

How to Use This Document

The Iowa Hazard Mitigation Plan is organized into seven sections: Introduction, Prerequisite, Planning Process, Risk Assessment, Mitigation Strategy, Local Coordination, and Plan Maintenance. The seven plan sections are consistent with the multi-hazard mitigation planning guidance issued by the Federal Emergency Management Agency (FEMA). The plan sections, along with primary subsections and annexes, are shown in the plan organization table below.

Each mitigation plan section is represented by a tab in the printed version of the document. If there are annexes associated with a section, those annexes are referenced by section number and annex letter on a tab directly below the section tab. On the first page of each plan section is a table of contents specific only to that section.

Figure 1-1: Plan Organization by Section/Subsection



Plan Update Revision Table

Standard Plan Section	Update Review and Analysis
1.0 Plan Organization	<ul style="list-style-type: none"> Updated section to include updated update/change log
1.0.1 Executive Summary	<ul style="list-style-type: none"> Executive summary changed to address the 2013 update process
1.0.2 Community Profile	<ul style="list-style-type: none"> Updated to reflect changes in development and Statewide trends. Removed source water chart as data hasn't been collected since 1990. Removed Top Iowa Counties USDA Ag sales receipts due to no update since 2007. Added to Climate section language about climate change
1.0.3 Iowa Map Book	<ul style="list-style-type: none"> Iowa Map Book updated with best available data and agency ArcGIS overlays
1.1 Prerequisite	<ul style="list-style-type: none"> State adoption section and adoption letter to be updated
1.2.1 Documenting the Planning Process	<ul style="list-style-type: none"> Planning process updated to reflect the 2013 update process, new process for local plan review and tech assist
1.2.2 Coordination Among Agencies	<ul style="list-style-type: none"> Coordination among agencies section changed to reflect the 2013 update processing
1.2.3 Program Integration	<ul style="list-style-type: none"> Updated section to reflect the 2013 update and relevant agencies participating in the planning process Updated section to reflect State and Local plan integration and planning initiatives
1.2-B Iowa Hazard Mitigation Team Members	<ul style="list-style-type: none"> Contact information updated and changed to reflect new and existing/changed team members
1.2-C Iowa's Rural Electric Cooperatives (REC) Annex under the Iowa Association of Electric Cooperatives	<ul style="list-style-type: none"> Updated with changes provided by the Iowa Association of Rural Electric Cooperatives, expanded REC Annex Planning Team
1.3.1 Identifying Hazards	<ul style="list-style-type: none"> Updated the hazards considered to reflect the consolidation of hazards into 14 natural and 6 human caused / combination hazards
1.3.2 Hazard Profile and Risk Assessment	<ul style="list-style-type: none"> Updated the hazard scores to reflect best available data collected on hazards and any changes in hazard data Hazard data was updated with best available current information as of April of 2013
1.3.3 Assessing Vulnerability	<ul style="list-style-type: none"> Updated to reflect most up to date information and include information from Local Data Collection Sheets
1.3.4 Estimating Potential Losses	<ul style="list-style-type: none"> Updated to reflect changes in the loss estimation that occurred due to changes in NCDC data including limited number and available time span for certain hazards State facilities inventory by county was updated to reflect best available data from State partners
1.3-A Loss Estimation Model	<ul style="list-style-type: none"> Updated to reflect changes in the loss estimate process, data available
1.4.1 Hazard Mitigation Goals and Objectives and Measures	<ul style="list-style-type: none"> Updated to reflect the consolidation of hazards and input from State partners Updated process to reflect the consolidation of goals, objectives, and mitigation measures Severe Repetitive Loss information updated
1.4.2 State Capability Assessment	<ul style="list-style-type: none"> Updated to reflect changes in mitigation laws, regulations, programs, and policies
1.4.3 Local Capability Assessment	<ul style="list-style-type: none"> Updated to reflect changes in local planning and local mitigation policies
1.4-A Mitigation Measures (Actions) Initiated / Accomplished	<ul style="list-style-type: none"> Updated with mitigation actions from 2010 to present as well as provided most recent information on previously identified mitigation measures
1.4-B Capability Assessment	<ul style="list-style-type: none"> Updated to reflect changes in program information
1.5.1 Local Funding and Technical Assistance	<ul style="list-style-type: none"> Updated with changes to the technical assistance and State review for local mitigation plans
1.5.2 Local Plan Integration	<ul style="list-style-type: none"> Updated to reflect changes in local planning integration utilizing the Data Collection Sheet
1.5.3 Prioritizing Local Assistance	<ul style="list-style-type: none"> Updated to reflect changes in the process of prioritization of local assistance
1.6.1 Monitoring, Evaluating, and Updating the Plan	<ul style="list-style-type: none"> Updated process of plan maintenance procedures
1.6.2 Monitoring Progress of Mitigation Activities	<ul style="list-style-type: none"> Updated the monitoring process for mitigation planning and program activities

Purpose and Scope

The State of Iowa has been proactive in hazard mitigation planning since the 1990's. The mitigation plan demonstrates the State's commitment to reducing risks from all hazards, natural and human caused, and serves as a guide for state decision makers in committing resources to reduce the effects of these hazards.

To remain eligible for hazard mitigation grant assistance following a Presidential Declaration, the State Plan must be maintained, reviewed, updated and submitted to the Federal Emergency Management Agency (FEMA) for approval every three years. State Mitigation Plan requirements are outlined in Section 44, Code of Federal Regulations (CFR), Part 201. The following document represents the update to the approved State Mitigation Plan that was submitted in 2010.

In addition, the Iowa Hazard Mitigation plan is maintained in accordance to Federal planning requirements for the following funding sources:

- Permanent Work Public Assistance, Categories C through G (Road Systems, Water Control Facilities, Building and Equipment, Public Utility Systems, and Other Public Assistance Projects that do not reasonably fit into the other six categories)
- Pre-Disaster Mitigation Program
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
- Repetitive Flood Claims Program
- Severe Repetitive Loss Program

FEMA regulations establish two types of State Mitigation Plans, Standard and Enhanced. For each Presidential-declared disaster, HMGP funding is allocated using a "sliding scale" formula based on the percentage of the funds spent on Public and Individual Assistance programs. Fulfilling the Enhanced Plan requirements increases the funding base up to 20 percent of the total estimated eligible Stafford Act disaster assistance.

Coordination

The mitigation planning process followed a methodology prescribed by FEMA:

- Describing the planning process – Section 1.2;
- Developing and reviewing risk assessments to analyze natural and manmade hazards statewide – Section 1.3;
- Developing and reviewing the mitigation strategy for reducing the losses identified in the risk assessment – Section 1.4;
- Establishing a process for local coordination of hazard mitigation planning and activities – Section 1.5;
- Establishing a plan maintenance process – Section 1.6;
- Formal adoption process; and
- Addressing all applicable federal statutes and regulations including changes in state and federal laws.

To establish a clear understanding of the planning requirements outlined in the scope of work for Iowa's plan update, the State Hazard Mitigation Team (SHMT) met beginning in late 2011 to discuss the process and to review requirements outlined in 44 CFR Part 201 for the update.

The team reviewed the existing hazards, and elected to combine some previous hazards. The team reviewed updated hazard analysis and risk assessments, mitigation strategies, mitigation measures, state agency capabilities, and identified completed mitigation actions.

The hazard identification portion of the hazard analysis and risk assessment is an inventory of all the hazards that could potentially impact the State of Iowa. Each hazard profile was reviewed for accuracy and updated using the best available data. Hazards were consolidated and verified with the identified hazards from Iowa's FEMA approved Local Hazard Mitigation Plans related to the Disaster Mitigation Act of 2000 (DMA 2000) since 2010. Iowa's previous plan identified 23 hazards and with this update the team identified a total of 20 hazards, which is addressed in Section 1.3 Risk Assessment.

The Rural Electric Cooperatives (REC) under the name of the Iowa Association of Electric Cooperatives again participated as a private non-profit organization (PNP) for the purpose of disaster assistance provided by FEMA under the Stafford Act. The REC plan is included in Section 1.2, Annex C.

The Iowa Department of Homeland Security and Emergency Management (HSEMD) staff reviewed and compiled mitigation measures from approved local plans. The list was compared to the previous measures and refined. A list of completed mitigation measures was gathered from agencies, council of governments, and local communities for reporting purposes to this update. This report is included in Section 1.4, Annex A.

HSEMD conducted a comprehensive analysis to determine prioritization of effective mitigation measures. These measures are generally measures that are technically feasible and cost-effective while also providing for multiple benefits or risk reduction related to multiple hazards. Measures that are prioritized are associated with mitigation of higher priority hazards from the hazard analysis and risk assessment process.

While this method of comprehensively prioritizing hazard mitigation measures is effective, it is recognized that disaster specific events and associated disaster response and recovery actions can result in the prioritization of specific mitigation measures that contribute to the disaster recovery process. Prioritizing mitigation measures post disaster is also effective, particularly in light of the devastating effects of the flooding and severe thunderstorm events that occurred in the summer of 2008 and subsequent agricultural and severe weather events occurring after that date. In Iowa this holds true in particular for flood retrofitting projects for critical facilities and infrastructure as well as the acquisition and/or relocation of flood impacted residential and commercial structures.

1. Overview

An important step or component to the Iowa SHMT planning process was to develop a community profile for the state of Iowa. This required the planning team to research climate and weather, geography, land use, and other conditions that impact the state or can be influenced by hazards in the state. This information helped identify the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas. For the 2010 plan update the 2010 census was not yet completed and approved by the data cutoff date. For the 2013 update statistics were brought up to date to include the 2010 census and most current information available.

2. Geography and Environment

Iowa ranks 26th in size among U.S. states with a total land area of 55,857 square miles. The state is roughly rectangular in shape and its extreme dimensions are roughly 200 miles from north to south and about 300 miles east to west.

