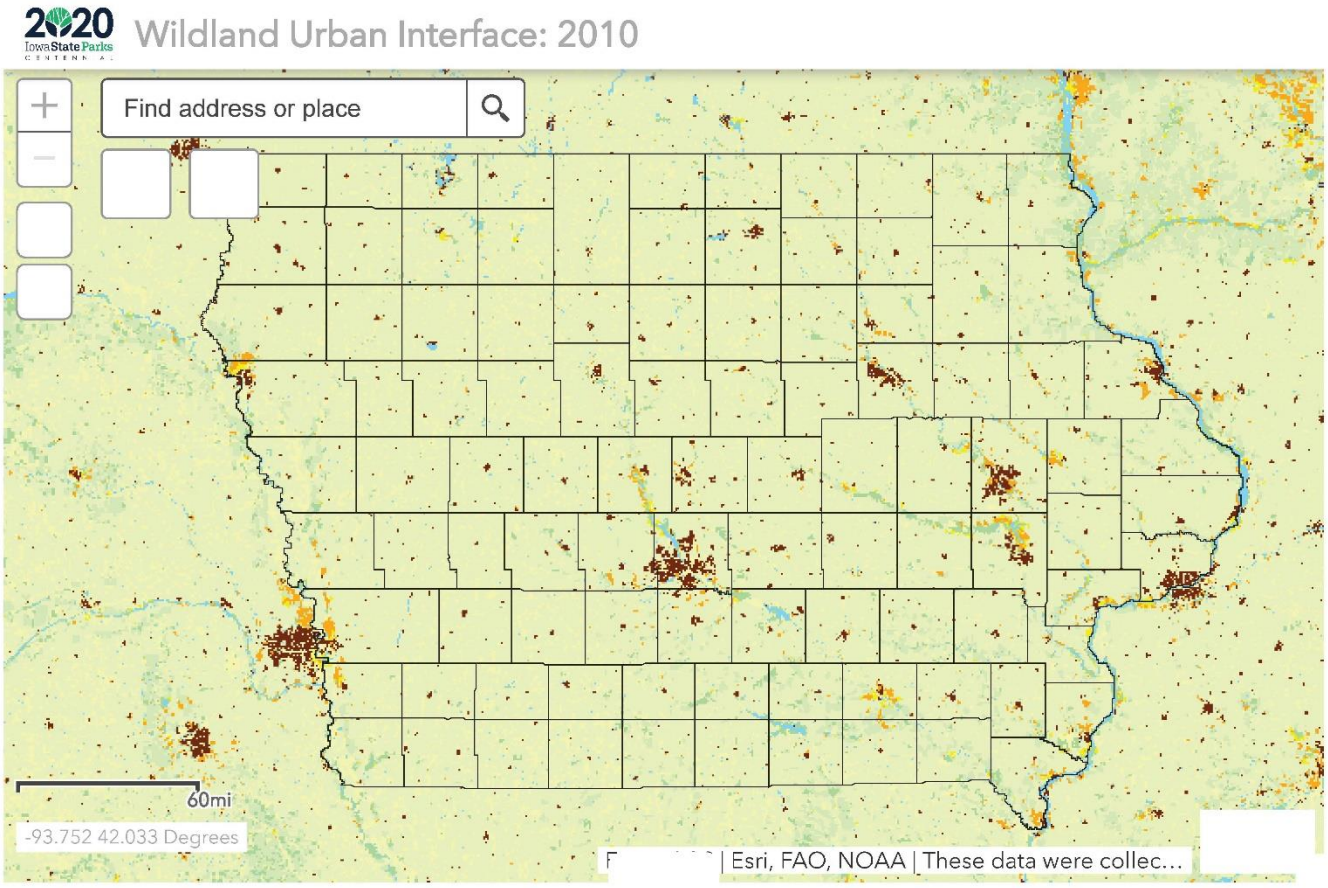
Wildfire is the responsibility of over 800 rural, mainly volunteer fire departments scattered across the state. Volunteer fire fighters in Iowa are decreasing in number, and many lack appropriate wildfire training and equipment to deal with the issues of the wildland urban interface. It is estimated that over 90% of wildfires involve grassland, cropland or forested areas, many of which occur within the wildland-urban interface.

The DNR Forestry - Fire program works to provide support to Iowa's volunteer fire departments and firefighters with the tools and training needed to provide for their safety while they work to protect lives, property and resources.

Fire departments should report wildland fires to the Iowa DNR State Wildland Fire Supervisor. Wildland fire report forms are available on the Fire Management page of the Iowa DNR's website.

Reported Wildland Fires in Iowa 2009 to 2018

Federal Fiscal Year	Number of Wildland Fires Reported	Acres of Wildland Fires Reported
2009	844	9,303
2010	375	4,835
2011	745	1,548
2012	720	7,969
2013	285	2,548
2014	718	13,789
2015	594	16,210
2016	182	1,557
2017	588	10,501
2018	422	7,932



Map from the U.S. Forest Service showing wildland-urban interface across Iowa. Areas where urban communities meet rural agricultural lands can have an increase potential for wildland fires.

Wildfire Risk to Communities

The USDA Forest Service developed a highly informative webpage, Wildfire Risk to Communities. Through this webpage one can understand what makes areas more susceptible to wildfire, explore their area for risk, and learn steps to reduce the risk of wildfire.

Smokey Bear

One of the most widely recognized and longest standing symbols of wildfire prevention, Smokey Bear, has been promoting the message "Only You Can Prevent Wildfire" since 1944. Iowa DNR Forestry offers a variety of tools and methods to spread the message of preventing forest fires, including being Iowa's guardian of the nation's symbol of fire prevention - Smokey Bear.

Smokey Bear programs are typically coordinated through your local fire department. Fire Departments may request access to Smokey Bear and supporting educational materials by calling the DNR State Forest Nursery and Fire Headquarters office at 515-233-1161.

To learn more about Smokey Bear and for tips and tools about wildfire prevention, visit Smokey Bear's website.

Firewise Communities

The Firewise Communities program is a national organization of wildland fire management agencies. These agencies are working together to supply information to community members who are living with the possibility of wildfire. The Iowa

DNR is proud to be a part of this national program and be able to provide Iowans with information about how they can work together to reduce wildfire risks.

Becoming Firewise is a process. Being Firewise is not difficult, but requires commitment. A Firewise person or community pays attention to the details in their environment that might start or encourage the spread of a wildfire.

Take the possibility of a wildfire seriously and prepare before a fire starts. When adequately prepared, a house and its surrounding community can be both Firewise and compatible with the area's ecosystem. To help you get started with becoming Firewise in Iowa, please click on a topic from the list below:

- How to Protect Your Home
  An illustrated brochure of the fire safety zones around your home. For an easy access resource, print this 2-page brochure backed on legal size paper (8½" x 14"), then fold into 4 panels.
- Firewise on the Farm
  Six simple steps to a safer harvest.
- Wildland/Urban Landscape
  Beginning steps of fire prevention for your rural property
- Is Your Landscape Fire Resistant?
  A condensed checklist for assessing your property.

To help you measure your home's fire risk and determine what improvements need to be made, use the Forest Home Fire Risk Form. Please take the time to fill out the form carefully and honestly.

To take Firewise to the community level, attend city meetings and talk with your local urban planners as they consider spreading urban growth into natural areas. Another way to get information into the community is to organize a yard waste chipping day. Working with neighbors to thin out overgrown vegetation and to share expenses, makes wildfire preparedness affordable, as well as your neighborhood fire-resistant.

If your neighborhood would like to participate on the national level of Firewise, visit Firewise Communities USA Recognition Program.

Additional resources:

- NE Wildfire Preparedness Resource Guide
- Guide to Staying Safe During Wildfires

Volunteer Fire Assistance

The DNR Forestry - Fire program administers Iowa's allocation of the United States Forest Service (USFS) Volunteer Fire Assistance (VFA) cost share program. The VFA program improves the capability of Iowa's rural volunteer fire departments to protect lives, structures, and natural resources in rural and wildland-urban interface areas.

The funding is available to fire departments that provide fire protection to rural areas with populations of less than 10,000 people. Departments may purchase wildland firefighting equipment on a 50/50 matching funds basis with a maximum award allocation of $3,500 annually per department. Priority funding is given to wildland fire equipment, safety items and communication needs. Grant information can be found at www.iowadnr.gov/fire.

Iowa DNR Forestry - Volunteer Fire Assistance Grant Funds Awarded to Fire Departments 2009 to 2018

Federal Fiscal Year	VFA Funds Available for Fire Department Grants	Number of VFA Grants Awarded
2009	$228,292	105
2010	$226,505	103
2011	$217,735	101
2012	$185,515	86
2013	$181,778	87
2014	$203,327	84
2015	$162,184	68
2016	$194,811	81
2017	$213,824	91
2018	$232,464	100

Federal Excess Personal Property

Federal excess property is acquired as authorized by the USFS and loaned to state forestry agencies and their cooperators (volunteer fire departments) for their use in providing wildland and rural community fire protection. To obtain available equipment, fire departments must enter into a formal Cooperative Agreement with the DNR Forestry - Fire Program.

Screening instructions are provided to Fire Department contacts upon request (Fire-Program@dnr.iowa.gov).

Fire Departments are responsible for:

- Requesting access to screening site
- Requesting property
- Transporting property from the screening location
- Making conversions in a safe and timely manner
- Protecting the equipment from theft, vandalism, and weather
- Painting vehicles in fire service colors
- Maintaining appropriate liability insurance
- Making property available for biennial inventory inspections
- Returning the equipment, less any added equipment, to the DNR Forestry - Fire Program when no longer needed

Iowa DNR Forestry - Federal Excess Personal Property Acquisitions 2009 to 2018

Federal Fiscal Year	Number of FEPP Items Acquired	Value of Acquisitions
2009	12	$503,664
2010	17	$226,455
2011	17	$345,100

Federal Fiscal Year	Number of FEPP Items Acquired	Value of Acquisitions
2012	39	$2,361,910
2013	120	$652,167
2014	10	$817,274
2015	56	$1,375,433
2016	106	$402,970
2017	503	$2,744,393
2018	97	$1,652,386

Department of Defense - Firefighter Property

This program is similar to the Federal Excess Personal Property (FEPP) program, with the exception that generally, once the equipment is modified, put into service, and inspected by a DNR Forestry - Fire Program staff, title transfers to the Fire Department. The departments are asked to retain ownership for a minimum of five years.

Screening instructions are provided to Fire Department contacts upon request.

Department of Defense - Firefighter Property (DOD-FFP) is acquired by the DNR Forestry - Fire program as authorized by the Department of Defense and the USFS to support fire departments and emergency responders. To obtain available equipment, fire departments must enter into a formal Cooperative Agreement with the DNR Forestry - Fire Program.

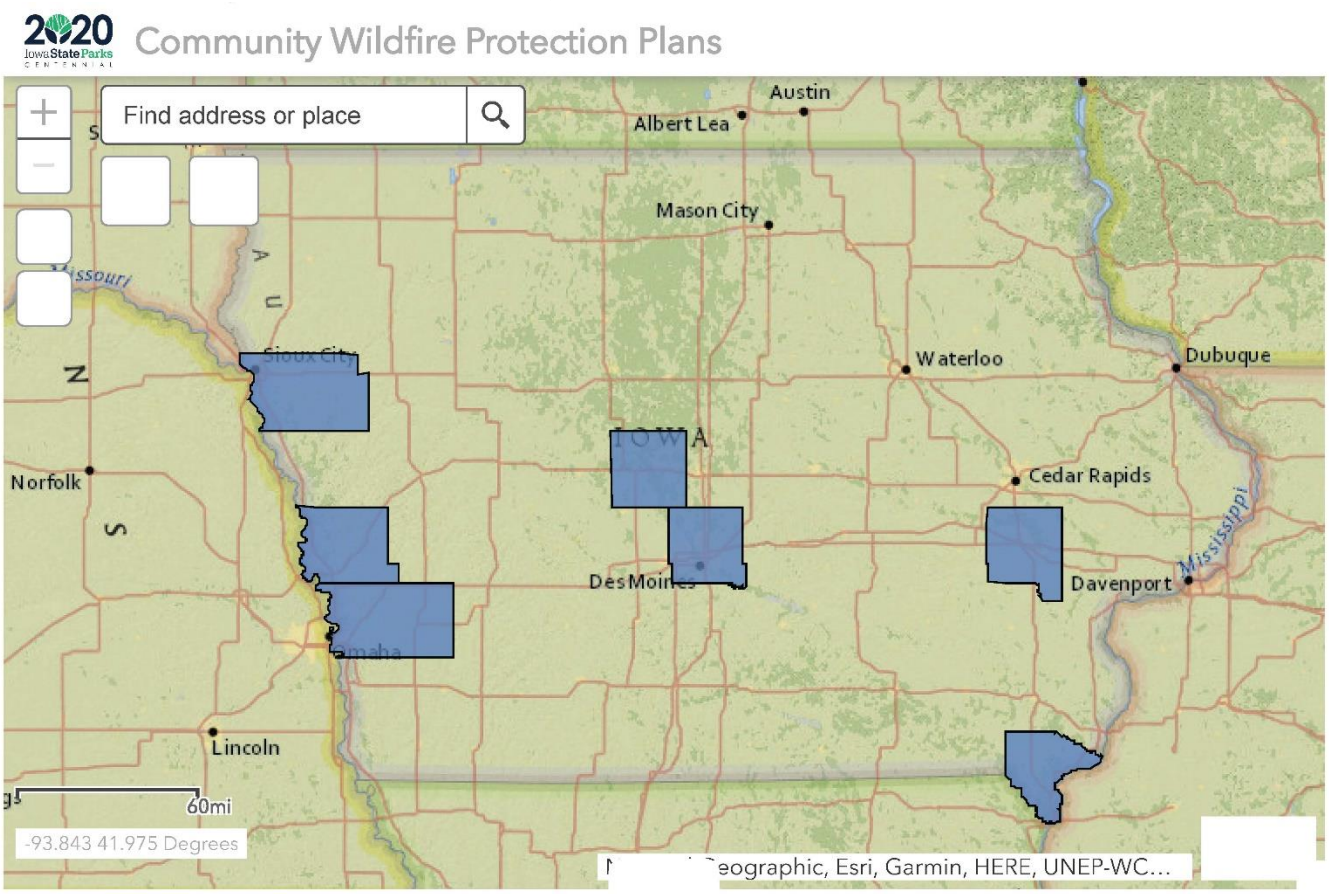
Screening instructions are provided to Fire Department contacts upon request (Fire-Program@dnr.iowa.gov).

