

Changes in Land Use

How do humans change their environment?

The current Iowa landscape owes much to the most recent Ice Age and the glaciers that edged down from the north. As the climate grew colder, ice and snow did not melt off over southern Canada but piled up and pushed out the outer edges of huge ice sheets in the form of glaciers. One account describes it as similar to a pancake on the griddle spreading out as batter pours into the center. Several glaciers covered all or portions of Iowa. Northeastern Iowa is called the driftless area because it received little or no glaciation.

From “Great Desert” to Fertile Oasis

At the end of the most recent ice age, the climate was unsteady with periods of warming and cooling. When the unstable climate turned cold and then warmed, glaciers scraped across north central Iowa and then retreated, back and forth, creating flat surfaces and pulverizing rocks and gravel into fine particles. When the climate finally began warming up and drying out, evergreen forests appeared first, then hardwoods, and finally the grasslands came to characterize the region as we know it. Season after season, the grasses and other prairie plants grew and died, leaving their roots in the soil to create the incredible topsoil for which Iowa is famous. The glaciers left western and southern portions of the state more hilly.

When American explorers began to investigate the newly-purchased Louisiana Territory, Iowa was considered a “great desert.” The fertility of the land was measured by its ability to grow trees, and the prairies looked like miles and miles of barren acres. It was not until early families began moving out onto the prairies and, with John Deere’s steel plow, scoured off the sticky prairie dirt, discovering the incredible fertility of the deep, black topsoil.

At the beginning of European settlement, Iowa was around 85 percent prairies, treeless grasslands. Trees grew in the hills of southeast Iowa and along major rivers, but on the uplands back from the waterways, fires burned off trees and other woody plants. Early settlers tried to include at least some timber land in their purchases for the fuel, fencing and lumber they needed. Lumber mills along the Mississippi and inland rivers created Iowa’s first millionaires as the flood of settlers that the railroads brought with them built homes, barns and outbuildings and businesses. The coming of the railroads took more trees to make railroad ties. Today, less than 0.1 percent of Iowa’s original prairies are left; the rest of the land has been plowed or in some other way altered.

Different Uses for Iowa’s Land

Not all Iowa farmland is used in the same way. In the hills of northeast Iowa, dairy farming has deep roots as farmers harvest hay through the summer to feed their herds through the winter. The hillsides are too steep to plow but abundant rainfall produces excellent pasture. Hilly land in southern and western Iowa support livestock production. Many farmers raise herds that produce calves in the spring that graze to a certain weight and then are shipped north to feedlots where they are finished on corn. The flat, fertile fields of north central Iowa are some of the world’s most valuable farming acres. Corn and soybeans dominate the landscape, often to the exclusion of trees, shrubs and wildlife habitat that once supported a variety of birds and wildlife. With larger and larger equipment, a single farm operation can now manage thousands of acres, reducing the number of farms, farm families and the small towns that once supported them.

Farming practices have greatly affected the land. In early Iowa, swamps and wetlands accumulated water in rainy seasons making farming impossible. Tiling ponds to drain the water from ponds and wet lands opened thousands of acres to the plow but created the potential for flooding as excess water flowed into streams and rivers very quickly. The use of commercial fertilizers created ecological challenges in the lower Mississippi as chemicals that kill of vegetation and fish accumulate. Deep plowing and rapid run-off also encourages erosion and the loss of Iowa’s most precious resource, its rich topsoil. Livestock confinement operations can concentrate animal wastes that can pollute streams or the air. Efforts are now being explored that try to minimize the impacts of these challenges while still allowing the farm production vital to the state’s economy and the world’s food and fuel supplies.

Supporting Questions

How has land been changed to grow food?

- [“Millions of Acres” Advertisement, 1872 \(Image\)](#)
- [Letter from Giles S. Thomas to His Family, January 3, 1876 \(Document\)](#)
- [“A Modern Iowa Farm,” 1927 \(Image\)](#)
- [Farmer Plowing Sod in Grundy County, Iowa, 1940 \(Image\)](#)
- [Plowed Sod in Grundy County, Iowa, 1940 \(Image\)](#)

How has land been changed to provide energy?