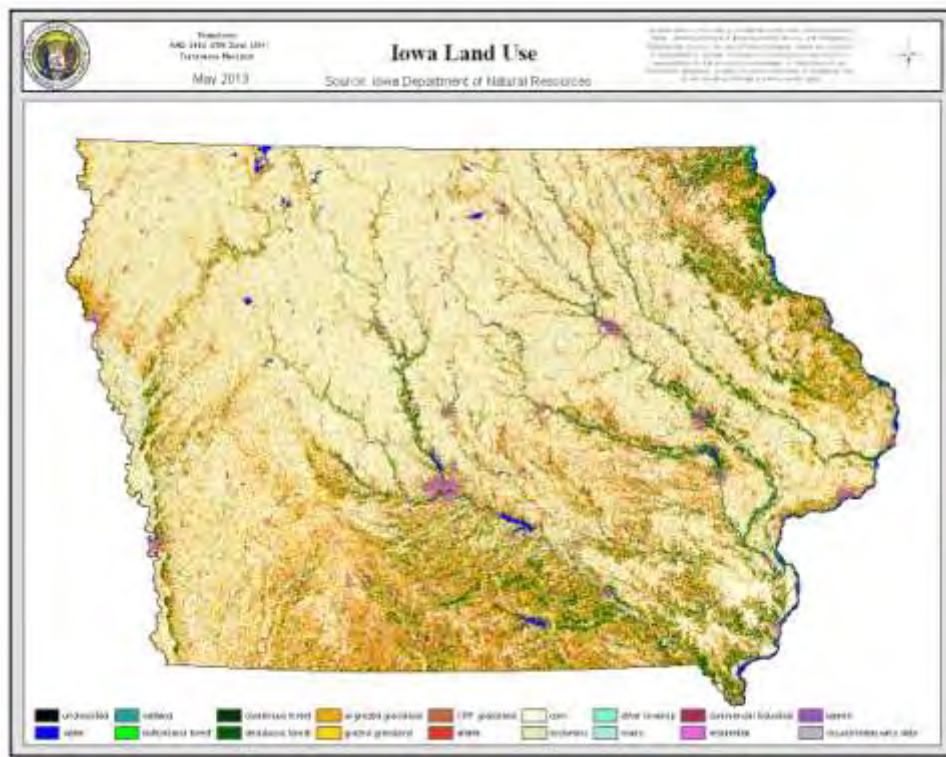
2.1 Location

Iowa is generally located in the North Central portion of the United States. It is bound on the north by Minnesota, on the east by Wisconsin and Illinois, on the south by Missouri, and on the west by Nebraska and South Dakota. The Mississippi River forms the entire eastern border and the Missouri River forms much of the western border. Des Moines is Iowa's capital and largest city.



2.2 Land Use

According to the 2010 census farms occupy about 86 percent of Iowa's land area representing the influence and importance of agricultural industries in the state. The land cover map below illustrates that about 75 percent of the state is covered by cropland; 4 percent by grasslands (e.g., pasture, hay land, prairie, and wetland vegetation), and 4 percent by forest lands. Less than one percent of the land area is owned by the federal government. Incorporated areas account for approximately 5 percent of the land while water bodies cover a little over 1 percent. Too small to see on the map are barren areas (less than 1 percent) that include flooded cropland and sand bars.



Large areas of pasture and hay are located in northeast Iowa, along with a broad, semi-circular swath in south-central Iowa. Rich cropland is particularly noticeable in north-central Iowa. Most of the land originally covered by prairie is now in agricultural production. Along the western border of the state, grass and trees mark the boundary of the Loess Hills with the fertile Missouri River floodplain. Larger tracts of forest lands are found in the northeast and south-central parts of the state. Most forest lands are concentrated in eastern Iowa along river corridors.

2.3 Elevation

Elevations in Iowa range from a low of 480 feet above sea level at the Mississippi River in the southeast to the high point of 1,670 feet in Osceola County in Northwest Iowa. The approximate mean elevation is 1,100 feet.

Iowa terrain is generally flat or gently rolling, but the extreme northeast has been deeply cut by streams as shown in the following map. In the Northeast, hills frequently rise about 330 feet to 390 feet above the Mississippi River and its tributaries. The western portion of the state contains the Loess Hills, a stretch of hilly terrain reaching hundreds of feet in elevation formed from clay deposits blown eastward from the Missouri River.

Iowa's most level land is found in the North Central region and is the result of ice sheets scraping the land during the glacial periods. When the ice sheets melted, they deposited a mixture of rock and soil; some of the most fertile soil in the United States is found here. Most of the remainder of Iowa consists of rolling lands of the dissected till plains. These plains were formed by glacial deposition of till (a mixture of rock and silt) hundreds of thousands years ago.

Streams have had ample time to erode the land, forming rounded hills. A small area of flat till plains is found in the southeastern part of the state. Rich soil has formed on most of the till plains.



2.4 Rivers, Streams, and Lakes

The major types of waters in Iowa include lakes, ponds, streams, rivers, and wetlands. Iowa waters tend to be very productive—they are very rich in plant and animal life. This is due largely to the richness of Iowa soils; however, run-off from agricultural and urban areas also contains nutrients which

can increase plant growth, sometimes to the extent it is undesirable.

Natural lakes, formed by glaciations, are common in the northwestern and north central parts of the state. Many of the more shallow lakes and prairie “potholes” have been drained and/or filled in for agriculture, but 31 major natural lakes with a combined surface area of almost 29,000 acres and 17 marsh-like lakes with over 3,000 acres of combined surface area are still present in Iowa.

Iowa has nearly 19,000 miles of interior rivers and streams, and approximately 209 square miles of lakes and reservoirs, and 79 square miles of wetlands. There are 87 cold water streams located in northeast Iowa with a combined length of 266 miles. The 25 largest interior rivers in Iowa extend over 3,500 miles and each is fed by numerous smaller creeks and streams (tributaries). All interior rivers in the state are part of either the Mississippi or the Missouri River systems.

Iowa’s flowing waters are subject to violent and sudden fluctuations because of the nature of our soils, intensive farming of small grain crops, and drainage. Headwaters of streams usually are quite clear and less subject to water fluctuations. Lower stream reaches tend to be more turbid and subject to greater agricultural and industrial pollution.

Streams and rivers naturally meander, changing their course over time. Pools and riffles between meanders support diverse aquatic life. Channelization (straightening of a stream) and replacement of surrounding natural vegetation with row crops eliminates habitat and, thus, much of the aquatic life disappears from the area.

Water in channelized streams flows faster, increasing erosion and deepening the channel. The chain reaction destroys the

natural integrity of stream channels and often results in major damage to bridges. Likewise, floods are more severe.

Most of Iowa's interior rivers and streams have channelized stretches—some 3,000 miles of Iowa rivers have been lost to channelization. Iowa is known as the “land between two rivers.” The Mississippi and Missouri Rivers make up most of the east and west borders, respectively. (The Big Sioux and Des Moines Rivers make up small portions of the northwest and southeast borders.)

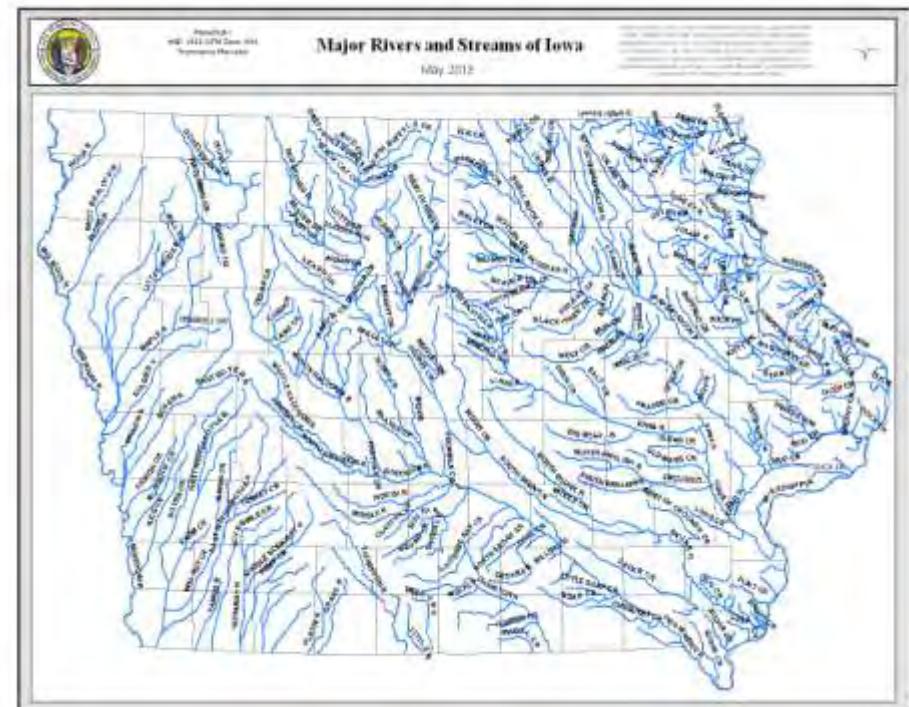
All of the state's rivers flow into the Mississippi River (on the eastern border) or the Missouri River (on the western border). Prominent among the Mississippi's tributaries are the Des Moines River and the Raccoon River, which drain the east central plains; and the Iowa, Cedar, Skunk and Wapsipinicon rivers which drain the eastern plains. All flow south and east into the Mississippi. Major tributaries of the Missouri River include the Big Sioux, Little Sioux, Boyer, and Nishnabotna Rivers, all of which flow southwest.

Most Iowa natural lakes are “middle-aged” and have partially filled with windblown and water-carried sediments, remains of water plants, and soils from eroding shorelines.

Marshes are older lakes that have filled with more sediment and plant remains. These waters generally have good water quality, but this can rapidly decline as a result of shoreline development or loss of soil and nutrients from unprotected land in the lake's watershed.

A second type of natural lake, the oxbow, is formed when river channels change course and sediments block the ends of a meander in the old channel. Larger oxbows are found along the Missouri and Mississippi Rivers and smaller, pond-like oxbows are found along many interior rivers and streams.

Constructed lakes include recreational lakes, municipal water supplies, river impoundments, and surface mine lakes. Over 100 lakes have been constructed in Iowa for recreation. These generally are small; with less than one-fourth over 100 acres.



There are approximately 3,800 dams in the State Dam Inventory. Dams provide water for a variety of purposes. Many are used for municipal water storage. Some are used for flood control, others for recreation. These range in size from 15-acre Mitchell Lake to Lake Red Rock, which has a surface area of some 19,000 acres at normal pool level.

2.5 Ponds and Wetlands

There are more than 90,000 ponds statewide. Most are in the southern half of the state because clay soils found there readily form a water-tight basin. (Soils in northern Iowa tend to be more porous.) Ponds generally are less than 10 acres in size. Water quality and habitat in a pond are especially dependent on management of the watershed (land that drains into the pond). Ponds with well-managed watersheds can support excellent fish populations and are very important fisheries. Ponds also provide reliable water sources for livestock and wildlife.

Wetlands are areas where soil is saturated for various lengths of time during the growing season. They are transitions between terrestrial and aquatic systems. All wetlands have three things in common: hydric soils, a hydrology, and the presence of hydrophytes (water plants).

Hydric soils form when soil is saturated and decomposition is slow due to low oxygen. They are characterized by a thick, dark layer of organic soil just below the topsoil, with a gray layer beneath mixed in with splotches of brown, orange, or yellow.

Wetland hydrology is the presence of water on or near the soil surface for most of the growing season. Hydrophytes (water plants) are specially adapted to living with their roots in wet soils.

Marshes are open and unforested. They are dominated by cattails, sedges, and grasses. Iowa marshes include prairie potholes formed during the last ice age, when the Des Moines Lobe of the Wisconsin glacier melted (approximately 10,000 years ago). As the glacier receded, it gouged thousands of shallow depressions.

This area of the northern Great Plains in the U.S. and southern Canada, known as the Prairie Pothole region, is ecologically diverse and economically important.