Fire Departments are responsible for:

- Requesting screening access
- Requesting property
- Transporting property from the screening location
- Making conversions in a safe and timely manner (within 1 year)
- Painting vehicles in fire service colors
- Protecting the equipment from theft, vandalism, and weather
- Maintaining appropriate liability insurance
- Making property available for required inspections
- Accepting ownership

Iowa DNR Forestry - Department of Defense - Firefighter Property Acquisitions 2009 to 2018

Federal Fiscal Year	Number of DOD-FFP Items Acquired	Value of Acquisitions
2009	395	$3,058,728
2010	349	$877,985
2011	97	$441,580
2012	34	$2,363,816
2013	44	$1,085,370
2014	39	$722,990
2015	146	$2,882,289
2016	158	$1,794,889
2017	641	$6,269,886
2018	537	$2,536,842



Map showing the Community Wildfire Protection Plans within Iowa.

A Community Wildfire Protection Plan (CWPP) is generally developed by local governments with assistance from state and federal agencies and other interested partners. This provides communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal land, as well as how additional federal funds may be distributed for projects on non-federal lands. A CWPP must be collaborative in approach, identify and prioritize areas for hazardous fuel reduction treatments on both Federal and non-Federal land, and recommend the types and methods of treatment that, if completed, would reduce the risk to the community. A CWPP may address issues such as wildfire response, hazard mitigation, community preparedness, structure protection, or all of the above.

Community Wildfire Protection Plans have been developed for the following locations in Iowa:

- Boone & Dallas County - Des Moines River Corridor
- Harrison County
- Johnson County
- Lee County
- North Polk County
- Pottawattamie County
- Woodbury County

For more information about Community Wildfire Protection Plans in the US Forest Service Eastern Region, please click here to be taken to the U.S. Forest Service Eastern Region Community Wildfire Protection Plan Dashboard.

Forest Productivity

This section explores forest productivity within Iowa.

Contents:

- Iowa's Wildlife Productive Capacity
- Native Forest Understory
- Economic Impact of Forests in Iowa
- Timber Value and Sales
- Non-timber Forest Products
- State Forest Nursery

Forest Wildlife in Iowa

Many types of wildlife rely on forests for shelter, food, and shade. Iowa's forests are home to an impressive variety of wildlife including birds, mammals, reptiles, amphibians, butterflies and snails. Different forest types host unique wildlife communities. For example, deciduous, oak-hickory forests are an important source of hard and soft mast - acorns, nuts, and berries - for deer and turkey, and several Iowa butterfly species rely on oaks as a hostplant for their larvae. Other species, such as the long-eared owl, prefer coniferous forests. The age and structure of a forest also influences which wildlife species will use it; ruffed grouse and woodcock prefer forests that have areas of dense young forest, while cerulean warblers and southern flying squirrels prefer more mature woodlands. Encouraging wildlife diversity in Iowa takes a variety of forest management approaches to balance the varying needs of plant and wildlife species.

Species of Greatest Conservation Need in Iowa's Forests

In addition to providing habitat for many common wildlife species such as white-tailed deer, wild turkey, and squirrels, forests also provide habitat for a large number of species in need of conservation. Specifically, forests provide habitat to nearly 75 Species of Greatest Conservation Need (SGCN) as described in the Iowa Wildlife Action Plan (IWAP):

- 8 species of amphibians, (e.g., frogs and toads)
- 10 species of reptiles, (e.g., turtles and snakes)
- 30 species of birds, (e.g., songbirds, owls, hawks, grouse, and woodpeckers)
- 17 species of butterflies, (e.g., swallowtails, hairstreaks, checkerspots, and skippers)
- 5 species of Terrestrial Snails, (e.g., Pleistocene snails)
- 14 species of mammals, (e.g., bats, flying squirrel, gray fox)

Status and Recent Trends for Selected Woodland Wildlife Species in Iowa

While some Iowa wildlife species that depend on forest are declining, many forest wildlife species are thriving. The sections below describe the recent population trends for a variety of forest wildlife.

Wild Turkey

Iowa is home to the Eastern subspecies of the wild turkey (*Meleagris gallopavo silvestis*), which continue to have a robust population despite recent declining productivity. Wild turkeys are documented in each of Iowa's 99 counties. The majority of the population is located in the eastern 1/3 of the state in correspondence to the primary habitat of forests. Much of the population in the rest of the state is located in small woodlots and along riparian corridors with the exception of the Loess Hills region. The northern 1/3 of the state appears to have stable to increasing populations while the southern 2/3 have shown declining trends in recent surveys. This is not unique to Iowa as many Midwestern and Eastern states with this subspecies are showing the same trends.

Wild Turkey, courtesy of U.S. Fish and Wildlife Service

White-tailed Deer

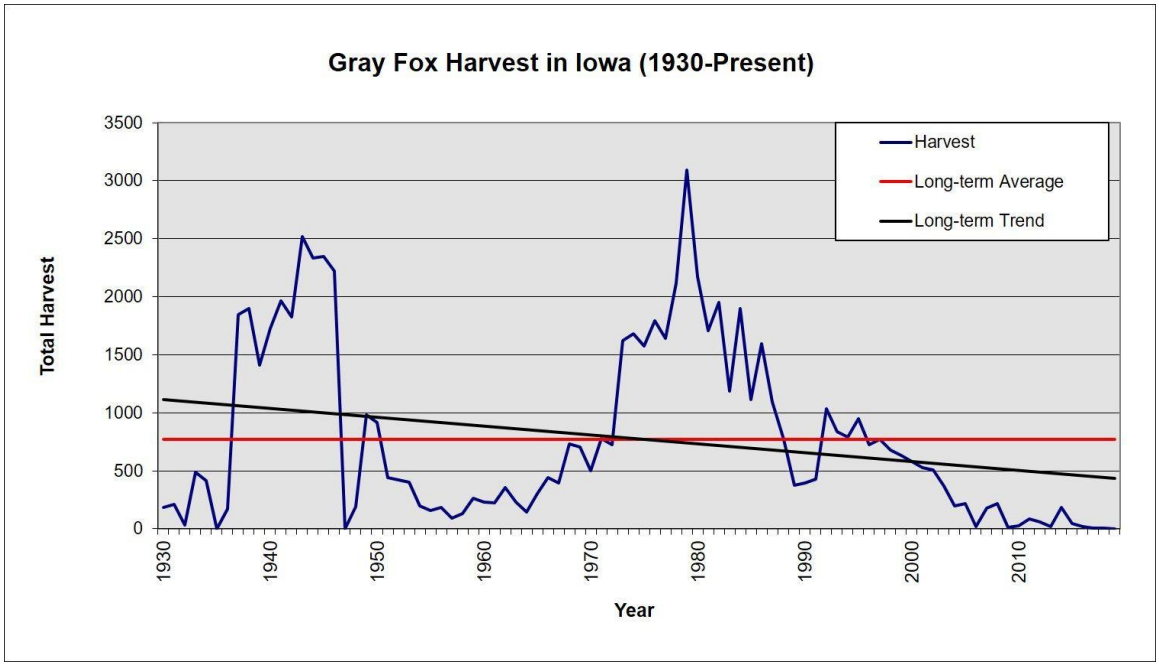
White-tailed Deer occur statewide, and use forests as well as a variety of other habitats. Deer thrive in Iowa due to the presence of plentiful food and a winter climate where snow depths rarely exceed 12" for a prolonged length of time. The excellent nutrition also enables deer to have high reproductive rates, with does often having 2 fawns per year. Deer populations are managed through hunting. Careful management of deer populations consists primarily of regulating the doe harvest, since hunting provides the major source of mortality for deer in Iowa today. Without active management, Iowa's deer herd could grow at a rate of 20% to 40% each year. At this rate, deer numbers would double in as few as 3 years. Maintaining a deer population in balance with the differing and often competing wants and needs of the people in the state is a difficult task and hunting is the only viable management option to achieve this goal. Deer populations in Iowa over the past decade have stabilized, after a period of reduction during the early 2000s.

White-tailed Deer, courtesy of U.S. Fish and Wildlife Service

Gray Fox

Gray fox in Iowa have historically existed in smaller numbers than red fox. Since the early 2000s, gray fox populations have declined steadily across the Midwest, including Iowa. The specific causes of this decline are not well understood, and researchers are working to identify the driving factors behind these declines. Gray fox rely heavily on forested habitats for food and shelter. In contrast to the red fox that prefers open, mixed habitat types, the gray fox thrives in eastern deciduous forests, more commonly found in eastern and southern Iowa. Areas with early successional forest habitat are most preferred because they support more prey such as rabbits, birds, and small rodents.

Gray Fox, courtesy of Vince Evelsizer



Annual grey fox harvests reported by licensed fur dealers in Iowa (1930 to present)

Cerulean Warbler

Cerulean Warblers (*Setophaga cerulea*) depend on large areas of mature, deciduous forest, often along river corridors. As forests have become fragmented into smaller parcels across the Midwest, species such as Cerulean Warblers have shown some of the steepest declines. North American Breeding Bird Survey data shows a -2.63%/year [-3.43, -1.73 95% CI] range-wide population trend between 1966 and 2015 (Sauer et al. 2017), with the steepest declines occurring before 2005. Iowa is on the western edge of the Cerulean Warbler range, with the species most abundant in eastern Iowa, especially in Driftless Area forests, and in forests along major rivers like the Des Moines and Iowa. Large tracts of public forest land support the majority of the Cerulean Warbler population in the state.

Black-billed Cuckoo

Black-billed Cuckoo (*Cuccyzus erythropthalmus*) prefer shrubby forest habitats, especially along rivers and streams and the edges of large forest patches. This bird was once a common breeder in Iowa, but is now considered uncommon. Black-billed cuckoos specialize in eating caterpillars, like Eastern Tent Caterpillar (*Malacosoma americanum*) and invasive Gypsy Moth larvae (*Lymantria dispar*), which are often considered pests. Increased use of pesticides and the associated loss of caterpillar food, as well and forest loss and fragmentation are thought to be the primary causes of species declines. During the first Iowa Breeding Bird Atlas (1985-1990), Black-billed Cuckoos were found in 27% of atlas block across the state, while they only occurred in 16% of blocks during the second Iowa Breeding Birds Atlas (2008-2012). The population declines experienced in Iowa are similar to the declines throughout the species range, with North American Breeding Bird Survey data showing a range-wide population trend of -1.62%/year [-9.12, -0.53 95% CI] between 1966 and 2015 (Sauer et al. 2017). Similar to the Cerulean Warbler, Black-billed Cuckoos are associated with areas that have large amounts of intact forest, and are most often found on public lands throughout the state.

American Woodcock

American Woodcock (*Scolopax minor*) is an uncommon migrant and breeding bird in Iowa and occurs most frequently in the eastern part of the state. It is a shorebird, but unlike most other shorebirds, it requires early successional forest habitat for breeding. American Woodcock are a game species, although they are not hunted heavily in Iowa. The species has experienced long-term population declines across its breeding range, with North American Breeding Bird Survey data showing a -2.63%/year [-3.79, -1.61 95% CI] trend in the United Sates population between 1966 and 2015. In more recent years that trend has started to stabilize, but Iowa Breeding Bird Atlas data suggests a continued loss of the species in the state between Atlas I (1985-1990) when Woodcock were found in 16.6% of survey blocks and Atlas II (2008-2012) when woodcock were found in only 11.6% of blocks. Habitat management that produces young regenerating forest can be used to increase breeding habitat for this species, and other associated species like Ruffed Grouse (*Bonasa umbellus*) and Blue-winged Warbler (*Vermivora cyanoptera*).