- [View of Top of Nevada Power Plant at Hoover Dam, Date Unknown \(Image\)](#)
- [“British Reported Set To Build World’s First Nuclear Power Station” Newspaper Article, August 8, 1951 \(Document\)](#)
- [Farm in Hardin County, Iowa, August 18, 2008 \(Image\)](#)
- [View of Eagle Butte Coal Mine in Gillette, Wyoming, August 20, 2008 \(Image\)](#)
- [Nuclear Power Plant in Northern California, 2012 \(Image\)](#)

How has the environment been impacted by human land use?

- [“Preserve Your Forests from Destruction” Illustration, January 9, 1884 \(Image\)](#)
- [“Farm Wells and Pollution” Newspaper Article, February 25, 1916 \(Document\)](#)
- [“Deforestation Means Famine in U.S.” Newspaper Article, May 23, 1921 \(Document\)](#)
- [Dubuque “Shacktown” Near the Banks of a Polluted Stream, April 1940 \(Image\)](#)
- [“Results of Deforestation” in San Juan County, Colorado, September 1940 \(Image\)](#)

*Printable Image and Document Guide

Additional Resource

“Energy Sprawl is the Largest Driver of Land Use Change in the U.S.” by Cara Cannon Byington

This online blog from “Cool Green Science” website focuses on how the diversity of the energy industry - or sprawl - has had one of the biggest impacts to land use in the United States.

“Millions of Acres” Advertisement, 1872



Courtesy of Library of Congress, “Millions of Acres,” Burlington & Missouri River Railroad Co., 1872

Description

This was an advertisement created by the Burlington & Missouri River Railroad Co. in 1872 to increase land sales in Iowa and Nebraska. This flyer promoted “millions of acres” of land being sold on 10 years credit with six percent interest.

[Transcript of “Millions of Acres” Advertisement](#)

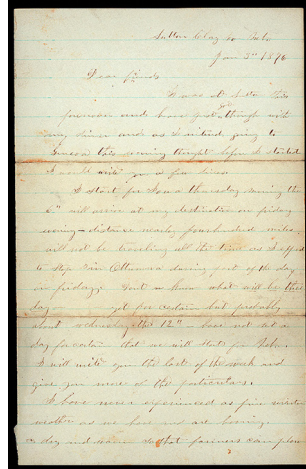
Source-Dependent Questions

- Describe the flyer above. What is this flyer advertising?
- What evidence is there in this flyer to suggest that humans are modifying their physical environment to grow food?
- Describe and explain how flyers like this helped people settle in the Great Plains.

Citation Information

“Millions of Acres,” Burlington & Missouri River Railroad Co., 1872. Courtesy of Library of Congress

Letter from Giles S. Thomas to His Family, January 3, 1876



Courtesy of Library of Congress, Thomas, Giles S., Prairie Settlement: Nebraska Photographs and Family Letters, 3 January 1876

Description

In this letter, Giles S. Thomas discusses traveling across Iowa and the weather. He indicates that the winter was mild, and farmers were able to get into their fields early to begin plowing the land.

[Transcript of Giles S. Thomas' Letter to His Family](#)