Other wetlands include: wet meadows (dominated by sedges with very shallow water levels or are just saturated to soil level); bogs and fens (unique wetlands with peat-partially decomposed organic material); and wet prairies (soils almost always organic and saturated). Most Midwestern wet prairies have been drained and now are farmed.

Fens are formed only under very specific conditions. Of the 200 species of plants associated with fens, 24 are considered rare species.

From creeks and streams to major rivers, all flowing waters have a riparian zone (floodplain). Riparian zones vegetation traps sediment, agricultural chemicals, and animal waste. Cottonwood, green ash, silver maple, willow, and many other trees, shrubs, and grasses stabilize stream banks and prevent erosion from storms and snow melt. Streambank vegetation provides shade, moderating temperature, humidity, and light for stream creatures during summer. Forest animals come to drink and find food, shelter, and hiding places. In Iowa, many riparian zones have been cleared and replaced by cultivation, converted to pasture, or developed. Loss of this zone of vegetation has caused serious environmental problems.

It is estimated Iowa had four million acres of wetlands in the mid-1800s (includes oxbows, floodplain wetlands, and natural lakes). As humans realized how rich soils under wetlands and prairies were, these areas soon were drained or filled and converted to cropland, urban areas, housing complexes, industrial areas, railroads, and highways.

Iowa has lost approximately 99 percent of its original wetlands. Wetlands were, and still are, considered by many to be waste areas. Until recently, drainage of wetlands for agriculture was promoted by state and federal programs.

In 1997, approximately 1.2 percent of the state surface area is covered by wetlands that remain in Iowa. Policies to protect wetlands have helped slow the rate of loss, and restoration programs are gradually reintegrating wetlands into the landscape. Iowa wetland and riparian wetland restorations have included more than 78,000 acres enrolled in USDA NRCS programs, and another 10,000 acres through the FWS Partners for Wildlife Program.

2.6 Mississippi and Missouri Rivers

The Mississippi River borders Iowa for more than 300 miles and drains two-thirds of the state. It originates in Lake Itasca, Minnesota, and flows some 2,350 miles to the Gulf of Mexico. Through the ages it has formed chutes, side channels, and sloughs while carving a valley two to six miles wide. It first served as a corridor for settlement by Native Americans from the South and later as a major mode of transportation for Euro-American settlers. The Upper Mississippi River (from the entrance of the Missouri—above St. Louis—to Minneapolis) was a mosaic of braided channels with rapids and shallow areas. Water levels were unpredictable and the river was vulnerable to drought and floods. In 1824, Congress authorized “improvement” of the river for navigation through removal of snags and other obstructions. In 1907, work began to form a six foot navigation channel in the Upper Mississippi. The Mississippi became a major transportation route and the U.S. Army Corps of Engineers (Corps) constructed locks and dams for navigation on the Upper Mississippi between 1930 and 1940. A nine-foot channel now is maintained by the Corps for barge navigation.

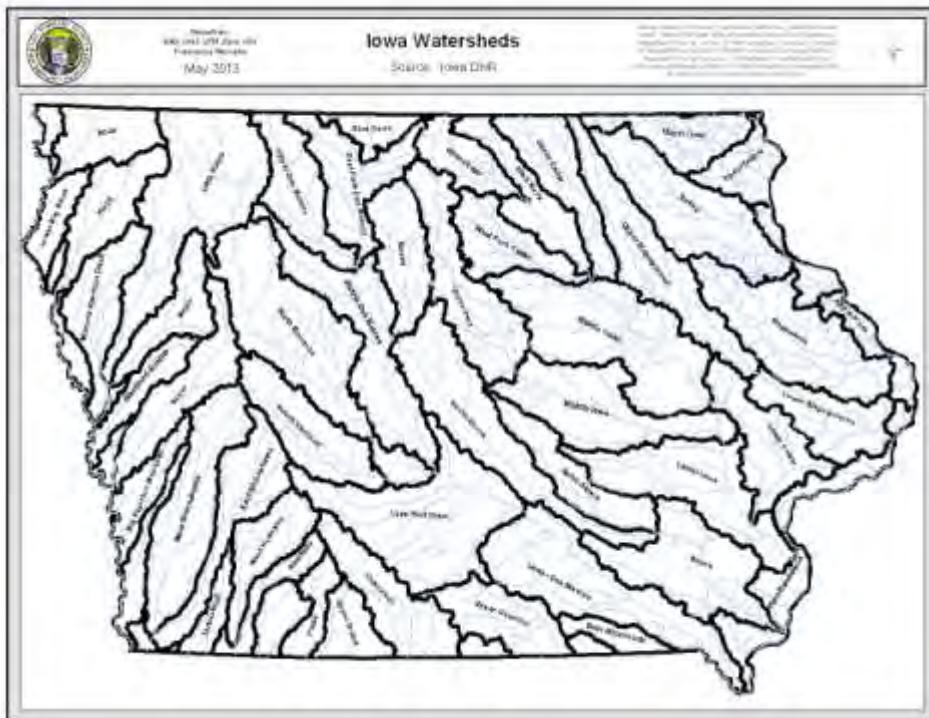
The level of the river along the Iowa border is controlled by 11 locks and dams. Damming the Mississippi raised water levels so many chutes between islands, and even islands themselves, were inundated. It also changed the habitat structure from a continuous, flowing body of water to a series of “lake-like” pools (stretch of river between two navigation dams). Each pool is numbered in reference to the dam at its downstream end. Example: Lock & Dam 12 in Bellevue, Iowa creates Pool 12 above it.

The Missouri River was dubbed the “Big Muddy” by early explorers because its shifting sands were swirled by relatively fast-moving currents through a broad series of braided channels. The Missouri River Valley bordering Iowa contained lush hunting grounds used by the Dakota, Iowa, Oto, Winnebago, Sac, Fox, and Pottawattamie. Many fur companies established trading posts along the Missouri. Buffalo, elk, and deer (along with many species of small game and wild fowl) were common in the river valley. A variety of fish were plentiful in the river. Engineering work for navigation and flood control has had a profound effect on the Missouri. Work began as early as 1876, but accelerated channel stabilization occurred in the late 1920s and early 1930s. Between 1923 and 1976 the river channel was altered from its former braided appearance to a narrow, single channel with a series of gentle bends and well armored shoreline. This reduced the channel area by nearly 35,000 acres along Iowa alone. Dikes and other structures regulate flows instead of locks and dams. The Corps maintains a nine foot channel for commercial river traffic.

Islands, sand bars, brush piles, etc. disappeared after channelization. Habitat diversity is nearly non-existent. Sport and commercial fishing have suffered greatly. Commercial fishing yielded 50,000 to 80,000 pounds of fish each year between 1940 and 1955. Reports in 1996 showed an annual harvest just over 21,500 pounds, compared to almost three million pounds harvested from the Mississippi.

2.7 Watersheds

Combined, all the rivers, streams, and lakes in Iowa represent watershed basins. Iowa has 56 watersheds that range from 390 to 1,954 square miles in size. Within these watersheds are 420 smaller basins ranging from 63 to 391 square miles in size.



Activities in the watershed (land that drains into a lake, marsh, or stream) determine water quality. Water dissolves soil, fertilizers, chemicals, etc. As it moves across the land it picks these up and carries them to the water body. Water also is very heavy and has tremendous power as it falls from the sky and moves across the land. It can move huge amounts of materials during heavy rainfall events or rapid melting of ice and snow, so bare soil is very susceptible to erosion.

Within many of these watersheds, there is a strong history of work to solve problems like upland sheet and rill erosion, gullying, sedimentation of lakes and streams and flooding. More recently, water quality-oriented watershed projects have been organized to address threats to some of Iowans as well as the support of the creation of water quality improvement plans and watershed monitoring groups.

2.8 Climate and Weather

Iowa has a continental climate with hot, moist summers and cold, generally dry winters. The average annual temperatures range from about 45 degrees Fahrenheit in the north to about 52 degrees Fahrenheit in the southeast. The recorded temperature in the state has ranged from -47 degrees Fahrenheit in 1912 and 1996 to 118 degrees Fahrenheit in 1934. Nearly every year somewhere in the state a maximum temperature will exceed 100 degree Fahrenheit and a minimum of -20 occurs. The average annual precipitation is 34 inches for the state, ranging from about 26 inches in the northwest to about 38 inches in the southeast. The Great Flood of 1993 proved to be an extreme exception to historical averages. Although most of the annual precipitation falls in the warm months, snowstorms, ice storms, and occasional blizzards occur during the winter. Thunderstorms are common in summer. There is approximately a 5 percent chance of a drought severe enough to cause major widespread crop losses in a given year. ([Source: IDALS State Climatologist](#))

Evidence trends towards Iowa's climate growing warmer with more precipitation and more frequent severe weather events. As the Earth warms there is more moisture contained in the air and more clouds, which cause nighttime temperatures to increase more than daytime temperatures. Iowa data shows small increases in average temperatures, but nighttime lows have been increasing at a much higher rate in the last 100

years. Seasonal cycles and ranges of species have been observed to be shifting. In 2006 the National Arbor Day Foundation updated its Hardiness Zone maps based on data from 5,000 weather stations, and northern Iowa moved from zone 4 to zone 5 indicating a wider variety of trees may now survive Iowa winter temperatures. Coldwater species of fish populations have been dropping due to groundwater temperatures and sedimentation.

Iowa Climate Statistics (long term averages 1981-2010)		Numbers
Average Temperature (degrees F) December/January/February		22.1
Average Temperature (degrees F) March/April/May		48.3
Average Temperature (degrees F) June/July/August		71.6
Average Temperature (degrees F) September/October/ November		50.2
Average Annual Temperature (degrees F) Southeast		51.1
Average Annual Temperature (degrees F) Northwest		46.2
Average Precipitation (inches) December/January/February		3.31
Average Precipitation (inches) March/April/May		10.22
Average Precipitation (inches) June/July/August		13.71
Average Precipitation (inches) September/October/ November		8.03
Average Annual Precipitation (inches) Southeast		38.65
Average Annual Precipitation (inches) Northwest		30.4
Average Annual Snowfall (inches) Southeast		26.5
Average Annual Snowfall (inches) Northwest		36.9
Average Temperature as of May 2010*		60.6
Average Temperature Departure as of May 2010*		+0.4
Average Precipitation Since January 1, 2010 to May 2010*		12.06
Average Precipitation Departure Since January 1, 2010 to May 2010*		+0.36
*Departures are computed from 1981-2000 normals based upon information collected by the U.S. Department of Commerce, NOAA National Weather Service.		

Source: IDALS Climatologist

3. Population and Households

Iowa's 2012 population was 3,074,186 retaining the previous ranking of 30th state in the nation by total population. Over the last 32 years (1980-2012) the population in Iowa has increased by 160,378 persons, or about a total of 5.5 percent. Current projections of the Iowa Data Center conclude that Iowa population of in 2040 will be 3,487,942 in 2040, indicating an increase in population of 413,756 or about 13.46 percent. Population density in Iowa is 54.5 people per square mile for a rank of 38 when compared with other states.