America Woodcock, courtesy of U.S. Fish and Wildlife Service

Red-headed Woodpecker

Red-headed Woodpeckers are found in every county in Iowa and are associated with open woodlands, oak savannas, parks, and wooded farmsteads and require large diameter dead snags for nesting. Although still quite common, North American Breeding Bird Survey data suggests Iowa's Red-headed Woodpecker population declined -4%/year [-4.86, -3.10 95% CI] between 1966 and 2015 (Sauer et al. 2017). In more recent years those declines have seemed to stabilize with Iowa Breeding Bird Atlas data showed no change in species distribution between atlas I (1985-1990) and atlas II (2088-1012), although the species continues to decline in other parts of its range. Management that encourages oak savanna and open woodland and retaining dead trees and limbs will help to Red-headed woodpecker and other species

like Eastern Bluebird (*Sialia sialis*) in the state. Increased tree death from emerald ash borer (*Agrilus planipennis*) may temporarily bolster Red-headed Woodpecker populations in the state by providing new foraging and nesting opportunities.

Red-headed Woodpecker, courtesy of U.S. Fish and Wildlife Service

Northern Long-eared Bat

The Northern Long-eared Bat is one of three bat species in the genus *Myotis* that occurs in Iowa. All three of these *Myotis* species hibernate in groups in caves and as such are susceptible to the fungal disease, White Nose Syndrome, which has had a notable impact on their populations. Since 2015, as a result of these population declines, the Northern Long-eared Bat has been listed as a threatened species under the Endangered Species Act. During the summer breeding season, Northern Long-eared Bats roost singly or in small maternity colonies under the loose bark of trees or in the hollowed out cavities of dead trees. Supporting this type of habitat so that this species can have healthy reproduction has been an important part of their conservation under the threat of White Nose Syndrome. Annual acoustic based surveys that have been underway in Iowa since 2014 have found that Northern Long-eared Bats and their *Myotis* relatives are most abundant in the Eastern part of the state and that their numbers are declining (J. Blanchong, unpublished report, 2019).

Northern Long-eared Bat, courtesy of U.S. Fish and Wildlife Service

Treefrogs

Cope's gray treefrog (*Hyla chrysoscelis*) and Eastern gray treefrog (*Hyla versicolor*) are two of Iowa's few forest-dwelling frog species. Almost indistinguishable by appearance alone, both species were historically described as common throughout their range and have been documented in almost every one of Iowa's 99 counties. Treefrogs begin their breeding season in late Spring to early Summer and may be found along a variety of small forested waterbodies such as ponds, wetlands, and road ditches. Outside of the breeding season, treefrogs use the specialized, suction cup-like pads at the ends of their toes to climb trees, plant stems, fences, and buildings. They overwinter in forested habitats by burrowing just below the soil surface or within leaf litter, small roots, and shallow cracks in the soil. Both Cope's and Eastern gray treefrogs are listed as Species of Greatest Conservation Need (SGCN) in Iowa and since 1991, the Iowa DNR has conducted an annual spring frog and toad call survey to monitor their population status. Though little is known regarding abundance, data suggest that overall treefrog site occupancy has remained stable to slightly increasing. Preliminary research shows that paved roadways and agricultural landcover surrounding their sites may negatively impact their presence while higher amounts of forest and increased precipitation could have a positive impact on populations.

Gray Treefrog, courtesy of Jennifer Swanson

The plants on the ground and in the lower canopy levels of forests can hint at the overall health and quality of the ecosystem. A diverse array of flowers, grasses, shrubs, and herbaceous plants are indicative of healthy forest habitats. Spring ephemeral flowers like jack-in-the-pulpit (*Arisaema triphyllum*), white trout lily (*Erythronium albidum*), and Dutchman's breeches (*Dicentra cucullaria*) are popular finds in the forest when the snow first melts.

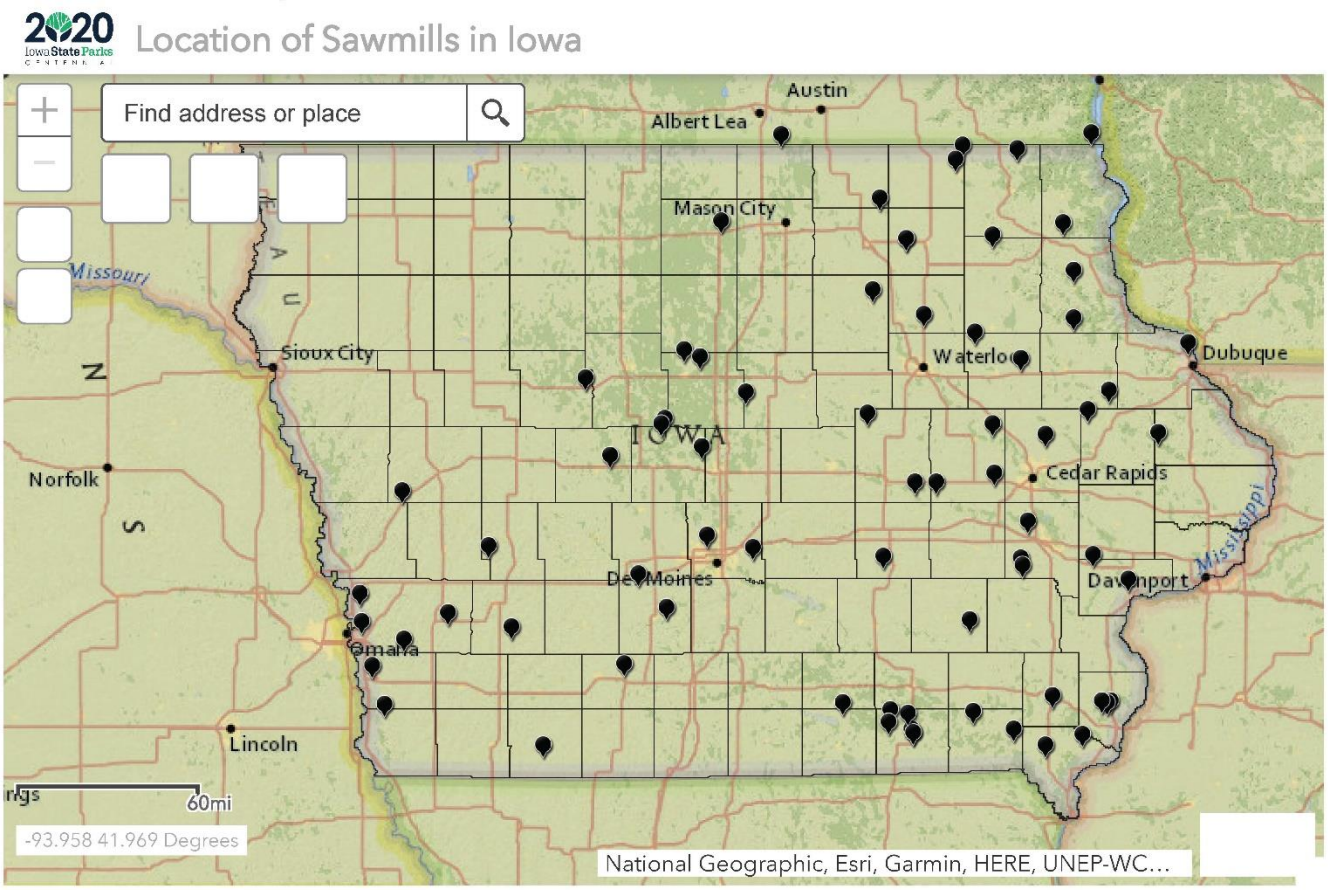
White Trout Lily, Dutchman's Breeches, Jack-in-the-pulpit, photographs by Riggs Wilson, used with permission

Dozens of herbaceous plants thrive in the shady understory of forests in Iowa. Bare-stemmed tick-trefoil (*Desmodium nudiflorum*), blunt-scaled wood sedge (*Carex albursina*), and spinulose wood fern (*Dryopteris carthusiana*) are plants that could be found in a healthy, high quality forest in Iowa. Smaller shrubs like witch hazel (*Hamamelis virginiana*), rock elm (*Ulmus thomasii*), downy arrowwood (*Viburnum rafinesquianum*), and northwestern serviceberry (*Amelanchier alnifolia*) make up the lower levels of the forest canopy. A longer listing of native forest understory plants can be found in the Appendix.

Similar to how healthy forests can be identified by the presence of certain understory plants, other plants indicate unhealthy forest ecosystems. Nonnative invasive plants often dominate a forest understory, quickly outcompeting native plants. Invasive plants are discussed in more detail in the Forest Health section of this Action Plan. Common invasive plants found in the forest understory include garlic mustard (*Alliaria petiolata*), common buckthorn (*Rhamnus cathartica*), multiflora rose (*Rosa multiflora*), and amur honeysuckle (*Lonicera maackii*).

Japanese barberry (Berberis thunbergii) invasion in Ledges State Park. The understory plants that are reddish/brown are all invasive Japanese barberry.

Iowa DNR professionals have observed an increase of nonnative invasive species in Iowa's forest ecosystems over the past decade. This trend is concerning to natural resource professionals across the state. Active management can help mitigate the presence of these invasive plants and restore the health of the forest ecosystem. More information about invasive plants and pests in Iowa can be found in the Forest Health tab of this Action Plan.



Map showing the location and a brief description of currently known sawmills in Iowa.

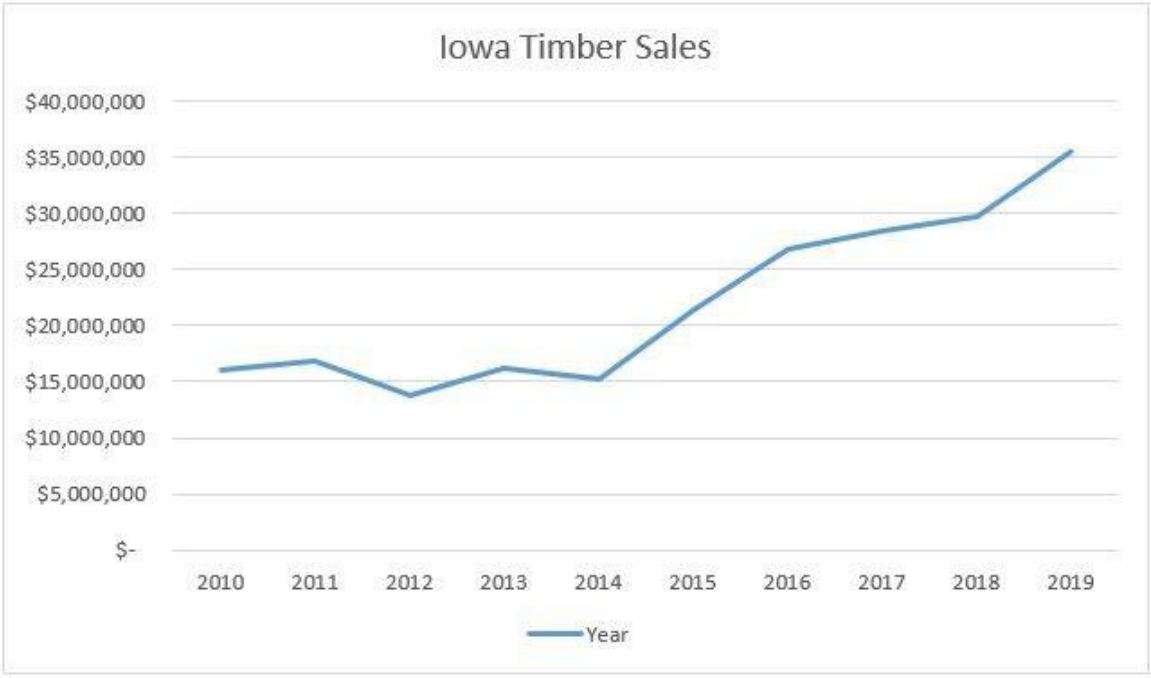
Businesses involved with managing Iowa's forests contributed $5.3 million in economic output from the 94 jobs associated with this work in 2017. Forestry services include consulting with landowners on how to improve their forests, helping with timber sales and tree planting.

The logging industry in Iowa contributed $39.1 million to Iowa's economy while employing 610 people, mostly in rural areas in 2017. Iowa's best grown trees can produce logs that are sold on a worldwide market with the remaining trees processed at a local sawmill. Iowa has had a law since 1980 that requires anyone who buys timber from a landowner to be a bonded timber buyer. For more information about Iowa's bonded timber buyer law and for landowner information about how to sell timber, please visit: https://www.iowadnr.gov/Conservation/Forestry/Wood-Industry-Logging.

Sawmills provided 518 jobs and $144 million contribution to Iowa's economy in 2017. Iowa sawmills can vary from portable sawmills that can cut lumber from a yard tree to larger sawmills that process thousands of logs each year. Although there is not an organized network of sawmills within Iowa, it is estimated there are around 70 permanent and portable sawmills across the state.

Timber Value and Sales

The amount of money paid to Iowa forest landowners from timber buyers has been increasing since 2014. The graph below shows the value of timber purchased by bonded timber buyers for each of the last 10 years.



Iowa Timber Sales as estimated from Bonded Timber Buyers

The value of a tree can depend on a lot of variables. Proximity to a sawmill or being located within economically reasonable transportation distance to several different markets for timber provides the best economic opportunities for forest landowners. It is incumbent on forest landowners to grow tree species that have timber value in enough quantity

and of a size that meets merchantable demand for their forest to have timber value. Even if a landowner is successful at growing high quality trees, there needs to be foresters, loggers and sawmills within the area who can find the best markets for that timber to be utilized. Therefore, it is important to have a good wood business environment to capture the wood being grown in Iowa's forests.