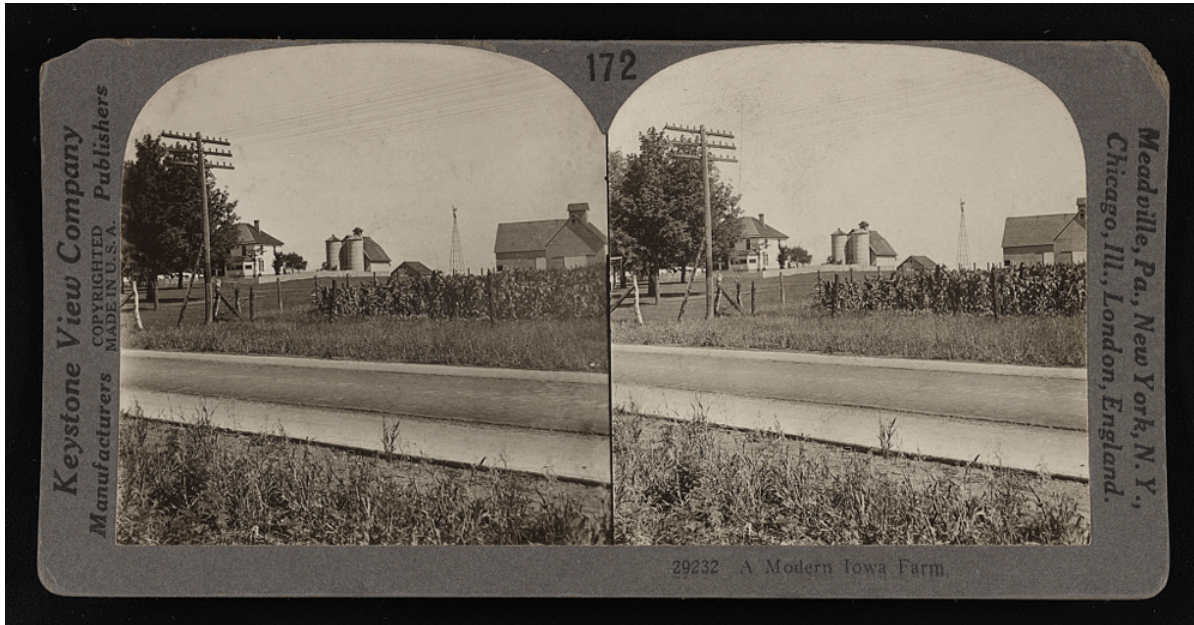
Source-Dependent Questions

- What does the author of this letter appear to be doing?
- What is the purpose of writing this letter?
- What was unique about the winter that the author is describing, and why was that significant for farmers?
- What evidence is there in this letter to suggest that humans were modifying their physical environment to grow food?

Citation Information

Thomas, Giles S., Prairie Settlement: Nebraska Photographs and Family Letters, 3 January 1876. Courtesy of Library of Congress

"A Modern Iowa Farm," 1927



Courtesy of Library of Congress, "A Modern Iowa Farm," Keystone View Company, 1927

Description

This stereograph shows an Iowa farm from 1927. The image shows the farmland, house, barn and other buildings on the property.

Source-Dependent Questions

- Describe the image above. What is this image showing?
- How has this landscape been changed by humans?
- What human elements have been added to this area?
- Compare the landscape in this image to landscape in the ["Millions of Acres" advertisement](#). Over 50 years have passed between these images of the Iowa landscape. What remains the same? What is different?

Citation Information

"A Modern Iowa Farm," Keystone View Company, 1927. Courtesy of Library of Congress

Farmer Plowing Sod in Grundy County, Iowa, 1940



Courtesy of Library of Congress, Vachon, John, "Untitled photo, possibly related to: Plowed sod, Grundy County, Iowa," 1940

Description

The photo was taken by John Vachon in April 1940, and it shows a farmer in Grundy County, Iowa, plowing a field. The farmer is sitting on the plow, which is being pulled by horses.

Source-Dependent Questions

- Describe the image above. What is happening in the image, and why is this happening?
- How is this land being changed in this image?
- The image shows a steel plow being used. How has this invention helped humans settle this area of the Great Plains?
- Notice what is pulling the steel plow. How has farming changed over time? And how does this change impact the land for food production?