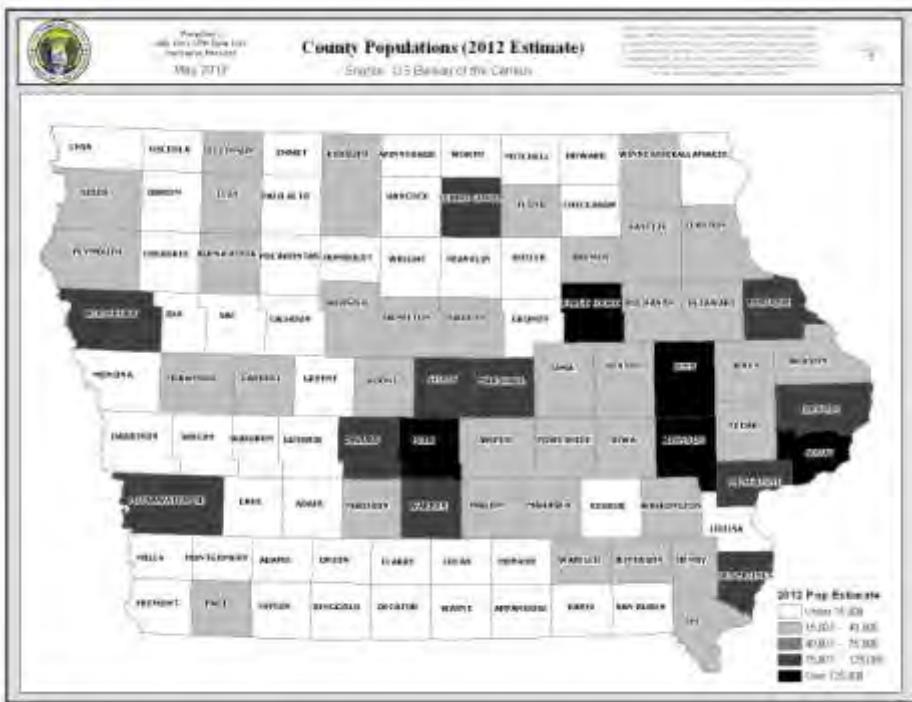
Population distribution within the Iowa can generally be described as highest in the Central and East Central regions of the state and lowest in the Southwest and South Central regions.

Iowa's Largest Cities	City Population (2010)	County
Des Moines	203,433	Polk
Cedar Rapids	126,326	Linn
Davenport	99,685	Scott
Sioux City	82,684	Woodbury
Waterloo	68,406	Blackhawk
Iowa City	67,862	Johnson
Council Bluffs	62,203	Pottawattamie
Ames	58,965	Story
Dubuque	57,637	Dubuque
West Des Moines	56,609	Polk/Dallas

Iowa Hazard Mitigation Plan

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Community Profile



Iowa's largest city is Des Moines. The Metropolitan Area spans five counties in central Iowa: Polk, Dallas, Warren, Madison, and Guthrie. Estimated total metropolitan population is 569,633 and a city proper population of 203,433. The second largest city is Cedar Rapids with a total population of 126,326. The other communities rounding out the top ten of Iowa's largest cities range in population from 99,685 to 56,609.

Iowa is largely comprised of persons considering themselves White or Caucasian totaling 93 percent of the population. This proportion of Whites to other populations is consistent with rural or agriculturally inclined states. As with other states, particularly those with significant agriculture, persons of Hispanic origin continue to represent a higher proportion of the population. In 2011, persons considering themselves of

Hispanic or Latino origin accounted for 5.2 percent of the total state population which constitutes an increase of 1 percent from the last plan update. Iowa has a median population age of 38.1 years. This age ranks 13th in the country compared with other states. Iowa's population is generally older than most other places in the country, including neighboring states.

Percent Population by Age	2010	Population by Race/Hispanic	2010
0-5	6.6	White	93
Under 18	23.9	Black	3.1
18-64	61.2	American Indian, Eskimo, Aleut	0.5
65+	14.9	Hawaiian or Pacific Islander	.1
Median age	38.1	Latino (of any race)	5.2
		Reporting two or more races	1.5

There are an estimated total of 1,216,765 households in Iowa as of 2011. Of these households 64.7 percent represent families, and 35.3 represent non-family households. People in households living alone represent approximately 28.4 percent of the State's total, with about 40 percent of those representing persons age 65 years and older. The average size of Iowa's households is 2.44 persons with average family size being slightly larger at 3.02.

Households by Type (2010)	Total	Percent
Total Households	1,216,765	100.0
Family households	787,247	64.7
Non-family households	429,518	35.3
Householder living alone	347,479	28.6
Householder 65 years and over	135,061	11.1
Average household size	2.44	
Average family size	3.02	

Iowa's population living in urban areas represents over 60 percent of the state in 1990, increasing slightly to just over 61 percent by year 2000. In 2010 over 64 percent of Iowans live in urban areas. Of the rural population, significant changes occurred between 1990 and 2000 relative to farm and non-farm households. In 1990, rural non-farm population represented 23.5 percent of rural households and by 2000, this represented only 15 percent. Rural farm households increased from 76.5 to 85 percent during the same period. This trend suggests that non-farm households are either moving to urban areas or out of the state entirely.

Percent Urban and Rural Households	1990	2000	2010
Total Population: Urban	60.6%	61.1%	64.02
Total Population: Rural	39.4%	38.9%	35.98
Total Population: Rural: Non-farm	23.5%	15.0%	--
Total Population: Rural: Farm	76.5%	85.0%	--

4. Housing

In 2011, housing units in Iowa totaled 1,340,588. This is an increase of over 14 percent from 1990, and an average annual increase of about one percent. Mobile homes represent 3.9 percent of Iowa's total housing stock. The number of mobile home units had increased each year, but dropped in the most recent data. A growth in housing units has brought a lower percentage of older housing; Iowa's proportion of older homes is predictably decreasing. As of 2011 estimates, housing units constructed in 1939 or earlier represent approximately 27.1 percent of Iowa's total units with less than half of all units in Iowa constructed before 1960. In 2011, housing units in Iowa that were less than 11 years old represented 12.6 percent of all units.

Total Housing Units in Iowa (1940-2011)			
Year	Total Housing Units	Mobile Homes	Percent
1940	726,654	N/A	N/A
1950	811,912	7,250	0.9%
1960	905,295	11,735	1.3%
1970	964,060	24,285	2.5%
1980	1,131,299	44,172	3.9%
1990	1,143,669	56,857	5.0%
2000	1,232,511	64,719	5.3%
2011	1,340,588	51,840	3.9%

Source: US Census Bureau, American Community Survey

Year Structure Built for Iowa (2011 Estimate)		
Year	Number	Percent
2005 or later	82,453	6.2%
2000 to 2004	86,458	6.4%
1990 to 1999	145,307	10.8%
1980 to 1989	91,729	6.8%
1970 to 1979	197,434	14.7%
1960 to 1969	137,799	10.3%
1950 to 1959	146,176	10.9%
1940 to 1949	89,279	6.7%
1939 or earlier	363,953	27.1%

Source: US Census Bureau, American Community Survey

Home ownership in Iowa had steadily increased over the past 50 years, but in 2011 a slight drop occurred. Time will tell whether this was a blip on the radar due to the housing crisis and economic downturn or a new trend. The percent of units rented has decreased proportionately with home ownership generally, and also shows a small uptick in the most recent data. In 2007, 73.7 percent of Iowa's total housing units were owner occupied whereas 2011 percentage was 72.4 for home ownership.

Home Ownership and Median Rent in Iowa (1900-2011)						
Year	# Occupied	# Owned	% Owned	Rented	% Rented	Median Rent
2011	1,216,765	880,368	72.4%	336,397	27.6%	\$643
2007	1,214,353	894,841	73.7%	319,512	26.3%	\$567
2000	1,149,276	831,419	72.3%	317,857	27.7%	\$470
1990	1,064,325	745,377	70.0%	318,948	30.0%	\$336
1980	1,053,033	456,517	71.8%	296,516	28.2%	\$226
1970	896,311	642,676	71.7%	253,635	28.3%	\$99
1960	841,357	581,352	69.1%	260,005	30.9%	\$68
1950	780,167	494,826	63.4%	285,341	36.6%	\$43
1940	701,824	361,477	51.5%	340,347	48.5%	N/A
1930	635,704	340,778	54.7%	282,607	44.5%	N/A
1920	559,188	332,567	59.4%	239,880	42.9%	N/A
1910	498,943	292,951	58.7%	208,344	41.8%	N/A
1900	468,682	282,760	60.3%	183,053	39.1%	N/A

Source: US Census Bureau, American Community Survey

The primary road system, which is managed by the DOT, represents 8.2 percent of the total road mileage in the state. However, in 2011 these roads carry 61.8 percent of all vehicular traffic. The weighted average daily count on Iowa's Interstate Highway System is 22,493 vehicles in rural areas and 45,698 in municipal areas. The weighted average daily traffic on rural county roads is 161 vehicles and the average on municipal streets is 1,235 vehicles.

Trucks transport 82.9 percent of the shipments originating in Iowa, according to the total value of the commodities. This is followed by rail at 6.6 percent, water 0.9 percent, air at 0.4 percent, and other modes at 0.8 percent. When measured according to tons shipped, trucks transport 81.4 percent of goods, rail 13.9 percent, water 2.8 percent, and other modes 0.8 percent. Commodities originating in Iowa travel an average of 10 miles by truck, rail averaged 836 miles, water averaged 1,203 miles, and 1,116 miles by air. (2007 Commodity Flow Study). The primary highway system is critical to the passenger, freight and intermodal transportation throughout the state. Ensuring safe travel on these routes is crucial.

2011 Public Road Length – miles by ownership	
Iowa DOT	8,893*
Counties	89,841
Municipalities	14,904
Parks & Institutions	619
Federal agencies	127
Total miles	114,384*

*Totals exclude ramps. The Iowa DOT maintains 9,387 miles of roadway, including 494 miles of ramps.

5. Public and Private Infrastructure

5.1 Highway and Roads

Iowa's highway network is the backbone of the state transportation system and accounts for the vast majority of investments. In 2011 the total number of registered vehicles equaled 4,176,857 with 939,043 of these classified as trucks and truck-tractors, and over 1.69 billion gallons of gas were purchased. Motor vehicles on Iowa's public roads traveled an estimated 31.411 billion miles in 2011. The busiest spot on Iowa's roadways is on I-235 in Des Moines between 56th Street and 42nd Street where the average daily traffic count in 2011 was 113,600 vehicles per day.

There were estimated to be more than 2.23 million Iowa driver licenses in force in May 2012 with 50.7 percent of licensed drivers in Iowa age 14 and older being females and 49.3 percent male. About 91.4 percent of Iowa's total driving population is age 21 and older with individuals age 40 to 49 representing the largest group (393,219) and 18.6 percent or 415,020 aged 65 or older.