Non-timber Forest Products

Non-timber Forest Products (NTFPs) are made from plant materials and fungi. These products are harvested from the soils and aboveground vegetation. NTFPs are harvested for personal enjoyment, cultural and spiritual significance, and commercial gain. Among the most well-known NTFPs in Iowa are American ginseng (*Panax quinquefolius*), morel mushrooms (*Morchella spp*), and black walnuts (*Juglans nigra*). Non-timber Forest Products expand the economic potential of woodlands in Iowa beyond the traditional timber products. The markets for NTFPs include culinary markets, medicinal and dietary supplements, decorative products, products made by Indigenous persons, and fine arts and crafts. Foraging Iowa's forests for wild edible plants and fungi has become more popular in the past several years.

The economic impact of these NTFPs is difficult to track and quantify since they are components of other markets and not easily separated. In addition, these products are often sold as small quantities into larger markets making their impact even more difficult to identify. For instance, the market for culinary NTFPs is growing to include morel mushrooms, ramps (wild leeks, *Allium tricoccum*), and fiddlehead ferns (*Matteuccia struthiopteris*). Dozens of native forest understory plants are harvested for medicinal purposes including American ginseng, coneflowers (*Echinacea spp*),

and slippery elm (*Ulmus rubra*). Balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*) and various ash species (*Fraxinus spp*) are used for decoration and fine arts and crafts.

Oftentimes the presence of these products are related to the overall health of the forests where they grow. Invasive species will easily outcompete these native plants and fungi. Active management is key to sustaining these NTFP populations including forest farming, prescribed burns, and assisted migrations.

Iowa is one of only 19 states to allow the harvest and selling of American ginseng in the nation. All American ginseng sales must be reported to the U.S. Fish and Wildlife Service (US FWS). According to the US FWS approximately 300 pounds dry weight of ginseng was harvested in Iowa. Specific rules and regulations related to harvesting American ginseng in Iowa can be found on the Iowa DNR's website.

The nuts of several different tree species are collected for commercial sale in Iowa. These include walnuts, chestnuts, pecans, and hazelnuts. More information about growing trees for nuts can be found by visiting the website of the Iowa Nut Growers Association.

State Forest Nursery

The State Forest Nursery provides affordable, high-quality native plant material for use in timber production, wildlife habitat restoration, erosion control, and other conservation-related endeavors, to landowners in Iowa and other states. Located on 98 acres just south of Highway 30 in Ames, the nursery was established by the Civilian Conservation Corps in the 1930s and has operated continuously ever since. Currently, the nursery sells approximately 1 million seedlings per year, and 3-5 million seedlings are grown on-site at any given time.

Why Plant Trees?

Trees provide an incredible array of benefits, including: food and habitat for wildlife and pollinators; reduced soil erosion along streambanks and waterways; innumerable products, such as lumber, furniture, fruit, and Christmas trees, just to name a few; reduced heating and cooling costs for homes and other buildings; cleaner water through removal of chemicals such as nitrogen and phosphorous; cooler temperatures, cleaner air, and reduced noise pollution in towns and cities, and; aesthetic and other benefits that have been shown to improve mood, increase focus and learning, and

foster general health and well-being for people.

Why Plant Native Trees?
No matter where you live, it's always best to plant trees grown from locally-adapted seed. The further a tree is planted from its seed source, the greater its risk of suffering from disease or early mortality, even if the seed source and planting site both fall within the native range of the species. The habitat provided by native tree species is also far superior to that of non-native species, as wildlife and pollinators are adapted to trees that are native to where they live. Iowa has the enviable distinction of possessing the soil and climate ideal for producing some of the finest trees in the world, and the State Forest Nursery strives to grow and distribute the best stock possible. Whatever your tree-planting needs, the State Forest Nursery is here to help you achieve your goals!

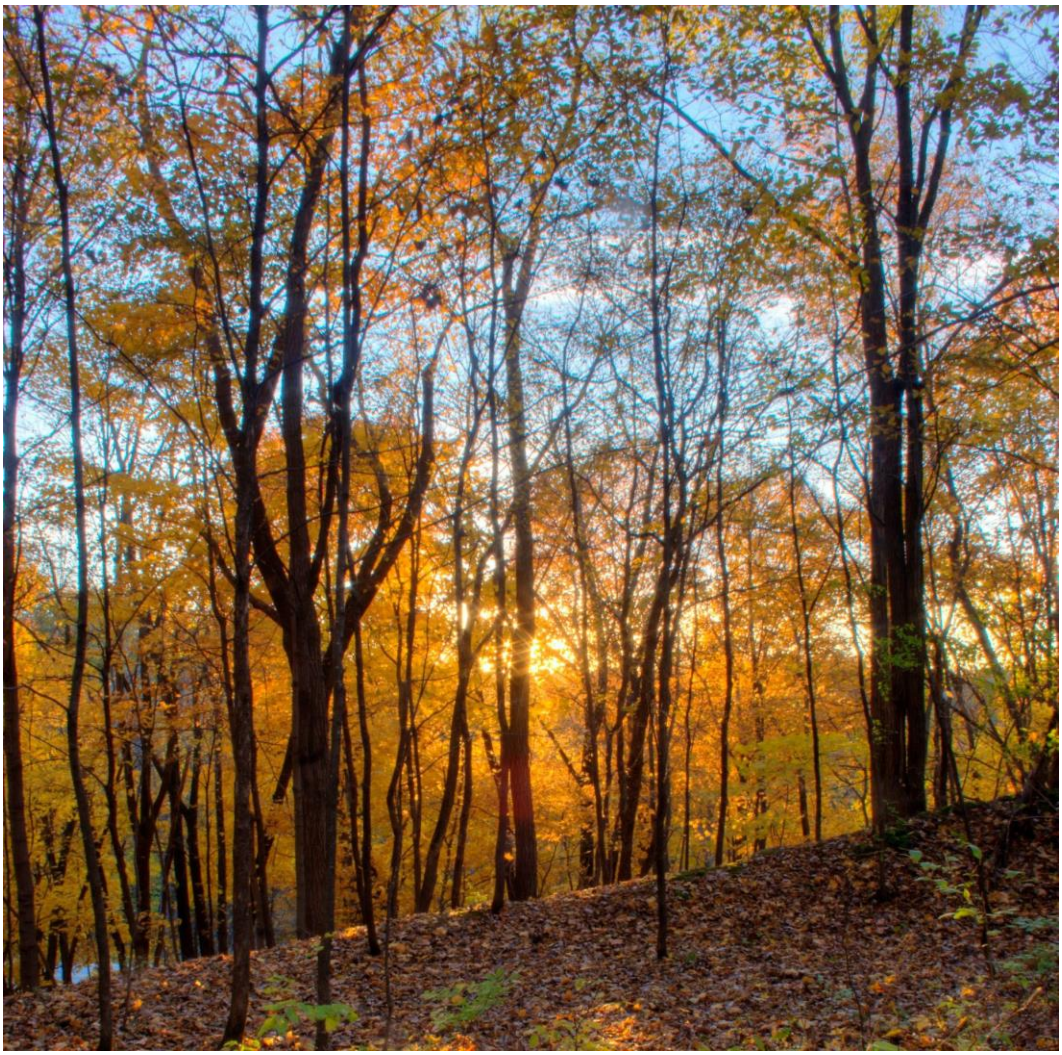
Orders are taken August 1 - May 31. Fall orders are processed beginning the last week in October and spring orders are typically processed starting April 1st, weather-permitting. Sizes range from 11-30", depending on species, and two size categories are available for most species.

How to Place an Order:
Ordering online is easier than ever with the nursery's new online order system. Simply click on the following link to set up an account, and follow the instructions given. After you place your order, you will receive invoices and updates via email.

State Forest Nursery

If you have any further questions please contact the State Forest Nursery directly at 515-233-1161.

Looking to the Future



The trees around us provide countless ecosystem benefits such as erosion control, temperature mitigation, and energy conservation. Since trees provide us with these benefits it is crucial to understand some of the environmental impacts that trees may face in the years to come. By being aware of future changes in temperature, precipitation, air quality, flood occurrences and more, land managers can better understand where and when to focus management to ensure longevity and quality of their forestland.

This section focuses on how trees affect our surrounding environment and how the future might look with projections of temperature, precipitation, and growing degree days, a method used to estimate the growth and development of plants and insects.

Contents:

Well Being

Trees and natural green (plants) and blue (water) spaces can act as a salve to the human spirit. While the positive benefits of trees and natural space are difficult to quantify and fully understand, the impact has been shown in countless scientific studies. Studies have shown that hospital patients recover faster from surgery if they have a view of green space from their window (Ulrich, 1984). Green space might lower the occurrence of Type 2 Diabetes (Astell-Burt, 2014). Children suffering from Attention Deficit/Hyperactivity Disorder may focus better after going on a short walk in nature (Kuo, 2004). Spending time in nature reduces stress (Roe, 2013), promotes physical and mental health (Mytton, 2012), reduces crime (Troy, 2012), and facilitates social cohesion (de Vries, 2013). This is only a short listing of some of the positive impacts nature and trees have on human health. More and more research-based connections are being discovered every day between nature and human health.

Being surrounded by nature often helps people feel better, regardless of knowledge of the research. Standing in the presence of and simply viewing trees and green space calms, grounds, and refreshes us. Designing space for natural areas in the built environment of towns and city centers is important to our well-being. City planners are beginning to take note of this impact and are working to incorporate green and blue space in the design of urban environments.

Environmental Education

The value of engaging youth in caring for and learning about our natural environment cannot be understated. Environmental education connects the principles that students are learning in their classroom to real world problems. Students are able to experience how their actions can affect the quantity and quality of natural resources for years to come.

The Iowa Department of Natural Resources offers a variety of conservation resources for teachers and youth leaders including active engagement in the Project WILD and Aquatic WILD programs. More information about environmental education resources available from the Iowa DNR can be found on the Classroom & Teacher Resources page of the Iowa DNR's website. At this time Project Learning Tree is not active in Iowa due to lack of funding and staff. We hope to be able to offer Project Learning Tree courses for educators in Iowa in the future.

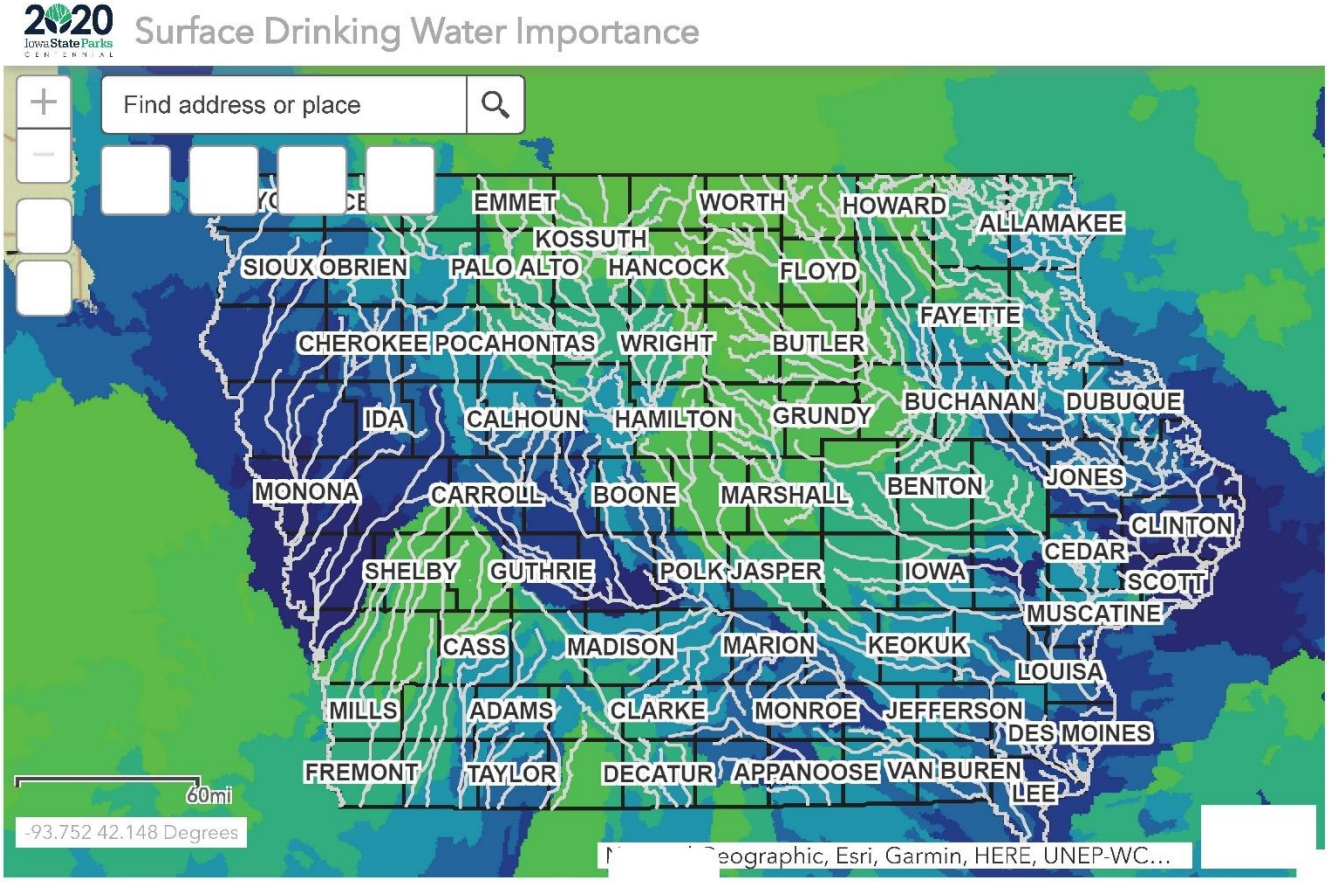
The Iowa DNR also offers the Trees for Kids grant program. This program funds the planting of trees on public areas with a required youth environmental education component. Since 2010 the Trees for Kids program has funded 352 grants, engaged more than 30,000 youth with environmental education, and planted more than 12,800 trees across the state. Recent cuts to donations that fund Tree for Kids have severely limited the scope of the grant program.