Citation Information

Vachon, John, "Untitled photo, possibly related to: Plowed sod, Grundy County, Iowa," 1940. Courtesy of Library of Congress

Plowed Sod in Grundy County, Iowa, 1940



Courtesy of Library of Congress, Vachon, John, "Plowed Sod, Grundy County, Iowa," April 1940

Description

The photograph was taken by John Vachon in April 1940, who also took the photo that shows the [Iowa farmer plowing sod](#). The image shows a field in Grundy County, which is located in northeast Iowa. That field has been half plowed, and it shows how the soil has been overturned and changed to accommodate growing crops.

Source-Dependent Questions

- Describe the image above. What is happening in the image and why is this happening?
- How is this land being changed? Why is this land being changed?
- How can this image be used as evidence that humans modify their physical environments to grow food?
- Compare this image to [Farmer Plowing Sod](#). Explain which image comes first in the progression of change to the land. Describe what comes next as farmers grow food.

Citation Information

Vachon, John, "Plowed Sod, Grundy County, Iowa," April 1940. Courtesy of Library of Congress

View of Top of Nevada Power Plant at Hoover Dam, Date Unknown



Courtesy of Library of Congress, "Hoover Dam, Circuits 1-15, U.S. Highway 93, Boulder City, Clark County, NV," Date Unknown

Description

This photograph shows an aerial view of the Hoover Dam with a power station at the top. On one side of the dam, there is visible water, while on the other side, there is none. The Hoover Dam is on the border between Nevada and Arizona. It was constructed between 1931 and 1936 during the Great Depression and was dedicated on September 30, 1935, by President Franklin D. Roosevelt. Its construction was the result of a massive effort involving thousands of workers, and cost over one hundred lives. The Hoover Dam generates, on average, about 4 billion kilowatt-hours of hydroelectric power each year for use in Nevada, Arizona, and California - enough to serve 1.3 million people.

Source-Dependent Questions

- Describe the photo above. What man-made features do you notice?
- What type of energy is being produced in this image?
- What are a few ways that this land has been changed by humans?
- How can this image be used as evidence that humans modify their physical environments to provide energy?

Citation Information

"Hoover Dam, Circuits 1-15, U.S. Highway 93, Boulder City, Clark County, NV," Date Unknown. Courtesy of Library of Congress

“British Reported Set To Build World’s First Nuclear Power Station” Newspaper Article, August 8, 1951



Courtesy of Library of Congress, “British Reported Set To Build World’s First Nuclear Power Station,” *The Evening Star*, 8 August 1951

Description

This article was published in the Washington, D.C., newspaper, *The Evening Star*. Written by the Associated Press, it reads that British atomic scientists have announced they are ready to begin building the world’s first nuclear power station. This article was published in 1951, but the world’s first nuclear power station to generate electricity for a power grid did not go into production until June 27, 1954, at the Obninsk Nuclear Power Plant in the Soviet Union.

[Transcript of “British Reported Set To Build World’s First Nuclear Power Station” Newspaper Article](#)

[Printable Excerpt of “British Reported Set To Build World’s First Nuclear Power Station” Newspaper Article](#)

Source-Dependent Questions

- What type of energy does the article say the British government is looking to produce?
- According to the article, what type of energy provides most of Britain’s power?
- How long does the government’s scientific advisory council say it will take to develop British atomic power stations?
- Compare this article to the [Hoover Dam photo](#). In your opinion, which type of power is safer for the land? Which is safer for people? Explain your answers.

Citation Information

“British Reported Set To Build World’s First Nuclear Power Station,” *The Evening Star*, 8 August 1951. Courtesy of Library of Congress

Farm in Hardin County, Iowa, August 18, 2008



Courtesy of Library of Congress, Highsmith, Carol M., "Farm Scene Including a Bright-Red Barn, Three Silos (one vintage, two modern), and Quite Modern Wind Turbines in Hardin County, Iowa," 18 August 2008

Description

This 2008 photography shows an Iowa farm with two tall blue silos, sheds, a house and a blue sky in the background. There is a cornfield in the foreground and large, white wind turbines in the background. Iowa is a national leader in wind energy, producing the highest percentage of electricity produced by wind – over 36 percent (2016) – of any state. Iowa is the first state to generate more than 30 percent of its electricity with wind power.