There is an increased emphasis on developing solutions to improve the safety and efficiency of the existing transportation system. Many of the solutions lie in technological advances, such as intelligent transportation systems (ITS). Both rural and urban areas of the state will benefit from implementing ITS technologies.

2011 Bridge Counts by ownership	
Iowa DOT	4,073
Counties	19,274
Municipalities	1,117
State Parks	4
Local Parks	3
Other State Agencies	18
Private	12
Railroad	368
Local Toll	2
Bureau of Indian Affairs	1
Bureau of Fish & Wildlife	1
National Park Service	2
Corps of Engineers	2
Army	18
Unknown	54
Total	24,799

Iowa's interstate system will continue to play a critical role in national and international trade. Interstate Highways 35 and 29 through Iowa have been designated as key routes on the Canada-to-Mexico corridor as a result of the North American Free Trade Agreement (NAFTA). Iowa's primary highway system, particularly the interstates and the Commercial and Industrial Network (CIN), must meet the challenges of providing safe and efficient travel for international trade.



In 2011 there were 114,384 miles of publicly owned highways and roads in Iowa, excluding 494 miles of ramps maintained by the Iowa Department of Transportation (IDOT). Iowa also has 24,799 bridges. The IDOT is responsible for maintaining 9,387 miles of those roadways, including the 494 miles of ramps. The IDOT also maintains 4,073 bridges.

5.2 Railway

Iowa's rail transportation system provides both freight and passenger service. Rail serves a variety of trips, including those within Iowa and those to other states as well as to foreign markets. While rail competes with other modes, it also cooperates with those modes to provide intermodal services to Iowans.

Rail service in Iowa is privately owned and operated by 15 railroad companies. Five of these railroads are major national companies and operate 81 percent of Iowa's total miles. The remaining 10 railroads consist of regional line haul carriers and local switching companies. These regional and local railroads serve about 18 percent of Iowa route miles. In 2010 54.4 million tons were shipped by rail, and 43.7 million tons were received. Together the rail companies serve 90 out of 99 counties, 407 of 947 cities, 43 out of 60 river terminals, and 444 out of 871 grain elevators (2006). The map on the right shows Iowa's active railroad lines.

In 2012 Iowa had 6,943 at-grade highway-rail crossings, 2,558 of these are on private roads and 4,348 on public roads. In 2011 there were 37 highway-rail crashes in at these public crossings with 20 resulting in no significant injuries or fatalities. Since 1985 crashes at highway-rail crossings have decreased even as there have been increases in rail car miles and motor vehicle miles.



5.2.1 Railway Freight

Iowa railroad mileage peaked in 1911 at approximately 10,500 miles. In 2009 Iowa had 3,945 miles, which is 37.6 percent of the peak mileage. While rail accounts for only 3 percent of the Iowa's 130,000 mile intermodal freight system, it carries 43 percent of Iowa's freight tonnage. A great variety of commodities ranging from fresh fish to textiles to optical products are moved by rail. However, most of the Iowa rail shipments consist of bulk commodities, including grain, grain products, coal and fertilizers. The railroad network performs an important role in moving bulk commodities produced and

consumed in the state to local processors, livestock feeders, river terminals and ports for foreign export. The railroad's ability to haul large volumes, long distances at low costs will continue to be a major factor in moving freight and improving the economy of Iowa.

The condition of Iowa's rail network has improved substantially since the 1980s as a result of infrastructure investments and abandonment of inadequate rail lines. Before the 1980s, Iowa was plagued by rail lines that could not handle cars weighing 263,000 pounds, slow operating speeds, and rail weights of less than 90 pounds per yard. Today's rail network is typified by heavier rail weights that can safely handle larger and heavier cars and locomotives at faster speeds. With today's rail equipment, railroads have placed an increased importance on the condition and clearances associated with their tracks and bridges.

5.2.2 Railway Passenger

Railroad passenger service, once the dominant mode of bridges. intercity passenger transportation in the United States, now plays a relatively minor role in moving people between cities. Rail passenger service is provided at six Iowa stops on the two Amtrak routes through southern Iowa consisting of 297 miles. In 2010, the total number of passengers arriving and departing from Iowa Amtrak stations totaled 6,744 which is an increase of 4,444 (6.9%) from 2008.

Passenger service in Iowa is currently provided by the California Zephyr from Chicago to Oakland, Calif., and the Southwest Chief from Chicago to Los Angeles, Calif. The California Zephyr operates over the Burlington Northern Santa Fe (BNSF) tracks in southern Iowa providing daily service in both directions. Stations include Burlington, Mount Pleasant, Ottumwa, Osceola and Creston. The Southwest Chief also

operates daily in both directions over the BNSF tracks in extreme southeast Iowa with one stop in Fort Madison.

5.3 Airports

Iowa's system of airports provides a variety of services vital to the state's economy and is an integral part of Iowa's overall transportation system. Iowa has 109 publicly owned airports that serve general aviation activity, with eight of those airports offering commercial air service. An additional 8 privately owned airports are also open for public use. There are 125 private use heliports and landing zones in Iowa used for helicopter EMS operations.

Scheduled air passenger service allows rapid access to national and international destinations. Iowa generates 2.5 million commercial airline passenger enplanements each year, with Des Moines and Cedar Rapids ranking 88th and 123rd (of the 412 commercial service airports) nationally in passenger enplanements for 2011.

There are approximately 1 million aircraft operations at publicly owned airports in Iowa each year, with nearly 90 percent of those operations from general aviation (non-airline, non-military) activity.

Air cargo service, which is the fastest growing mode of freight movement, is critical to many industries in Iowa. More than 175 million pounds of cargo are transported through Iowa's airports each year. General aviation airports support business and recreational flying at communities throughout the state and are important economic assets for those communities. Growth in demand for aviation services, both passenger and air cargo, continues to outpace other transportation modes. In 2012, there were more than 4,000 Federal Aviation Administration registered aircraft and 5,550 active licensed pilots.

The following map indicates the location of commercial and general aviation airports, as well as private landing strips and heliports.



Both the commercial service and general aviation segments of the aviation industry continue to evolve in response to market forces, new technologies and regulatory actions. Within this dynamic environment, the Iowa Aviation System Plan provides direction for the development of Iowa's system of publicly owned airports. It also addresses efforts to maintain and improve commercial air passenger service in the state. The plan identifies the airport infrastructure needs and initiatives the state can take to maintain a safe and efficient operating environment for aviation and respond to economic development opportunities.

5.4 Utilities and Pipelines

Iowa is served by numerous electric and gas providers. These providers range from multi-state firms (such as MidAmerican Energy or Interstate Power & Light), to small municipal utilities and rural/area cooperatives. In addition to MidAmerican and Interstate Power & Light two other significant gas distribution companies include Black Hills Energy and Atmose Energy. Many of the rural areas of Iowa rely on delivery of liquid propane to residential and commercial refillable propane tanks. Collectively, Iowa has 187 electric utilities serving 1,559,562 customers. There are 77 gas utilities serving 984,070 customers. Local exchange carriers and interexchange carriers providing phone service to 1,298,543 customers. The following tables outline the details of Iowa's utility profile.

Water Utility Data (2011)

Group	Number of Customers	Number of Companies
Water Utility	61,087	1

Source: Iowa Utilities Board

Electric Utility Data (2011)

Group	Number of Customers	Number of Companies
Investor Owned Electric Utilities	1,124,278	2
Municipal Electric Utilities	212,227	136
Rural Electric Cooperatives-Distribution	223,057	45
Rural Electric Cooperatives - G&T	0	4
Electric Utility Totals	1,559,562	187

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Telephone Utility Data (2011)

Group	Number of Customers	Number of Companies
Local Exchange Carriers	1,298,543	263
Interexchange Carriers	N/A	226
Telephone Utility Totals	1,298,543	489

Source: Iowa Utilities Board

Gas Utility Data (2011)

Group	Number of Customers	Number of Companies
Investor Owned Gas Utilities	930,802	4
Municipal Gas Utilities	53,150	53
Certified Natural Gas Providers	118	20
Gas Utility Totals	984,070	77

Source: Iowa Utilities Board

Electric Generation in Iowa by Primary Energy Source (2010)

Source	2010 Generation (MWh)	Percent
Coal	41,282,937	71.79%
Natural Gas	1,312,195	2.28%
Wind	9,170,337	15.95%
Fuel Oil / Petroleum	154,297	0.27%
Nuclear	4,450,640	7.74%
Hydro	948,168	1.65%
Other Renewables / Other	190,146	0.33%
Total	57,508,721	100.0%

Source: Iowa Utilities Board

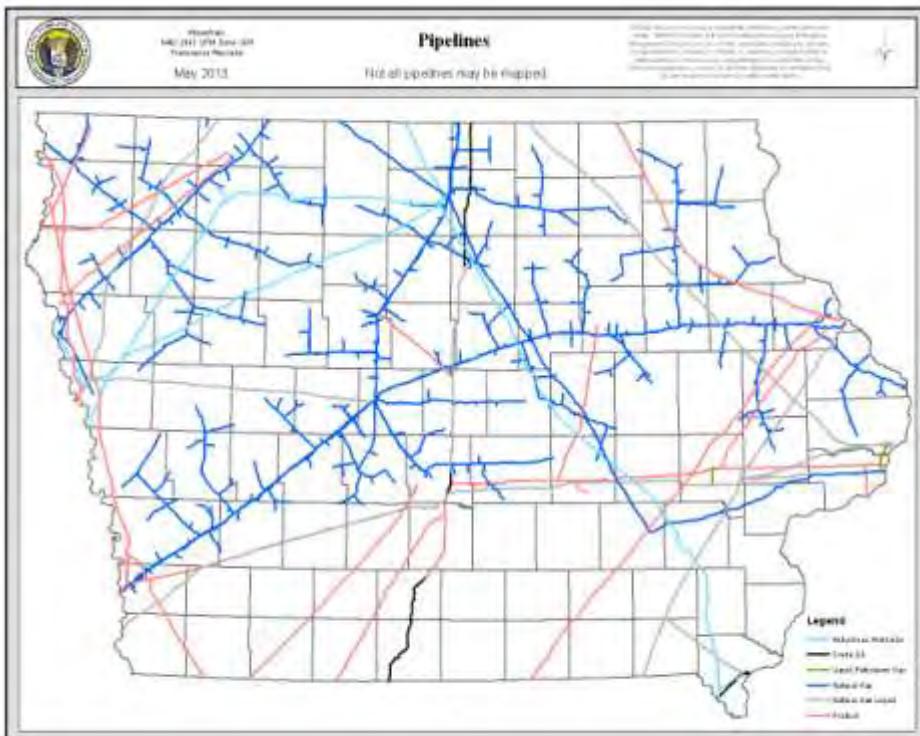
Iowa has been a leader in wind energy production. From 2008 to 2010 the amount of energy produced in Iowa from wind energy more than doubled. The chart above and map on the right provide detailed electric generation information.