The Iowa Conservation Education Coalition (ICEC) is the professional membership organization for all environmental / conservation educators in the state of Iowa. A non-profit organization founded in 1958, ICEC has a long-standing

tradition of providing personal and professional development to formal and non-formal educators in conservation and environmental education. Originally incorporated as the Iowa Conservation Education Council, ICEC is North America's longest running environmental education organization! ICEC is the unifying voice for conservation and environmental education in Iowa, sharing information between and among conservation and education professionals and supporters. ICEC promotes conservation education by building connections and lines of communication between educators and Iowa resources. This helps educators connect learners with authentic content and knowledge about the real world outside their windows. Through the power of conservation education, we can improve the lives of children, create healthy communities, and encourage decision-making based on environmental and social responsibility. More information about the Iowa Conservation Education Coalition and their programs can be found on their website.

The Iowa Department of Natural Resources along with our partners are hoping to create the next generation of Iowa's forest stewards, one program and child at a time.

Trees, Forests, and Water Quality



Trees and forests are a vital component of maintaining and improving water quality and protecting our water resource. Trees capture and slow rainwater, increase soil infiltration, recharge groundwater stocks, reduce stormwater runoff, reduce nutrient loads off agricultural lands, and so much more. Trees are highly interconnected with water sources and quality.

In Iowa, 972,748 people rely on surface drinking water from 189 uptakes while 2,095,059 people consume ground water from 2,786 intakes. Often large urban areas pull water from surface sources like rivers and lakes (surface drinking water) while rural communities and homes have groundwater wells (ground water). Even though most drinking water is treated to remove pollutants before consumption, the expense of this treatment can be reduced by protecting source water. The Iowa Department of Natural Resources has a voluntary Source Water Protection Program that assesses water supplies, creates a Source Water Protection Plan and helps implement the plan. More information about the Iowa DNR's Source Water Protection Program can be found on the Iowa DNR's website.

The surface drinking water importance map shows the most important drinking water watersheds - those serving the most people on public water systems drawn from surface water sources and providing the most water - in dark blue. Watersheds in yellow are either not important for surface drinking water or have very little runoff. Watersheds in yellow have little impact from forest ecosystems, while watersheds appearing green to blue have higher value of forest ecosystems relating to surface drinking water. In this map, watersheds appearing red are least likely to be able to produce clean water while watersheds appearing blue are most likely to be able to produce clean water. All three of these maps are from the U.S. Forest Service Forests to Faucets 2.0 dataset.

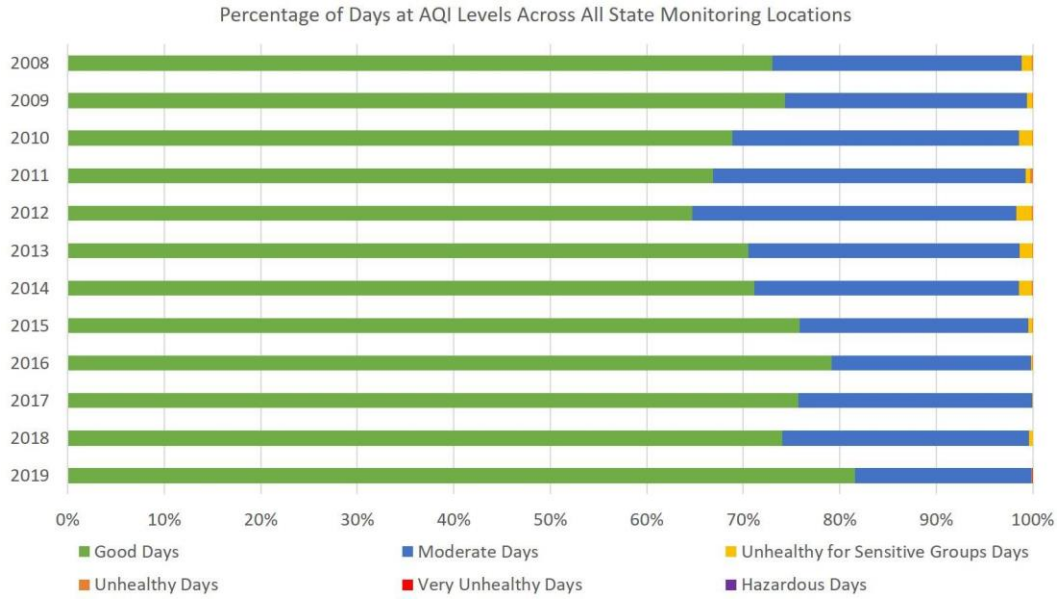
Trees and other vegetation can improve water quality by slowing down the flow of surface water and filtering out pollutants from groundwater. In an agricultural setting, a conservation practice like riparian buffers can have a large impact on the amount of nutrients in surface runoff. According to an Iowa State University Extension and Outreach publication, The Iowa Water Approach - Buffers, riparian buffers including a progression of trees and perennial vegetation on the edge of an agricultural field can trap 41-100% of sediment by slowing surface runoff. In addition, trees and other vegetation slow surface runoff which can delay downstream flooding.

In an urban setting, trees and vegetation are referred to as green infrastructure. Green infrastructure can have a large impact on the flow of water within an urban area. The canopy of trees intercepts rainfall which in turns slows down the speed of the raindrops and surface flow of water after a rain event. This interception and slowing of surface flow in turn reduces the load on stormwater systems and decreases the chance of flash flooding. The high rate of impervious surface in urban areas contributes to a high pollutant load in the water, as well; for instance, it is easy for salt from roads, oil and grease from cars, gasoline, and other chemicals to flow across cement and into the water system. Trees and other natural vegetation slow this water flow and help to remove some of the pollutants, thus improving water quality. These are only two ways that green infrastructure impacts water quality and surface water speed in an urban area, there are many more impacts not listed. City planners and engineers need to plan for more green infrastructure to assist with water quality problems, however there is still a debate within the industry about the cost to benefit ratio of these practices due to the complexity of benefits. More information about green infrastructure and stormwater management can be found through the Iowa Stormwater Education Partnership.

Every two years the Iowa DNR completes a statewide water quality assessment, most recently completed in 2020. This Section 303(d) Clean Water Act assessment generates a list of impaired waters needing a Total Maximum Daily Load (TMDL) requirement. The 2020 assessment lists 586 segments/water bodies that are in Category 5 (impaired waterway and TMDL is required) and 164 segments/water bodies in Category 4 (impaired but a TMDL is not required). The draft 2020 assessment suggests that of the river and stream segments assessed, 61% are impaired and 23% are potentially impaired. In addition, of the lakes and reservoirs assessed, 67% are impaired and 3% are potentially impaired. More details about the draft 2020 Impaired Waters List can be found on the Iowa DNR's website. Iowa is also a major contributor to the Gulf of Mexico Hypoxic Zone, an area of water so polluted with nutrients, like nitrogen and phosphorus, that massive algal blooms deplete the water of dissolved oxygen, leaving the area devoid of life. Water quality is a major issue in Iowa due in part to current agricultural practices and lack of native vegetation. As described above, trees and other natural vegetation help to improve the quality of water and can play a vital role in improving water quality in Iowa. Planting more trees and vegetation, especially along waterways and field edges will help to mitigate the effects of agricultural runoff and improve water quality.

Trees, Forests, and Air Quality

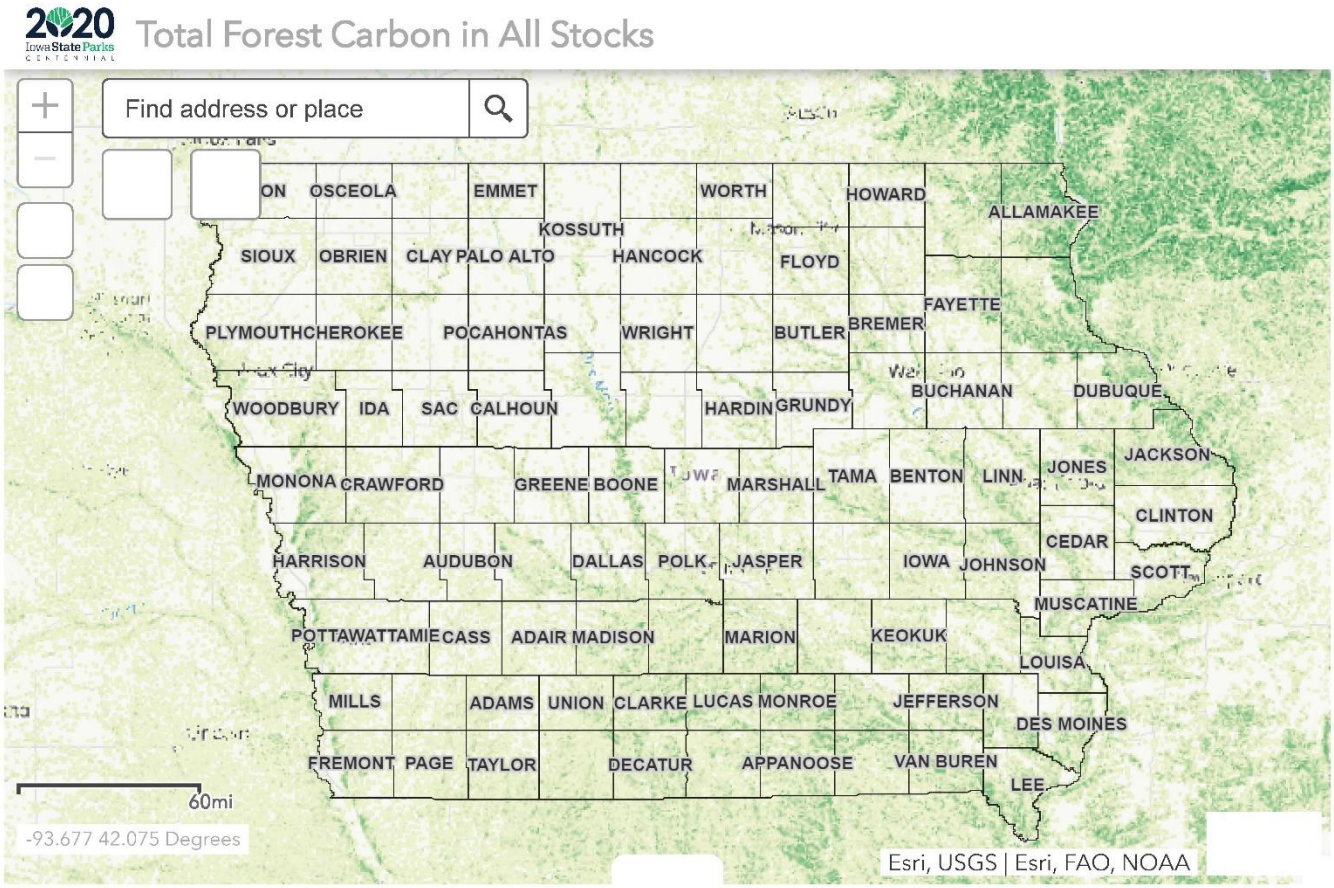
The United States Environmental Protection Agency's Air Quality System (AQS) monitors air quality at hundreds of locations across the country. There are sixteen different AQS sites in Iowa collecting data throughout the year. This data is analyzed and sorted into AirData using the Air Quality Index (AQI) values. AQI is an indicator of the overall air quality of a given location and can be calculated by county or by core based statistical areas. When calculating an AQI rating, all available pollutant measurements are included, however not every site collects data for every pollutant. AQI has six different ratings: Good, Moderate, Unhealthy for Sensitive Groups, Unhealthy, Very Unhealthy, and Hazardous. The chart below shows the annual percentage of days at each AQI level across Iowa from 2008 to 2019. The vast majority of days (between 65% and 82%) the AQI in Iowa is categorized as Good. The Moderate AQI level is seen between 18 and 34% of the time. Between 2008 and 2019 in Iowa 62,262 daily AQI values were reported to the U.S. Environmental Protection Agency, of this only 46 records were classified as having a Unhealthy AQI, 1 record registered at the Very Unhealthy level and no records were reported in the Hazard AQI level.



Percentage of Days at AQI Levels Across All Monitoring Locations

The presence of trees and other plants helps to mitigate pollutants in the air by removing airborne pollutants and reducing the overall air temperature. Air quality is primarily an issue in urban areas with higher populations, higher emissions and lower amounts of natural space, however some rural communities have air quality issues as well. Reducing the air temperature also lowers energy needs, which in turns reduces air pollutants. Trees reduce both pollutants in the air and emissions that create air pollution. A 2010 report from the National Recreation and Park Association estimates that U.S. urban park trees remove 75,000 tons of air pollution ($500 million) and 80 pounds per acre of tree cover ($300 per acre of tree cover) (Nowak, 2010). According to i-Tree Landscape the trees and forests of Iowa remove 133,483,784 pounds of air pollutants annual, including CO, NO_2, O_3, $PM_{2.5}$, SO_2, and PM_{10}.

