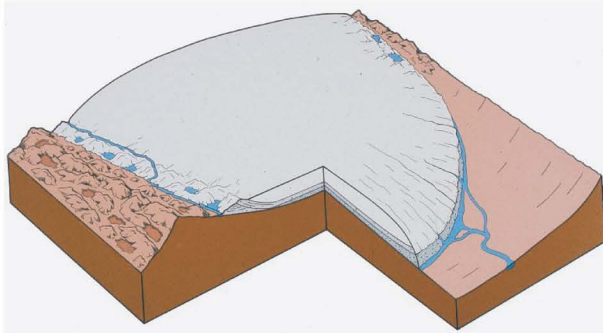


## RAGBRAI Geo-pedia

### Glacial terminology

On a sweltering, 100-degree, high-humidity day, it's hard to imagine a majority of Iowa covered by mile-thick glacial ice. But only a few thousand years ago the Iowa landscape looked more similar to modern-day Greenland than what it looks like today. Mega-fauna such as woolly mammoths, giant sloths, and giant beavers freely roamed the terrain. To better understand Iowa's terrain today, it's important to know some terms associated with glaciers.



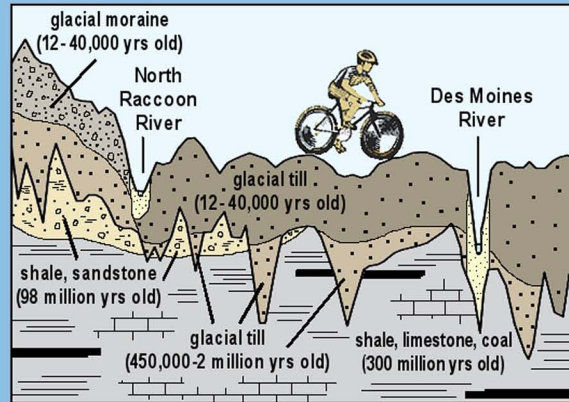
**End moraines** – a moraine that marks the greatest extent of a glacial advance (diagram above). Moraines form by drift deposited by direct glacial action, and can include debris as large as boulders (glacial erratics), or as small as clay.

**Hummocky topography** – topography consisting of randomly arranged knobs (hummocks) that are separated and defined by low-lying areas that are part of linked-depression systems.

**Laurentide Ice Sheet** – massive ice sheet that covered hundreds of thousands if not several million square miles of Canada and the United States from ~160,000 to 10,000 years ago (Pleistocene Epoch).

**Till** – sediment released directly from the glacial ice that has not undergone subsequent disaggregation and resedimentation. Till on the Des Moines Lobe is deposited by a slow release of glacial debris from ice (not deformed).

### Day 3 Milestones



**Start:** Carroll

**Bemis Moraine:** miles 0-15

**North Raccoon River:** mile 15

**Bemis Till Plain:** miles 15-70

**Des Moines River:** mile 57

**End:** Boone, mile 70

### For More Information...

The DNR Iowa Geological and Water Survey's **Watershed Monitoring and Assessment Section** is responsible for the design, implementation, and management of Iowa's Ambient Water Monitoring Program. To accomplish this it conducts a variety of projects and programs.  
[www.igsb.uiowa.edu/wqm/](http://www.igsb.uiowa.edu/wqm/)

For information on beach monitoring in Iowa, including the beaches that are monitored and the latest beach bacteria results, go to:  
[www.igsb.uiowa.edu/wqm/activities/beach/beach.htm](http://www.igsb.uiowa.edu/wqm/activities/beach/beach.htm)

Iowa has one of the most active and extensive volunteer water monitoring networks in the nation. Volunteers have caught spills, characterized our surface water, and promoted a healthier environment. To learn more about becoming an IOWATER water monitoring volunteer, go to:  
[www.iowater.net](http://www.iowater.net)

Every year, Project AWARE sends hundreds of volunteers down a river for a week to pick up trash along its banks:  
[www.iowadnr.gov/Recreational/CanoingKayaking/ProjectAWARE.aspx](http://www.iowadnr.gov/Recreational/CanoingKayaking/ProjectAWARE.aspx)

# RAGBRAI 2011

## Learn about the Land

Tuesday, July 26

# Day 3



**Iowa DNR -Geological and Water Survey**  
109 Trowbridge Hall  
Iowa City, IA 52242  
[www.igsb.uiowa.edu](http://www.igsb.uiowa.edu)

**US Geological Survey - IA Water Science Center**  
400 S. Clinton St.  
Iowa City, IA 52240  
<http://ia.water.usgs.gov>

**Iowa Limestone Producers Association**  
5907 Meredith Dr.  
Des Moines, IA 50322  
[www.limestone.org](http://www.limestone.org)

COVER PHOTO: Aerial photograph of the hummocky topography typical of the till plains on the Des Moines Lobe.