Iowa has interstate natural gas pipelines as well as liquefied natural gas and liquefied propane facilities that provide additional supplies to customers. There are some 41,410 miles of hazardous liquid and natural gas pipelines in Iowa. The national average per state is 51,765 miles. Pipelines continue to provide a safe and efficient vehicle for movement of natural gas, petroleum products and anhydrous ammonia to locations throughout the state.

Modern long-distance pipelines are operated mainly automatically by a computer at the headquarters of the pipeline company. The computer monitors the pressure, flow rates, and other parameters at various locations along the pipe, performs many on-line computations, and sends

commands to the field to control the operation of the valves and pumps. Manual intervention is frequently needed to modify the automatic operation, as when different batches of fuels are directed to different temporary storage tanks, or when the system must be shut down or restarted. The map below provides a visual representation of major pipeline locations in Iowa.



5.5 Dams

In 2011, there are a total of 3,768 dams on Iowa's dam inventory. Of these, 91 dams were classified as having a high hazard potential, 221 dams are classified as having significant hazard potential and the remaining 3,456 dam are classified as low hazard potential dams. There are also 11 lock and dam systems along the Mississippi River. The following map shows the location of Iowa's locks and dams along with their associated hazard potential. More information about Iowa dams is located in the Dam/Levee failure profile of Section 1.3 Risk Assessment.



5.6 Source Water

A public water supply is defined in federal law as serving 25 or more people each day for at least 60 days out of the year, or having at least 15 connections. Wells that fall short of these benchmarks are defined as private. The Water Supply Section of the Iowa Department of Natural Resources regulates public drinking water supplies in Iowa according to the federal Safe Drinking Water Act, under authority from the U.S. Environmental Protection Agency.

Approximately 67 percent of Iowa residents depend on groundwater for their daily water needs. The groundwater is accessed through the use of municipal or public water supply wells, or private water supply wells. There are about 206,000 rural Iowans who depend primarily on private wells to meet their daily water needs. In 2009 an estimated 2,814,000 Iowans' water came from public drinking water systems.

Historically in 1990 public or private service represented 81 percent of all source water for Iowans. Another 18.4 percent of Iowans received source water from individually drilled wells. Between 1990 and 2000, there was a shift from individual wells to public or private water systems. The percentages of the State residents on a public or private water system increased by about 7 percent while the percentage of people on wells decreased by 7 percent.

5.7 Wastewater

The Iowa Department of Natural Resources (IDNR) is responsible for maintaining and enhancing water quality in the state. To that end, IDNR develops Wasteload Allocation (WLA) for facilities that discharge treated wastewater (for example, domestic sewage treatment plants and industrial plants) into waters of the state in order to assure that the permitted

effluent limits meet applicable state Water Quality Standards. Local boards of health have primary responsibility for regulation of sewer systems serving 4 homes or fewer or less than 15 people, while the DNR has primary responsibility for larger (public) systems.

Historically in 1990, 76 percent of Iowa's households were connected to a public sewer system, while over 23 percent remained on a septic tank system. Between 1970 and 1990, there was an increase from 69% to 76% in households on public sewer. Updated statistics on wastewater are not readily available beyond 1990, but the trend of more households being on public sewer likely continues as urban growth outpaces rural growth in the State.

5.8 Communications

Commercial broadcast stations, both television and radio, represent the most prevalent communication systems in Iowa. The table below lists the most recent date on the number of television, radio, and newspaper resources available to Iowa's citizens. These media resources are available in a variety and combination of formats including visual, audio, and on-line.

Iowa Communication Statistics (2010)	Numbers
Commercial broadcast stations, TV and Radio	133
Noncommercial broadcast stations, TV and Radio	48
Broadcast Associates	18
Daily newspapers	38
Weekly newspapers	266
Newspaper websites	181

Source: Iowa Secretary of State's Office & Iowa Broadcasters Association

The Iowa Newspaper Association reports that Iowa has more newspapers per capita than any other state in the nation. Additionally, according to Newton Marketing and Research (2010) Iowa's newspaper readership of 86 percent is above the national average and 43 percent of Iowans rely on their local

newspaper for community news. More than 99% of Iowans had internet access of some sort in 2011.

The following table represents a historic census of hard line telephones. Between 1960 and 1990, the number of housing units without telephones decreased from 10.8 percent to 3.4 percent. Although remaining steady in terms of percentage at 3.4 percent, between 1990 and 2000, the number of housing units in Iowa with telephone service decreased by 3,156. The decrease in the number of units with telephones likely represents the increasing choice of people to use mobile phones rather than both a mobile and land based line in their homes. This demonstrates the importance of Iowa's focus on E911 and CodeRED warning systems as well as 911 texting initiatives.

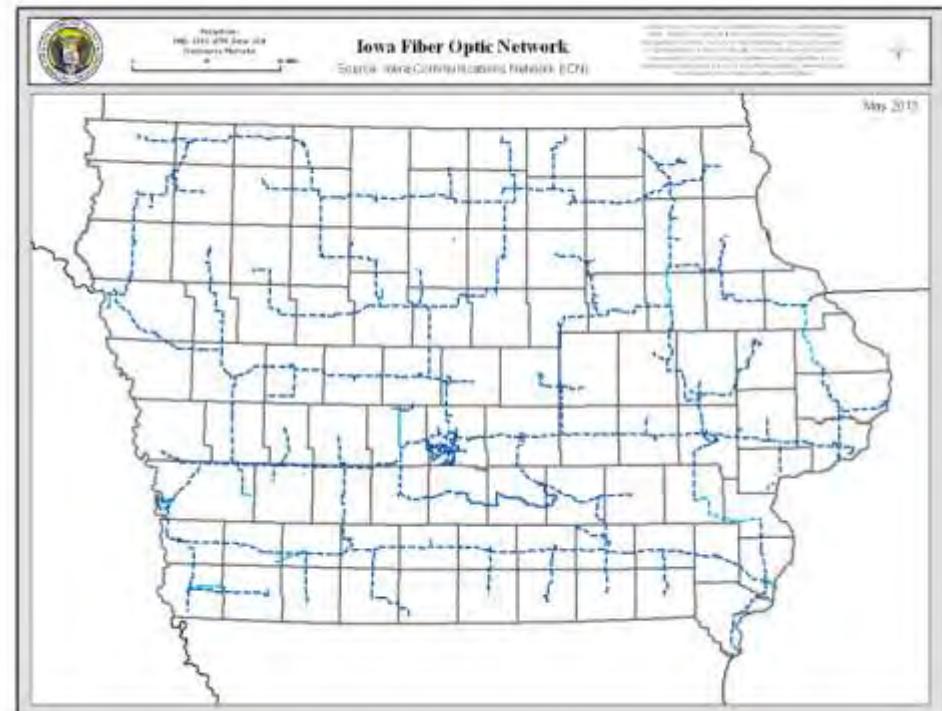
Iowa Historical Census of Telephones, U.S. Census Bureau

Year	Number of units with no telephone	Percent with no telephone
2000	39,643	3.4%
1990	36,487	3.4%
1980	40,305	3.8%
1970	62,028	6.9%
1960	91,127	10.8%

Source: US Census Bureau

The Iowa Communications Network (ICN) is a state agency that administers a statewide fiber optics network. The capacity of the Network enables authorized users such as hospitals, state and federal government, public defense armories, libraries, schools, and higher education to communicate via high quality, full-motion video using high-speed Internet connections and telephones. Each day across the state, the ICN is being used in a variety of ways by a variety of Iowans. The ICN provides a wide range of services and benefits to its authorized users such as voice, data, video, and Internet. In

addition to the mentioned communications systems, Iowa has 117 Public Safety Answering Points (PSAP) that are the first line of response to a 911 call. Each county has at least one PSAP.



6 Medical and Hospitals

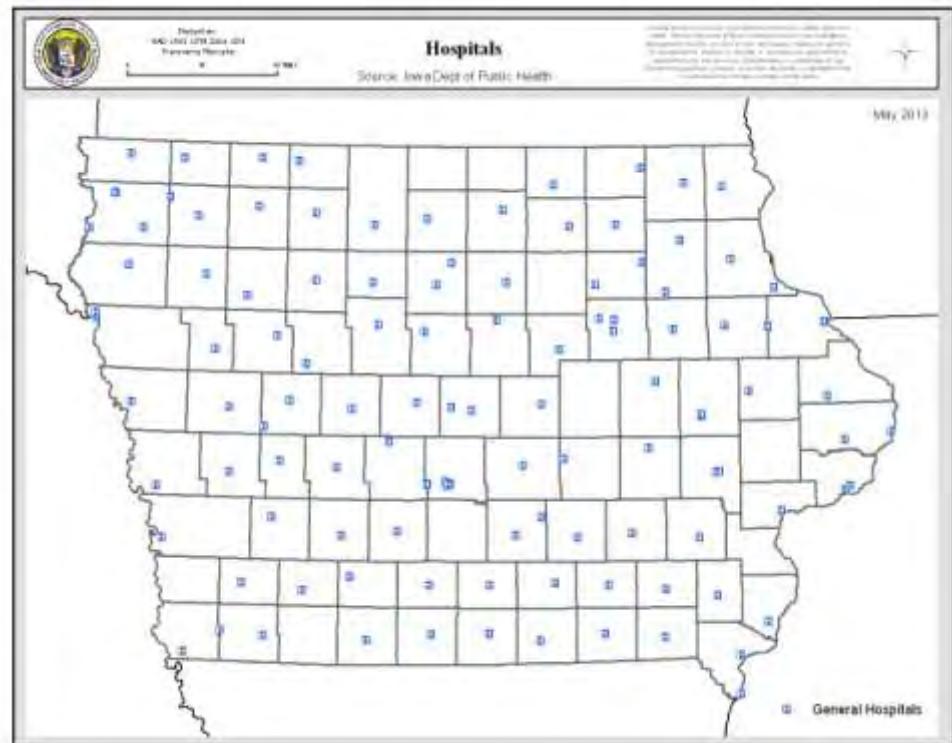
Among those regulated medical and healthcare facilities in Iowa are long-term care facilities, hospitals, hospices, end-stage renal disease units, rural health clinics, and child-placing agencies. In 90 of 99 Iowa counties there is at least one community hospital, and no Iowan is more than 25 miles from a hospital. The larger urban areas have higher level hospitals that can provide advanced care. According to the Iowa Hospital Association (2011), Iowa has 118 hospitals.

There are numerous other health care facilities across the state as well. These include long-term care facilities, hospices, end-stage renal disease units, rural health clinics, and child-placing agencies. The full inventory of health facilities by county can be found on the Iowa Hospital Association website.

In addition to the community hospitals, seven Federal and/or long-term hospitals are present in Iowa, including two veteran hospitals, four State psychiatric and one alcoholism/other chemical dependency facilities.