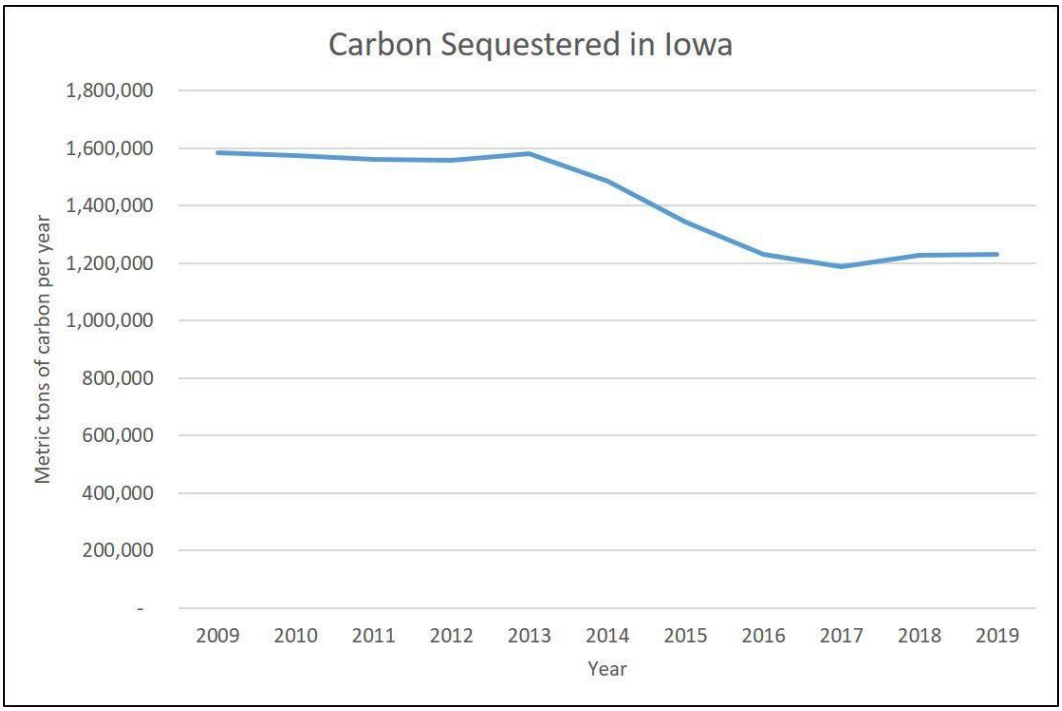
It is important to note that some trees also contribute to air pollution by emitting biogenic volatile organic compounds (BVOCs), which can increase ozone, however trees remove more air pollutants than they emit so the balance stays positive. In addition, trees contribute pollen into the atmosphere which can cause human health conditions.



Map showing total forest carbon stored in all pools according to the U.S. Forest Service Forest Inventory Analysis in 2016. The darker green areas are storing more carbon in all forest carbon pools.

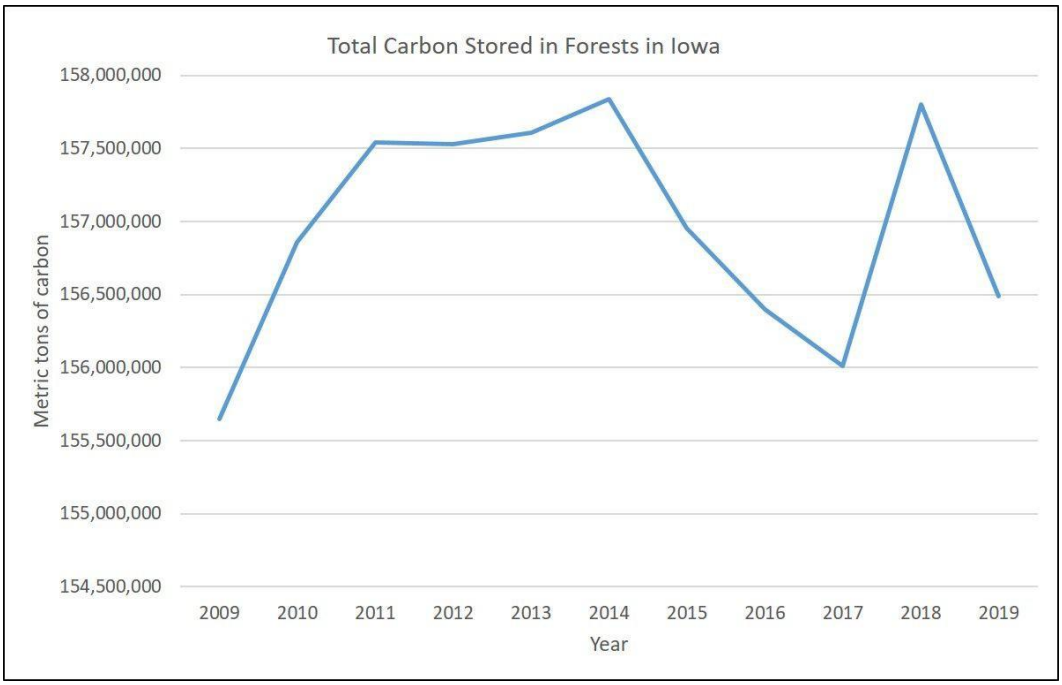
There are two ways that trees and forests impact carbon levels, carbon storage and carbon sequestration. It is important to define the difference between the two since they are often confused. Carbon storage is the biomass of a tree, aboveground and belowground, litter, and forest soil acting as a sink, storing carbon long term until the tree dies or is removed and the soil is disturbed. Carbon sequestration is in flux based around the process of photosynthesis, where trees take in and store carbon dioxide from the atmosphere temporarily.

Tree biomass is approximately 50% carbon. As trees grow larger, they take in more carbon from the atmosphere; however, when trees die and begin to decay, decomposition releases that carbon back into the atmosphere. U.S. Forest Service Forest Inventory Analysis (FIA) data reports trees and forests in Iowa sequestered1.2 million metric tons of carbon in 2019. Optimizing the amount of sequestered carbon involves maintaining or increasing forest coverage, avoiding forests conversion to non-forestland, and increasing the occurrence of new forests. Wood products also work to store carbon. More than 2.6 million metric tons of carbon was stored in harvested wood products in the United States in 2015.



Carbon Sequestered in Iowa, Forest Inventory Analysis, U.S. Forest Service

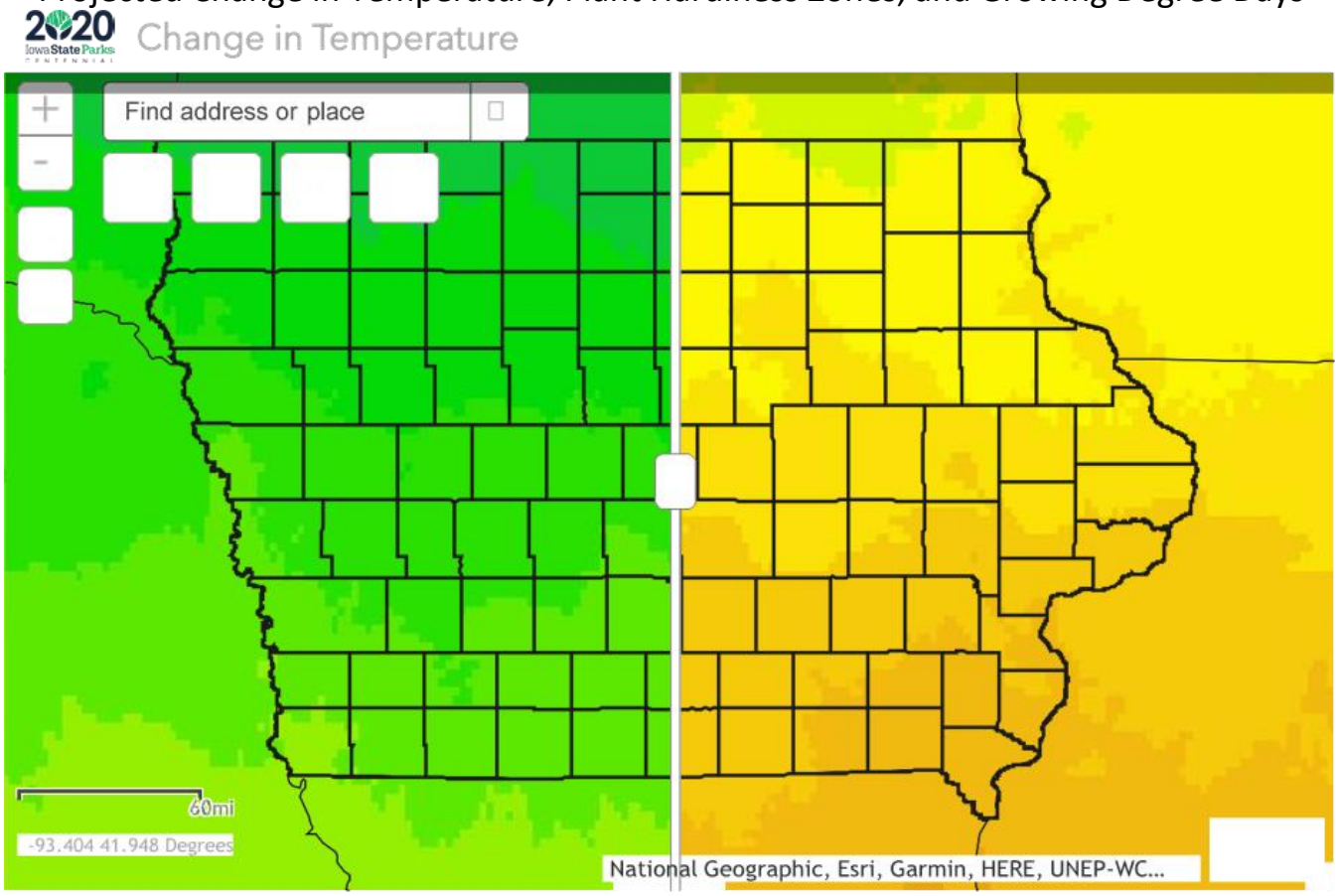
Forest ecosystems account for 92% of terrestrial carbon sinks on the planet. According to the U.S. Forest Service FIA, in 2019, 156.4 million metric tons of carbon was stored in all forest carbon pools in Iowa. Forest carbon pools include the five forest carbon pools as outlined by the Intergovernmental Panel on Climate Change defined as follows: live aboveground, live belowground, dead wood, litter, and organic soil.



Total Carbon Stored in Forests in Iowa, Forest Inventory Analysis, U.S. Forest Service

Actively managing forestlands will allow trees to grow larger and retain the forest as forest, thereby maintaining the existing forest carbon pools. Both of these components will increase the amount of carbon that is sequestered and stored by trees and forests. Based on high future carbon emission projections, it is vital that work is done to conserve and grow these important carbon systems and sinks.

Projected Change in Temperature, Plant Hardiness Zones, and Growing Degree Days



Map showing the historic (1975-2005) on the left side of the slider and future (2071-2090) on the right side of the slider, for the average annual temperature in Iowa. The values in the map are in degrees Celsius.

Historically the average annual temperature in Iowa ranged from 44.6° F and 53.6° F from 1975-2005. According to the USDA Forest Service National Forest Climate Change map projections (2071-2090), the average annual temperature in Iowa will increase by approximately 10° F. The northern-most section of the state will experience average annual temperatures hotter than the historical average annual temperature of the southern-most section of Iowa. As average annual temperature increases, native trees and other vegetation will become stressed and cease to thrive. Native habitats will slowly disappear as most plants will not be able to adapt to this rapid change.

Plant Hardiness Zones

Plant Hardiness Zones is a method used to determine the tolerance of species to a particular area's climate. The increase in average annual temperature will also change Plant Hardiness Zones for Iowa. Historically (1980-2009) Iowa was primarily classified as Zone 5 for Plant Hardiness Zone with only a small portion of the far northwest corner classified as Zone 4. Current projections of the impact of the changing climate on Plant Hardiness Zones has more than half of the state classified as Zone 6. Only the northern tier of Iowa will remain classified as Zone 5 in the projections for 2070-2099 with medium emission rates. This will result in tree species that could at one time tolerate the climate of southern Iowa, becoming stressed or even dying due to the change in climate. Iowa will begin to see species more common in the southern U.S. moving into the southern portion of the state while species that were once well suited to the climate in the northern portion will struggle to adapt.