Source-Dependent Questions

- Describe the photo above. What human-made features do you notice?
- What type of energy is being produced in this image?
- What are a few ways that this land has been changed by humans?
- Compare this image with the image of a [modern farm from 1927](#). What is similar between the images? What is different? Discuss how wind energy is impacting the land based on these two images.

Citation Information

Highsmith, Carol M., "Farm Scene Including a Bright-Red Barn, Three Silos (one vintage, two modern), and Quite Modern Wind Turbines in Hardin County, Iowa," 18 August 2008. Courtesy of Library of Congress

View of Eagle Butte Coal Mine in Gillette, Wyoming, August 20, 2008



Courtesy of Library of Congress, Highsmith, Carol M., "View into the Eagle Butte coal mine in Gillette, in Wyoming's Powder River Basin," 20 August 2008

Description

The photograph shows an open-pit "truck and shovel" mine in Gillette, Wyoming. Called the Eagle Butte coal mine, it produces low-sulfur, sub-bituminous coal from the vast Roland and Smith seams. This coal is used for domestic energy generation.

Source-Dependent Questions

- Describe the photo above. What is happening in the image? Why is this happening?
- How is this land being changed? Why is this land being changed?
- Compare this image to the ["British Reported Set To Build World's First Nuclear Power Station" article](#). Both of these sources mention coal. Using evidence from this photo, why would the British want to move away from using coal to power the country?

Citation Information

Highsmith, Carol M., "View into the Eagle Butte coal mine in Gillette, in Wyoming's Powder River Basin," 20 August 2008. Courtesy of Library of Congress

Nuclear Power Plant in Northern California, 2012



Courtesy of Library of Congress, Highsmith, Carol M., "Nuclear Power Plant in Northern California," 2012

Description

This 2012 photograph taken by Carol Highsmith shows a nuclear power plant in a field in northern California. As of late 2016, there are 60 commercially-operating nuclear power plants with 98 nuclear reactors in the United States. But the state of California has been phasing out the use of nuclear energy and its legislature voted in 2018 to close the state's last remaining nuclear energy power plant.

Source-Dependent Questions

- Describe the photo above. What man-made features do you notice?
- What type of energy is being produced in this image?
- What are a few ways that this land has been changed by humans?
- This photo address nuclear power. Compare this image to [coal mining](#), [wind power](#) and [hydro-electric power](#). Describe how each impacts the land. Which seems to have the most impact on land? Which seems to have the least? What are the benefits and drawbacks for each type of power?

Citation Information

Highsmith, Carol M., "Nuclear Power Plant in Northern California," 2012. Courtesy of Library of Congress

“Preserve Your Forests from Destruction” Illustration, January 9, 1884



Courtesy of Library of Congress, Keppler, Joseph Ferdinand, “Preserve your forests from destruction, and protect your country from floods and drought,” 9 January 1884

Description

This illustration shows a female spirit labeled “Public Spirit” warning two men cutting logs of the consequences of deforestation. The bottom of the image reads, “Preserve your forests from destruction, and protect your country from floods and drought.”

Source-Dependent Questions

- Describe the illustration. What human changes to the environment do you see?
- What do the words say at the bottom of the image? What do they mean?
- How can this document be used as evidence that human actions have consequences to land use and the environment?

Citation Information

Keppler, Joseph Ferdinand, “Preserve your forests from destruction, and protect your country from floods and drought,” 9 January 1884. Courtesy of Library of Congress

"Farm Wells and Pollution" Newspaper Article, February 25, 1916



Courtesy of Library of Congress, "Farm Wells and Pollution; Clean Water an Important Consideration on Every Farm," *Camas Prairie Chronicle*, pp. 6, 25 February 1916

Description

The article was published by the United States Department of Agriculture and addresses how clean water practices are an important part of farming. Published February 25, 1916, the article states that farmers need to consider the quality of their water, and that polluted water supply is evidence of bad sanitary conditions.