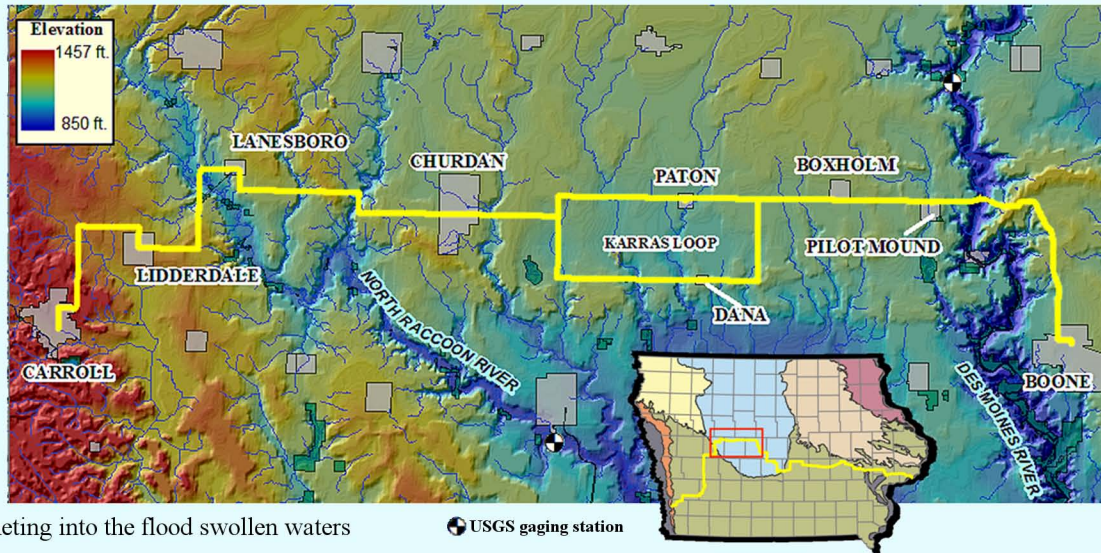
## Des Moines Lobe

For the next couple of days you'll be biking over a distinctive Iowa landform region known as the **Des Moines Lobe** (blue area in state map below). During the end of the last "ice age," approximately 16,000 years ago, the *Laurentide Ice Sheet* (green area on right map) split into several lobes that flowed down through the low lying regions of Canada and the Upper Midwest. One of these, the rapidly advancing Des Moines Lobe, extended from Canada through the Dakotas and Minnesota into Iowa until stopping 14,000 years ago at what now is the City of Des Moines. The Des Moines Lobe ice sheet advanced into Iowa during a relatively warm period of time (for an ice age). Today, as you depart Carroll you are on the crest of the Bemis Moraine, the terminal *end moraine* of the Des Moines Lobe. It is characterized by *hummocky topography* which is associated with stagnating ice at the former ice margins.

## Des Moines River

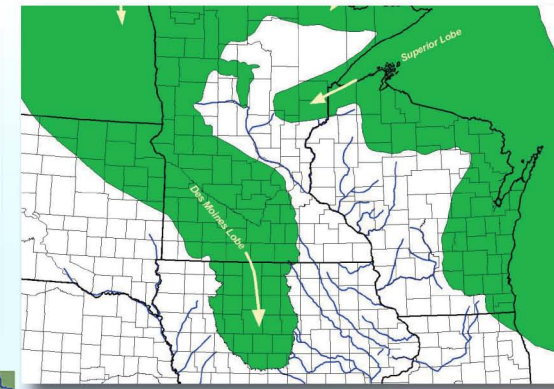
Two miles after Pilot Mound you will cross the **Des Moines River Valley**. The valley has a youthful geologic history related to the drainage of the last surge of the Des Moines Lobe. It is believed that the picturesque valley was created when the ice sheet spectacularly dewatered between 12,600 to 11,000 years ago. Near Boone there is at least 220 feet of deepened valley. This is the location of the Kate Shelley Bridge. It is the longest (3/4 mile) and tallest (186 feet) double track bridge in the United States and named after the heroin who saved the train and passengers from plummeting into the flood swollen waters in the late 1800s.

The U.S. Geological Survey operates 12 stream gages along the Des Moines River through cooperative agreements with the U.S. Army Corps of Engineers, the Iowa DOT and the cities of Fort Dodge and Des Moines. Ten of these gage sites are also used by the National Weather Service as flood forecast sites.



## Tallgrass Prairie

Following Iowa's last glaciations, about 12,000 years ago, a great flat expanse (the Des Moines Lobe) was left through what is now North-Central Iowa. This area developed into a vast **tallgrass prairie** covered with marshes ranging in size from small depressions to vast sloughs miles long. This landform, often known as the "Prairie Pothole Region," extended north into Minnesota, the Dakotas, Montana, and Canada. Historically prairie pothole areas were important breeding grounds for waterfowl and sustained great herds of bison, elk, and other game large and small. Although this region was a considerable obstacle for traveling pioneers, when drained these wetlands produced rich, fertile soils. As a consequence, greater than 95% of the marshes in this region were drained in the course of 100 years. Few wetlands remain in Iowa, but those that do are still used extensively by waterfowl during spring and fall migrations and for nesting. These areas provide recreational opportunities for Iowans and a lasting reminder of Iowa's recent landscape changes



## Boone Scenic Railroad

The **Boone Scenic Railroad** was first developed in 1893 as a way of transporting coal. By 1907 passenger cars made their first appearance. The Chicago and North Western Railroad Company bought the line in 1968, and limited the train to shipping only grain until 1983. Then the newly formed "Boone Railroad Historical Society" bought 11.3 miles of track. In 1989 the Iowa Railroad Historical Society purchased the last commercially-produced steam locomotive from China. Today the railroad is used for recreation, supplying visitors with dinner and excursion train rides along with numerous special event rides. The photo below shows the train crossing the 156' tall Bass Point Creek High Bridge on its way through the valley.