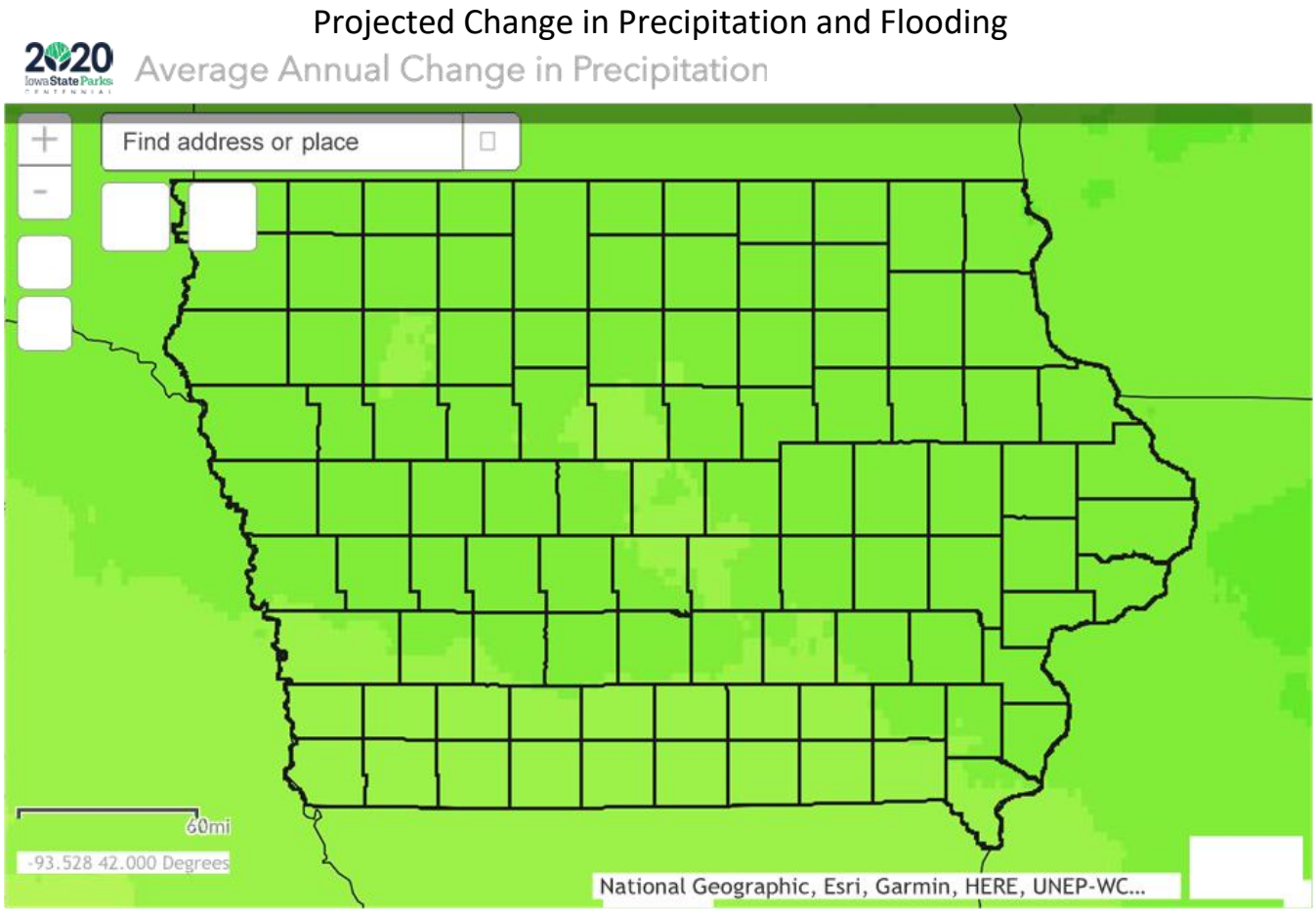
Plant Hardiness Zones: Present and Future map. This map has a slider function to easily compare historic versus future values. The map on the left side of the map slider is historic data and the map on the right side of the slider is a future projection. Click on a location to view data for both historical and future plant hardiness zones, you will need to click the small arrow at the top right of the popup to view the data.

Growing Degree Days

Growing Degree Days (GDD) uses a mean temperature to track the stage of development of plants and insects. GDD is calculated using a base temperature for the plant or insect and then taking that out of the mean temperature for each day. Historically (1980-2009) the northern two-thirds of the state accumulated 3000-3999 GDD, with the southern tier between 4000-4999 GDD. In future projection models (2070-2099) with medium emission rates GDD are expected to be between 3000-3999 for almost all of the state, with the exception of a few small pockets. This change in GDD will impact plant and insect life cycles with fewer days for development and growth.

Growing Degree Day: Present and Future map. This map has a slider function to easily compare historic versus future values. The map on the left side of the map slider is historical data and the map on the right side of the slider is a future projection.

The U.S. Forest Service Rocky Mountain Research Station and the Office of Sustainability and Climate created all of the maps in this section.



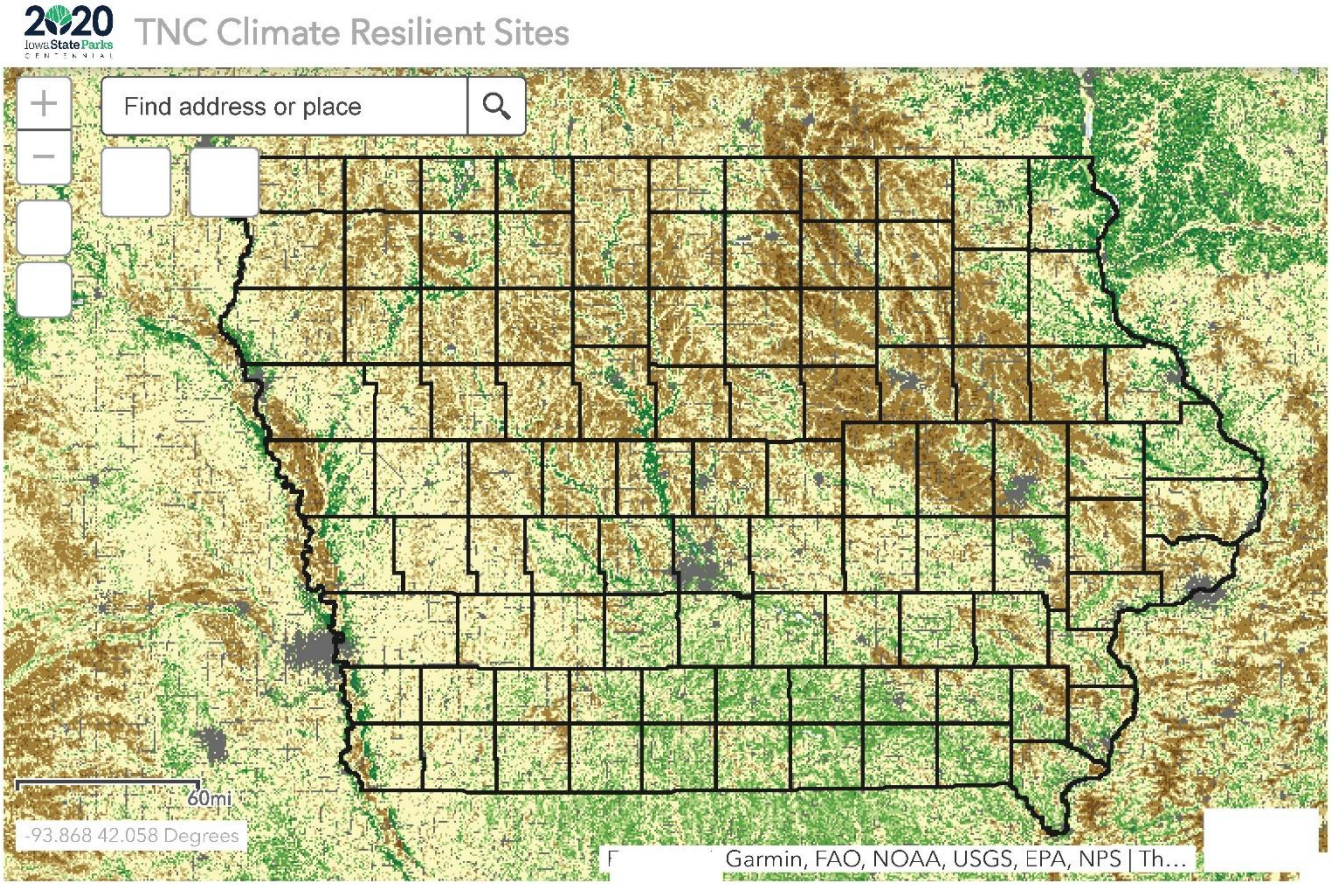
Map showing the average annual percent change in precipitation between historical (1975-2005) and future (2071-2090). The U.S. Forest Service Rocky Mountain Research Station and the Office of Sustainability and Climate created this map.

According to the USDA Forest Service National Forest Climate Change Maps project, precipitation across Iowa will increase between 4-8% based on a future projection for 2071-2090. Historically from 1975-2005 Iowa averaged 28-38" of precipitation annually. Additional precipitation will increase the occurrence of flooding especially along the major waterways in Iowa. On top of higher rates of precipitation annually, Iowa can also expect longer periods of drought to accompany periods of high rainfall. These changing climatic conditions will add stress to existing plant life and may cause a shift in species location and quantities.

The Iowa DNR has developed a flood risk map that shows previous flooding occurrences and potential flooding risk for the future. Flooding in Iowa: A brief history and overview of flooding and flooding responses in Iowa.

A projected increase in annual precipitation of up to 8% will affect the health and composition of trees and forests in Iowa. Bur Oak Blight spreads faster during wetter spring seasons, leading to a prediction that Bur Oak Blight will be more prevalent in the future due to higher rainfall totals (more information about Bur Oak Blight can be found in the Forest Health section of this Action Plan). Some tree species are not well equipped to handle droughts, which will be more frequent in the future, resulting in higher tree mortality. In addition, changing average annual precipitation amounts will likely cause a shift in overall forest composition towards species that are more drought and flood tolerant.

Resilient and Connected Landscapes



Map showing the location of resilient areas in Iowa from TNC's Resilient and Connected Landscapes project. The areas that appear gray on the map are urban communities and were excluded from the TNC analysis.

The Nature Conservancy (TNC) has lead an over 10-year initiative in partnership with over 150 scientists from agencies, academia, and non-governmental organizations across the United States to develop a dataset that interprets the resiliency and connectivity of landscapes in relation to climate change. The outcome of this project is TNC's Resilient and Connected Landscapes database. This is a "proposed conservation network of representative climate-resilient sites designed to sustain biodiversity and ecological functions into the future under a changing climate." The project also maps areas of high biodiversity, areas of land that will be most resilient to future climate conditions, and highlights connected lands between these resilient landscapes. All of this data combine helps to create priority areas for conservation work that would have the highest impact now and into the future for plant and animal species as well as environmental benefits.

Landscape Diversity

Landscape diversity according to the TNC's Resilient and Connected Landscapes references areas of land that have varying topography and elevation. Sites that have more elevation changes will provide pockets of climate resilience for plants and wildlife, slowing the rate of regional climatic change. Areas of high landscape diversity are priority areas for conservation practices in Iowa.

Resilient and Connected Network

Overall resiliency and connectedness of landscapes can best be evaluated by looking at multiple criteria. TNC combined resilient landscapes, regional flow of species and landscapes, and levels of biodiversity. Areas with recognized resilience, flow, and biodiversity are some of the most important and impactful areas for conservation.

Goals and Strategies

The Statewide Forest Resource Goals and Strategies serve as a broad strategic plan for all forest resources in Iowa. These goals and strategies were developed to be long term, broad, and flexible; functioning as guidelines statewide. A group of DNR staff developed these goals and strategies in response to issues and priorities experienced statewide. Partner groups reviewed the goals and strategies created to ensure alignment. This is not meant to be a strategic operational plan for the Iowa DNR Forestry Section.

Health and Productivity

Goal 1: Maximize Forest Health and Productivity

1. Use science-based techniques and technologies that are implementable, adaptive, and sustainable
2. Conduct management on public lands
3. Engage Iowans with management tools and strategies on private lands
4. Encourage quality, native nursery stock
5. Protect the forests from current and future threats
6. Protect quality habitats for wildlife include Threatened and Endangered species
7. Improve forest diversity and composition
8. Encourage landscape scale management
9. Increase forestry professionals statewide
10. Grow stock and market for timber and non-timber forest products

Goal 2: Strategically Grow Iowa's Forests

1. Decrease forest fragmentations and habitat loss
2. Expand public and private forest land
3. Identify plantable sites to achieve multiple benefits
4. Encourage appropriate species and site selection
5. Facilitate the use of incentive programs
6. Use trees and forests to grow Iowa's economy and improve the health and wellbeing of Iowans
7. Make use of forest cover to improve soil, air, and water quality

Goal 3: Promote the Benefits of Iowa's Forest Resource

1. Provide forestry education and technical assistance through individual contact
2. Reach stakeholders via workshops, field days, demonstrations, and trainings
3. Increase recreational capacity of forest lands where appropriate in alignment with the Statewide Comprehensive Outdoor Recreation Plan
4. Foster partnerships to increase forestry and forest resource awareness
5. Create and use educational materials, programming, and communication tools to reach diverse audiences
6. Inform and educate Iowans on forest policies and laws

Below are three maps, Urban Priority Areas, Forest Stewardship Program Priority Areas, and Iowa's Priority Landforms, displaying specific program priority areas. In addition to the lands displayed below we consider the following to be forest priority lands within Iowa:

- Forest Legacy Program and surrounding lands
- Native forest types
- Riparian forest land
- Existing forest land in Iowa
- Land surrounding existing forest land

- Trees outside of forest land

Urban Priority Areas
Map Placeholder

Forest Stewardship Program
Map Placeholder

Iowa's Priority Landforms
Map Placeholder

Resources Needed to Accomplish Statewide Forest Resource Strategies

Iowa DNR State Forester Jeff Goerndt

In order to accomplish the goals and strategies in the Iowa State Forest Action Plan, the Iowa Department of Natural Resources (DNR) relies upon funding, staff, and partnerships to carry out forestry work across the state.