[Transcript of "Farm Wells and Pollution" Newspaper Article](#)

[Printable Excerpt of "Farm Wells and Pollution" Newspaper Article](#)

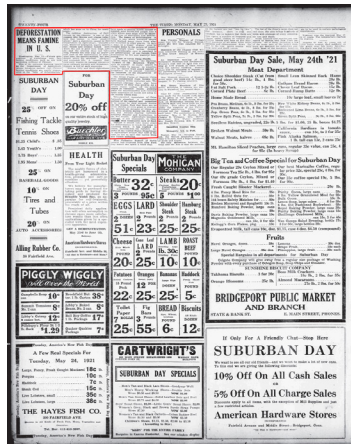
Source-Dependent Questions

- What agency prepared this document? Why would this agency lend credence to the topic?
- What is the central idea of this document? What does the author want you to know and understand?
- What warnings and advice is provided in the article?
- How can this document provide evidence that human actions have consequences to land use and the environment?

Citation Information

"Farm Wells and Pollution; Clean Water an Important Consideration on Every Farm," *Camas Prairie Chronicle*, pp. 6, 25 February 1916. Courtesy of Library of Congress

“Deforestation Means Famine in U.S.” Newspaper Article, May 23, 1921



Courtesy of Library of Congress, “Deforestation Means Famine in U.S.,” *The Bridgeport Times and Evening Farmer*, pp. 24, 23 May 1921

Description

This newspaper article was published in 1921, and it discusses the negative, long-term effects of deforestation. The article suggests that Americans could face a famine, similar to what was happening in China at the time, because of the amount of deforestation that was happening across the country.

[Transcript of “Deforestation Means Famine in U.S.” Newspaper Article](#)

[Printable Excerpt of “Deforestation Means Famine in U.S.” Newspaper Article](#)

Source-Dependent Questions

- What is this article warning the reader about?
- According to the article, explain the impact of deforestation in China.
- Compare this article to the [“Preserve Your Forests from Destruction” illustration](#). Almost 40 years have passed between these sources, describe how the messages remain the same.

Citation Information

“Deforestation Means Famine in U.S.,” *The Bridgeport Times and Evening Farmer*, pp. 24, 23 May 1921. Courtesy of Library of Congress

Dubuque “Shacktown” Near the Banks of a Polluted Stream, April 1940



Courtesy of Library of Congress, Vachon, John, “Shacktown runs along the banks of a polluted stream, Dubuque, Iowa,” April 1940

Description

This photography shows a “Shacktown” near Dubuque, located in northeast Iowa. The dilapidated “Shacktown” is located near the banks of a polluted stream. The image was captured in April 1940.

Source-Dependent Questions

- Describe the photo above. What possible consequences to the environment can you see?
- What forms of pollution can you observe in this image, and what are the consequences of this pollution?
- How can this image be used as evidence that human actions have consequences to land use and the environment?

Citation Information

Vachon, John, “Shacktown runs along the banks of a polluted stream, Dubuque, Iowa,” April 1940. Courtesy of Library of Congress

“Results of Deforestation” in San Juan County, Colorado, September 1940



Courtesy of Library of Congress, Lee, Russell, “Results of deforestation during the early mining days. San Juan County, Colorado,” September 1940

Description

The photograph was taken in September 1940 in San Juan County, Colorado. The photo shows the results of deforestation for mining purposes in Colorado. Many trees can be seen cut down, which drastically changed the landscape and forest.

Source-Dependent Questions

- Describe the photo. What human changes to the environment do you see?
- How is this image similar to the [illustration of deforestation](#)?
- How can this document be used as evidence that human actions have consequences to land use and the environment?

Citation Information

Lee, Russell, “Results of deforestation during the early mining days. San Juan County, Colorado,” September 1940.
Courtesy of Library of Congress