The Emergency Medical Service (EMS) system is a continuum encompassing prevention, out-of-hospital, hospital, and rehabilitation phases of care. EMS does not exist in isolation. It is integrated with other services and systems intended to maintain and enhance community health and will remain the public's emergency medical safety net. The EMS system must maintain a high state of readiness in order to fulfill its mission. As a component of the health care delivery system, EMS serves as the safety net for all ages, diseases, and segments of the population. EMS serves to promote the health status of Iowans through the efforts of prevention, acute care, and rehabilitation of the ill or injured.

Iowa has experienced the evolution of emergency medical services since the Advanced Emergency Medical Care act in 1978. New technology and more highly trained EMS providers are becoming state of the art throughout Iowa's EMS system. A reduction of suffering, disability, death, and costs from illness and injury is increasingly possible as EMS systems focus on development through planning, implementation, evaluation, and enhancement to enable more efficient and effective use of resources.



Key facts about the Iowa EMS system:

- Weekday staffing continues to be the most difficult challenge for volunteer ambulance service programs.
- Advancing technology and increasing national standards for training and certification is increasing the standard of patient care.
- Volunteer numbers are decreasing, the population is declining and aging in rural Iowa is on the rise.
- There is an increasing volume of non-emergency and long-distance transfers.
- Volunteerism alone is no longer able to sustain a full-time ambulance service in every community.

6. Economy

Iowa is known throughout the world as America's heartland, the source of abundant supply of top quality agricultural and manufactured goods. The natural wealth of Iowa's soil, cutting edge technology, world-class educational system and quality workforce has allowed Iowa to yield a diversified economy. While the trend of consolidation has resulted in a diminished farm population, the contribution of agriculture to Gross State Product assures that all Iowans maintain an interest and awareness in that portion of our economy. It would be a mistake to restrict perception of the state to farm-related goods and services, or to conclude that all Iowans are farmers.

The interconnectedness of the global economy is readily apparent, and Iowa can be influenced by events that occur far from state borders. For example Russia experienced severe drought and wildfires in 2010 that decimated Russian wheat and corn crops causing prices to increase worldwide. Iowa farmers increased their incomes as their corn could be sold at a higher price. Domestically climate trends generally point higher temperatures and more precipitation. With frost free days increasing and more precipitation corn production in Iowa should continue to increase with favorable circumstances. In other areas where long term forecasts are more arid corn production may suffer. Iowa will likely continue to be an important crop producer on a global scale.

7.1 Labor Force

As of April 2013, Iowa's labor force included 1,648,600 workers with an unemployment rate of 4.7 percent. Farm related employment accounted for 7.9 percent of the labor force with 92.1 percent working in non-farm employment. The Trade and Transportation sector represents the highest employment levels with 20.3 percent of the non-farm total, followed by

Government with 16.7 percent and Education and Health with 14.7 percent. The future labor force will likely see dramatic changes with the retirement of the baby boomers and the influx of immigrants and younger college-educated workers.

Iowa Employment Statistics (2013 employment by industry – persons 16 years or older)		
Seasonally Adjusted Labor Force Data		April 2013
Labor force		1,648,600
Unemployed		77,600
Rate (%) Unemployed		4.7%
Seasonally Adjusted Non-farm Employment	Number	Percent (of non-farm)
Total Non-farm	1,518,600	92.1% of labor force
Mining	2,200	0.1%
Construction	62,500	4.1%
Manufacturing	216,800	14.3%
Trade and Transportation	308,200	20.3%
Information	25,900	1.7%
Finance	104,100	6.8%
Professional and Business Services	129,700	8.5%
Education and Health	223,800	14.7%
Leisure and Hospitality	135,400	8.9%
Other Services	56,500	3.7%
Government	253,500	16.7%
Farm Related Employment	130,000	7.9% of labor force

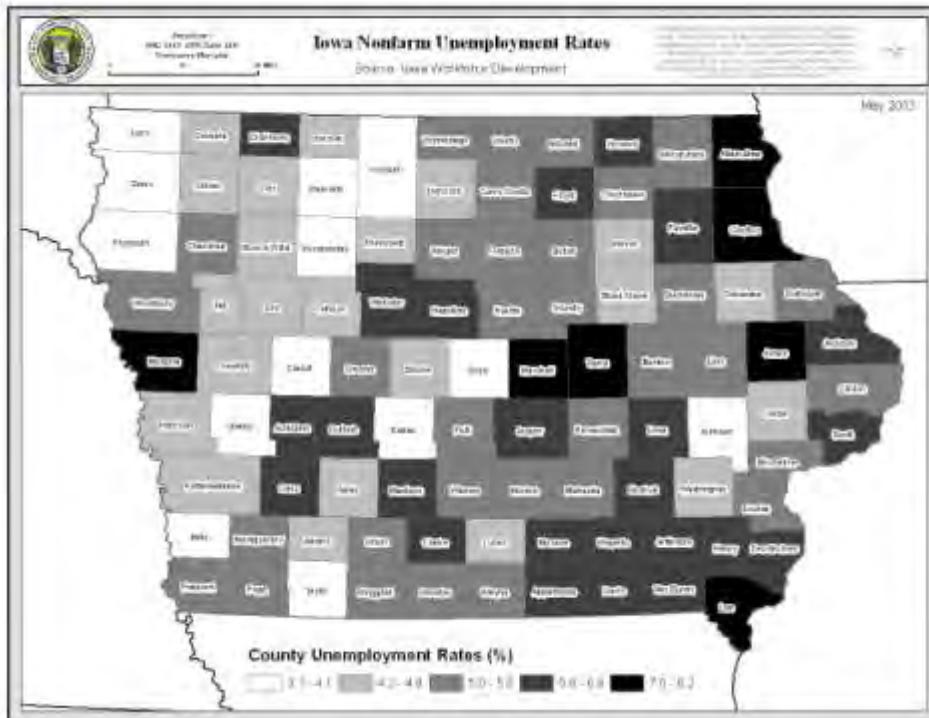
Source: Iowa Workforce Development

In 2012 some of the highest county unemployment rates were associated with counties where larger companies downsized, or where manufacturing represents a smaller portion of employment. Some counties with the lower unemployment rates in the State are home to the State's larger universities or community colleges, Story and Johnson counties in particular. The construction of new manufacturing or larger companies

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has provided employment opportunities to certain areas throughout the state. The following map shows the distribution of non-farm unemployment rates across Iowa counties.



7.2 Income

The following table indicates that less than ten percent of Iowa's population derives its personal income directly from agriculture. But indirectly, agriculture-generated dollars have spawned vigorous growth in other sectors. Because our economy is in the early stages of diversification, we are still vulnerable to fluctuations in demand for agricultural products. As new industries mature, a broader consumer base will bring increasing stability.

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Manufacturing provides Iowan's with 14 percent of total personal income, followed by the Government Sector at 12 percent and Wholesale/Retail Trade at 9 percent.

Iowa Total Personal Income by Industry (2011)

Manufacturing	14%	Agriculture	4%
Government	12%	Professional and Tech. Services	3%
Wholesale/Retail Trade	9%	Transportation and Warehousing	3%
Finance/Insurance/Real Estate	7%	Information	2%
Construction	5%		

Between 1990 and 2011, the median income for Iowa households increased from \$26,169 to \$49,427. This change in median household income represents an average annual change of 2.3 percent which indicates Iowan's are slightly ahead of the 2012 national inflation CPI rate of 1.7 percent, but less than the 3 percent in 2011.

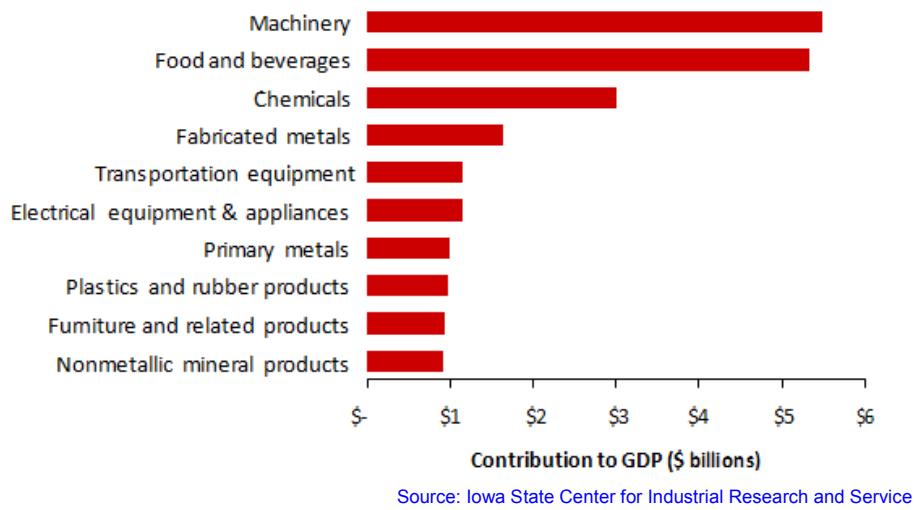
Iowa Household, and Per Capita Income (1989-2011)

Year	Median Household	Per Capita
2011	\$49,427	\$25,667
2008	\$49,007	\$36,680
2007	\$47,324	\$34,916
2006	\$44,560	\$32,741
2005	\$43,610	\$31,575
2004	\$42,865	\$30,732
2003	\$42,278	\$28,608
2002	\$41,052	\$28,128
2001	\$41,216	\$27,125
2000	\$40,443	\$26,558
1995	\$33,436	\$20,929
1990	\$26,169 (data source from 1989)	\$17,389

Source: U.S. Department of Commerce, Bureau of Economic Analysis

7.3 Productivity

Iowa's agricultural profile is strong and the State's strength in the Industrial sector is often overlooked. Approximately 13 percent of the Iowa workforce is employed in manufacturing holding steady within the non-farm job market. Machinery exports represent the highest dollar value of factory exports, followed by food & beverages, chemicals, and fabricated metals as shown in the following bar chart.



Historically, Iowa manufacturing has focused on heavy machinery, food processing, electronics and chemicals. Taking advantage of Iowa's fine reputation for agricultural products, food processors enjoy ready access to raw materials and an excellent workforce. Manufacturers of rubber and plastic products, machinery, electronics and pharmaceuticals all note the Iowa work ethic as a positive factor in their location here.

The value of Iowa's farm exports by commodity highlights the State's agricultural focus. Overall, oilseed grains and related products represent the largest commodity group in terms of value for Iowa's farm exports. This commodity represents approximately 3.7 billion dollars in annual value. Corn exports were valued at over 1.75 billion dollars in 2010. The state's meat and poultry commodities also have a high value with regard to exports and as with the other leading commodities in Iowa.