Iowa DNR Forestry receives annual funding from the U.S. Forest Service to help fund core forestry programs. Most of these federal funds require dollar for dollar match from the state and help accomplish our goals and strategies in various ways. The Forest Stewardship Program offers technical assistance to Iowa's private forest landowners. The Forest Health Program works toward early detection, monitoring and prevention of forest pests and diseases. The Urban and Community Forestry program works with cities and communities across the state to improve tree resources. The Fire Program helps local fire departments with equipment and training needs and provides prescribed fire training. Finally, the Forest Legacy Program helps protect private forestland through conservation easements.

Future funding of these core programs is critical to the management of the forest resource across Iowa. In addition to core federal funding, the Iowa DNR competes annually with other states for competitive funds through the Landscape Scale Restoration Program. The U.S. Forest Service awards these funds for specific, landscape level projects that address forest management issues. Iowa DNR Forestry has been very successful in the past few years, and must continue to prioritize forest resource needs, utilize state funds for leverage, and engage partner support to utilize this program effectively.

The steady decline of state funding for natural resources continues to be a concern for Iowa. In addition to using state funds to leverage federal funds, the Iowa DNR needs this critical funding for operation of the State Forests and Wood Utilization and Marketing efforts. State revenue for forestry is derived from many sources, including: timber sales, habitat land leases, and State Forest Nursery sales. Sustainable funding for natural resources, including Forestry at the state level must become a reality in order for forest management in Iowa to continue to be effective into the future. A bright spot in the state budget has been the state Woodland Health fund, a special appropriate for managing forest health issues across the state. Thanks to the Iowa legislature and many key stakeholders, these funds have been consistent in recent years. It is critical these funds continue to combat forest health issues in our state.

Within the Iowa DNR, there are approximately 40 full-time positions and 8 contract positions devoted to forestry management. In addition, the department utilizes numerous seasonal and temporary positions each year to accomplish our goals. Partnerships with outside organizations has always help stretch thin state resources across the state. Recently, as budget uncertainties continue to be a concern, the department has entered into cooperative agreements with partner organizations with a like-mindedness toward conservation and management of forest resources. These agreements have allowed the hiring of additional staff to carry out our goals and strategies in key areas of the state where staff resources are limited. A network of professionals including DNR foresters, forestry organizations, non-profit entities, and private forestry consultants will be critical for moving the needle toward increased forest management and protection of Iowa's critical forest resource in the future.

The State Forest Nursery provides quality, low-cost tree and shrub seedlings to encourage conservation planting. The Nursery serves an important role by providing seedlings for expansion and diversification of private owned forests and

tree planting on public lands and in communities. Landowner incentive programs for conservation practices often drive the demand for trees and thus have a heavy impact on sales. Since 85% of Iowa's forests are privately-owned, we need strong advocacy to expand these programs and keep tree planting a priority for landowners across the state.

U.S. Forest Service National State and Private Forestry Priorities

1. Conserve and manage working forest landscapes for multiple values and uses
2. Protect forests from threats
3. Enhance public benefits from trees and forests

Alignment Between U.S. Forest Service National State and Private Forestry Priorities and Iowa's Statewide Forest Resource Strategies

USFS S&PF Priority #1: Conserve and manage working forest landscapes for multiple values and uses

Aligning Iowa Strategies:

G1S4: Encourage quality, native nursery stock
G1S6: Protect quality habitats for all wildlife including Threatened and Endangered species
G1S8: Encourage landscape scale management
G1S10: Grow stock and market for timber and non-timber forest products
G2S1: Decrease forest fragmentation and habitat loss G2S3: Identify plantable sites to achieve multiple benefits
G2S4: Encourage appropriate species and site selection
G3S3: Increase recreational capacity of forest lands where appropriate in alignment with the Statewide Comprehensive Outdoor Recreation Plan
G3S4: Foster partnerships to increase forestry and forest resource awareness

USFS S&PF Priority #2: Protect forests from threats

Aligning Iowa Strategies

G1S1: Use science-based techniques and technologies that are implementable, adaptive, and sustainable
G1S2: Conduct management on public lands
G1S4: Encourage quality, native nursery stock
G1S5: Protect the forests from current and future threats
G1S7: Improve forest diversity and composition
G1S8: Encourage landscape scale management
G2S1: Decrease forest fragmentation and habitat loss
G2S2: Expand public and private forest land
G2S4: Encourage appropriate specie s and site selection
G3S4: Foster partnerships to increase forestry and forest resource awareness
G3S6: Inform and educate Iowans on forest policies and laws

USFS S&PF Priority #3: Enhance public benefits from trees and forests

Aligning Iowa Strategies

G1S2: Conduct management on public lands
G1S3: Engage Iowans with management tools and strategies on private lands
G1S6: Protect quality habitats for all wildlife including Threatened and Endangered species
G1S7: Improve forest diversity and composition
G1S8: Encourage landscape scale management
G1S9: Increase forestry professionals statewide
G1S10: Grow stock and market for timber and non-timber forest products
G2S1: Decrease forest fragmentation and habitat loss G2S2: Expand public and private forest land
G2S4: Encourage appropriate species and site selection
G2S5: Facilitate the use of incentive programs

G2S6: Use trees and forests to grow Iowa's economy and improve the health and well-being of Iowans
G2S7: Make use of forest cover to improve soil, air, and water quality
G3S1: Provide forestry education and technical assistance through individual contact
G3S2: Reach stakeholders via workshops, field days, demonstrations, and trainings
G3S3: Increase recreational capacity of forest lands where appropriate in alignment with the Statewide Comprehensive Outdoor Recreation Plan
G3S4: Foster partnerships to increase forestry and forest resource awareness
G3S5: Create and use educational materials programming, and communication tools to reach diverse audiences
G3S6: Inform and education Iowans on forest policies and laws

Forest Action Plan Appendix

Urban Forestry Resources

Selecting Trees for Your Yard
Currently, maples make up more than one third of all trees in Iowa communities, creating great risk of tree loss from insects and disease. This guide helps match species needs with site characteristics, to create a healthy and resilient community forest with a diverse mix of trees.

Community Benefits from Public Trees in Iowa
Trees and forests make Iowa communities stronger. If properly cared for, trees provide a wide variety of Iowa's forest ecosystems. The findings are compiled on a yearly basis into the forest health reports. Forest health reports from previous years can be found on the Forest & Tree Health page of the Iowa DNR's webpage.

Iowa Woodlands: Vital Habitat for Native Pollinators
Pollinators are essential in Iowa's environmental and agricultural systems, for both biodiversity and crop production. Woodlands fulfill the needs of many pollinators by providing food and nectar as well as providing quality habitat. Many of the suggestions in this guide are aligned with commonly recommended plantings and forest stand improvement practices.

Canopy Cover Report
Urban tree canopy, defined as the layer of leaves, branches, and stems in a community that cover the ground when viewed from above, is a simple way for a community to get an overall picture of both residential and public trees. The incorporated Iowa communities' data included in this report was developed using high resolution land cover dataset, target year 2009, in conjunction with the incorporated boundaries from the 2010 census data. Zonal statistics were acquired using ArcGIS 10.1.

Invasive Species Guide
A pocket guide with descriptions, pictures, and management techniques for common invasive species present in Iowa.

Forest Health Resources

2019 Forest Health Report
Foresters use the data from ground surveys, aerial surveys ,and other sources to develop comprehensive management approaches to address forest health issues that affect the sustainability of Iowa's forest ecosystems. The findings are compiled on a yearly basis into the forest health reports. Forest health reports from previous years can be found on the Forest & Tree Health page of the Iowa DNR's webpage.

Iowa Tree Pests Webpage
The Iowa Tree Pests website was designed to be an up-to-date source of information for Iowa, and for any person who wants to learn more about invasive tree pests. There currently are several invasive insect and disease pests on the horizon, not only of great concern for Iowa and the Midwest, but also the entire United States.

This site is maintained by the Entomology and Plant Science Bureau of the Iowa Department of Agriculture and Land Stewardship (IDALS).

Invasive Species Guide
A pocket guide with descriptions, pictures, and management techniques for common invasive species present in Iowa.

Wood Industry and Forest Products

Iowa Bonded Timber Buyers
Timber Buyer" is defined as a person engaged in the business of buying timber from the timber growers, for sawing into lumber for processing or resale. This does not include a person who occasionally purchases timber for sawing or processing for that person's own use and not for resale. Timber buyer includes a person who contracts with a timber grower on a share-profit basis to harvest timber from the grower's land.

Directory of Wood Processors in Iowa
This directory may be used as a guide by those who have timber to sell, who want logs sawn, or who want to buy logs, lumber, or other wood products. This directory does not claim to be complete; any omissions are strictly unintentional.

Economic Contributions of Hardwood Products - Iowa
This study by the Hardwood Federation investigated the economic contribution from the output of hardwood industries, including sawmills wood preservation, veneer and plywood manufacturing, engineered wood member manufacturing, truss manufacturing, wood window and door manufacturing, cut stock, and more.

Iowa's Fire Program Resources

Iowa DNR Fire Program Webpage
The Iowa DNR Fire Program webpage hosts a variety of information including tips to lower your fire risk, federal/state grant programs for equipment, training and other resources.

Iowa's Forest Legacy Assessment of Need

Forest Legacy Program Assessment of Need - 2001

2015 Driftless Area Boundary Change Approval
Approval from the U.S. Forest Service for boundary adjustment of the delineated Driftless Area Forest Legacy Priority Area.

Description of Boundaries of Driftless Forest Legacy Area
Text description of the approved 2015 boundaries of the Driftless Forest Legacy Area.

Map of Driftless Forest Legacy Area
Map of Driftless Forest Legacy Area approved by the U.S. Forest Service in 2015

2010 Iowa Forest Action Plan

Introduction: State Foresters Comments, Executive Summary, Why Trees are Important in Iowa, Table of Contents, Iowa Background History
Chapter 1: Conservation of Biological Diversity - Part 1: Area of Total Land, Forest Land, and Reserved Forest Land.
Chapter 1: Conservation of Biological Diversity - Part 2: Forest Type, Size Class, Age Class, and Successional Stages. Forest Land Conversion and Fragmentation. Status of Forest Communities and Wildlife Species of Special Concern. Highlights for Conservation of Biological Diversity.
Chapters 2 & 3: Maintenance of Productive Capacity of Forest Ecosystems & Maintenance of Forest Ecosystem Health and Vitality: Area of Timberland. Comparison of Net Growth and Removals of Timber. Trend of Timber Harvesting by Species. Highlights of Productive Capacity. Area of Forest Land Affected by Potentially Damaging Agents. Invasive Plant Species. Fire. Weather. Highlights of Issues Affecting Forest Ecosystem Health and Vitality.
Chapter 4: Conservation & Maintenance of Soil & Water Resources
Chapter 5: Maintenance of Forest Contributions to Global Carbon Cycles
Chapter 6: Maintenance & Enhancement of Long-Term Multiple Socioeconomic Benefits of Forests
Chapter 7: Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management
Chapter 8: Priority Landscape Areas
Chapter 9: State Issues and Strategies
2010 Forest Action Plan Appendix

2015 Iowa's Wildlife Action Plan

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Chapter 3: Iowa Fish and Wildlife and Species of Greatest Conservation Need
Chapter 4: Habitats of Species of Greatest Conservation Need
Chapter 5: Conservation Challenges Facing Iowa's Wildlife and Habitats
Chapter 6: A Vision for Iowa's Wildlife in the Year 2030
Chapter 7: Research, Survey, Inventory, and Monitoring
Chapter 8: Priorities for Conservation Actions
Chapter 9: Plan, Review, Coordination, and Implementation
Chapter 10: The Costs and Benefits of Sustaining Iowa's Biodiversity
Chapter 11: Implementation Highlights: The First Ten Years
Appendix

2018 - 2023 Outdoor Recreation in Iowa Plan

The purpose of the Statewide Comprehensive Outdoor Recreation Plan (SCORP) titled "Outdoor Recreation in Iowa" is to assess the supply of, and demand for, outdoor recreational opportunities while identifying a list of priority areas for outdoor recreation. From 2018-2023, the Department of Natural Resources, in partnership with other governments and partner organizations, will be dedicated to working in these priority areas and improving outdoor recreation for Iowans.

Appendix A: Land & Water Conservation Fund, Establishment 2017
Appendix B: State Plan Priorities
Appendix C: Iowa Residents' Participation in and Opinions on Outdoor Recreation
Appendix D: Grants Awarded FY2013 - FY2017

Additional Resources

Stakeholder Involvement
A list of all stakeholder groups involved in the creation of the 2020 Iowa State Forest Action Plan

2020 National Priorities Report
Iowa State Forest Action Plan Highlights by National Priorities Report

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We reached a milestone goal to plant at least 100,000 trees on state-managed lands in 2020! The tree plantings commemorate the 100th anniversary of the @StateForesters, as well as the 100th anniversary of #IowaStateParks.

Details: bit.ly/3pzNYxC#CentennialChallenge