Value of Iowa Farm Exports by Commodity (in millions of dollars)							
	2000	2005	2006	2007	2008	2009	2010
Dairy products	23.5	37.3	41.8	68.3	85.6	52.8	83.9
Corn	N/A	920.0	1345.8	1763.5	2468.9	1631.3	1757.1
Feeds and fodders	103.0	343.3	404.0	478.1	647.5	664.9	797.7
Fruit, processed	N/A	0.6	0.8	1.1	1.0	1.2	1.1
Fruit, fresh	N/A	1.1	1.3	1.6	1.5	1.8	1.8
Livestock and Products	N/A	760.5	873.1	988.6	1444.0	1290.2	1539.7
Oilseeds and Products	N/A	1567.1	1734.7	2416.6	3486.1	3484.8	3703.4
Poultry Products	29.0	50.7	59.4	122.3	185.3	143.3	149.2
Planting Seeds	N/A	7.8	8.0	12.3	13.0	13.5	16.2
Vegetables, processed	N/A	1.8	1.7	1.6	2.4	2.2	2.1
Vegetables, fresh	N/A	2.6	2.5	2.3	2.8	2.7	2.7
Wheat and products	13.1	1.9	2.7	4.7	8.4	2.8	1.7
Total	2,937.2	4458.4	5218.4	6995.6	9853.1	8456.1	9507.6

Agriculture represents approximately 4 percent of Iowa's personal income. Iowa farms raise 18.96 percent of the U.S. corn crop (2012), and nearly 15 percent of the U.S. soybean crop (2011). In addition, Iowa produces 29.4 percent of U.S. pork, over 8 percent of beef steers 500 pounds and over, and about 16 percent of the egg production. The 2011 statistics show that Iowa is number one in the nation in corn, soybeans, hogs, and egg production. Iowa is the second ranking state in the nation for net farm income.

7.4 Finance

The Iowa work ethic has resulted in a well-deserved reputation for productivity. While proud of this characteristic, high productivity is responsible for economic shifts that continue to challenge versatility. Productivity on the farm generated development of our manufacturing sector. Productivity in manufacturing, combined with sophisticated technology, has revealed an emerging financial sector. Iowa has seen employment growth in the home offices of its many insurance and financial service companies in an industry that has experienced cutbacks in other states. Analysts consider the people of Iowa particularly suited to strong performance in this sector. Our well-educated workforce, stable social environment, traditional values and conservative ideology provide a solid base from which to evaluate and satisfy service needs in recreation, medicine, communication and business.

8. History of Iowa

Source: History of Iowa By Dorothy Schwieder, professor of history, Iowa State University

In the summer of 1673, French explorers Louis Joliet and Father Jacques Marquette traveled down the Mississippi River past the land that was to become the state of Iowa. It is believed that the 1673 voyage marked the first time that white people visited the region of Iowa. Before 1673, however, the region had long been home to many Native Americans. Approximately 17 different Indian tribes had resided here at various times including the Ioway, Sauk, Mesquaki, Sioux, Potawatomi, Oto, and Missouri. Today, Iowa is still home to one Indian group, the Mesquaki, who reside on the Mesquaki Settlement in Tama County. The first official white settlement in Iowa began in June 1833, in the Black Hawk Purchase.

Most of Iowa's first white settlers came from Ohio, Pennsylvania, New York, Indiana, Kentucky, and Virginia.

8.1 Hardship on the Prairie

Pioneer families faced many hardships in their early years in Iowa. Constructing a farmstead was hard work in itself. But for the pioneers who remained on the land, and most did, the rewards were substantial. These early settlers soon discovered that prairie land, although requiring some adjustments, was some of the richest land to be found anywhere in the world. Moreover, by the late 1860s, most of the state had been settled and the isolation and loneliness associated with pioneer living had quickly vanished.

8.2 Railroad Fever

As thousands of settlers poured into Iowa in the mid-1800s, all shared a common concern for the development of adequate transportation. The earliest settlers shipped their agricultural goods down the Mississippi River to New Orleans, but by the 1850s, Iowans had caught the nation's railroad fever.

In the early 1850s, city officials in the river communities of Dubuque, Clinton, Davenport, and Burlington began to organize local railroad companies. City officials knew that railroads building west from Chicago would soon reach the Mississippi River opposite the four Iowa cities. With the 1850s, railroad planning took place which eventually resulted in the development of the Illinois Central, the Chicago and North Western, reaching Council Bluffs in 1867. Council Bluffs had been designated as the eastern terminus for the Union Pacific, the railroad that would eventually extend across the western half of the nation and along with the Central Pacific, provide the nation's first transcontinental railroad. The completion of five railroads across Iowa brought major economic changes. Of primary importance, Iowans could travel every month of the

year. During the latter nineteenth and early twentieth centuries, even small Iowa towns had six passenger trains a day. Steamboats and stagecoaches had previously provided transportation, but both were highly dependent on the weather, and steam boats could not travel at all once the rivers had frozen over. Railroads also provided year-round transportation for Iowa's farmers. With Chicago's pre-eminence as a railroad center, the corn, wheat, beef, and pork raised by Iowa's farmers could be shipped through Chicago, across the nation to eastern seaports, and from there, anywhere in the world.

8.3 Education

As Iowa's population and economy continued to grow, education and religious institutions also began to take shape. Americans had long considered education important and Iowans did not deviate from that belief. Early in any neighborhood, residents began to organize schools. The first step was to set up township elementary schools, aided financially by the sale or lease of section 16 in each of the state's many townships.

The first high school was established in the 1850s, but in general, high schools did not become widespread until after 1900. In the mid-1800s, state officials organized three state institutions of higher learning, each with a different mission. The University of Iowa, established in 1855, was to provide classical and professional education for Iowa's young people; Iowa State College of Science and Technology (now Iowa State University), established in 1858; was to offer agricultural and technical training. Iowa State Teachers' College (now University of Northern Iowa), founded in 1876 was to train teachers for the state's public schools.

8.4 Civil War

By 1860, Iowa had achieved statehood (December 28, 1846), and the state continued to attract many settlers, both native and foreign-born. Only the extreme northwestern part of the state remained a frontier area. But after almost 30 years of peaceful development, Iowans found their lives greatly altered with the outbreak of the Civil War in 1861. While Iowans had no battles fought on their soil, the state paid dearly through the contributions of its fighting men. Iowa males responded enthusiastically to the call for Union volunteers and more than 75,000 Iowa men served with distinction in campaigns fought in the East and in the South. Iowa women also served their nation during the war. Hundreds of women knitted sweaters, sewed uniforms, rolled bandages, and collected money for military supplies.

8.5 Political Arena

The Civil War era brought considerable change to Iowa and perhaps one of the most visible changes came in the political arena. During the 1840's, most Iowans voted Democratic although the state also contained some Whigs.

Iowa's first two United States Senators were Democrats as were most state officials. During the 1850s, however, the state's Democratic Party developed serious internal problems as well as being unsuccessful in getting the national Democratic Party to respond to their needs. Iowans soon turned to the newly emerging Republican Party.

8.6 Iowa: The Home of Immigrants

Following the Civil War, Iowa's population continued to grow dramatically, from 674,913 people in 1860 to 1,194,020 in 1870. Moreover, the ethnic composition of Iowa's population also changed substantially. Before the Civil War, Iowa had attracted some foreign-born settlers, but the number remained small. After the Civil War, the number of immigrants increased. In 1869, the state encouraged immigration by printing a 96-page booklet entitled *Iowa: The Home of Immigrants*. The publication gave physical, social, educational, and political descriptions of Iowa. The legislature instructed that the booklet be published in English, German, Dutch, Swedish, and Danish. Most immigrants from these countries came in family units. Germans constituted the largest group, settling in every county within the state. The great majority became farmers, but many also became craftsmen and shopkeepers. Moreover, many German-Americans edited newspapers, taught school, and headed banking establishments. In Iowa, Germans exhibited the greatest diversity in occupations, religion, and geographical settlement. Iowa also attracted many other people from Europe, including Swedes, Norwegians, Danes, Hollanders, and many emigrants from the British Isles. After 1900, people also emigrated from southern and eastern Europe.

8.7 Coal Mining

The majority of blacks who migrated to Iowa during the late nineteenth and early twentieth centuries worked as coal miners. Before the Civil War, Iowa had only a small black population, but in the 1880s that number increased considerably. Unfortunately, many of the early blacks were hired as strike breakers by Iowa coal operators. In later decades, however, coal companies hired blacks as regular miners.

8.8 The Family Farm

After the Civil War, Iowa's agriculture also underwent considerable change. By the 1870s, farms and small towns blanketed the entire state. Also in that decade, Iowa farmers established definite production patterns, which led to considerable prosperity. Even though farmers changed their agricultural production, farm work continued to be dictated by the seasons. Wintertime meant butchering, fence mending, ice cutting, and wood chopping. In the spring, farmers prepared and planted their fields. Summertime brought sheep shearing, haying, and threshing. In the fall, farmers picked corn, the most difficult farm task of all. During the late 1800s and early 1900s, social activities for farm families were limited. Most families made few trips to town. Some Iowans remember that even in the 1920s, they went to town only on Saturday night. Family members looked to each other for companionship and socializing. Moreover, the country church and the country school were important social centers.

In 1917, the United States entered World War I and farmers as well as all Iowans experienced a wartime economy. For farmers, the change was significant. Since the beginning of the war in 1914, Iowa farmers had experienced economic prosperity.

Along with farmers everywhere, they were urged to be patriotic by increasing their production. The 1920s were a time of hardship for Iowa's farm families and for many families, these hardships carried over into the 1930s. As economic difficulties worsened, Iowa farmers sought to find local solutions. Faced with extremely low farm prices, including corn at 10 cents a bushel and pork at three cents a pound, some Iowa farmers joined the Farm Holiday Association. In 1933, native Iowan Henry A. Wallace went to Washington as

secretary of agriculture and served as principle architect for the new farm program. Wallace, former editor of the Midwest's leading farm journal, Wallace's Farmer, believed that prosperity would return to the agricultural sector only if agricultural production was curtailed. Further, he believed that farmers would be monetarily compensated for withholding agricultural land from production. These two principles were incorporated into the Agricultural Adjustment Act passed in 1933. Iowa farmers experienced some recovery as a result of the legislation but like all Iowans, they did not experience total recovery until the 1940s.

In the economic sector, Iowa also has undergone considerable change. Beginning with the first farm-related industries developed in the 1870s, Iowa has experienced a gradual increase in the number of business and manufacturing operations. The period since World War II has witnessed a particular increase in manufacturing operations. While agriculture continues to be the state's dominant industry, Iowans also produce a wide variety of products including refrigerators, washing machines, fountain pens, farm implements, and food products that are shipped around the world.

8.9 Strong Traditions

At the same time, some traditions remain unchanged. Iowans are still widely known for their strong educational systems, both in secondary as well as in higher education. Today, Iowa State University and the University of Iowa continue to be recognized nationally and internationally as outstanding educational institutions. Iowa remains a state composed mostly of farms and small towns, with a limited number of larger cities. Moreover, Iowa is still a place where most people live stable, comfortable lives, where family relationships are strong and where the quality of life is high. In many peoples'

minds, Iowa is "middle America." Throughout the years, Iowans have profited from their environment and the result is a progressive people and a bountiful land.