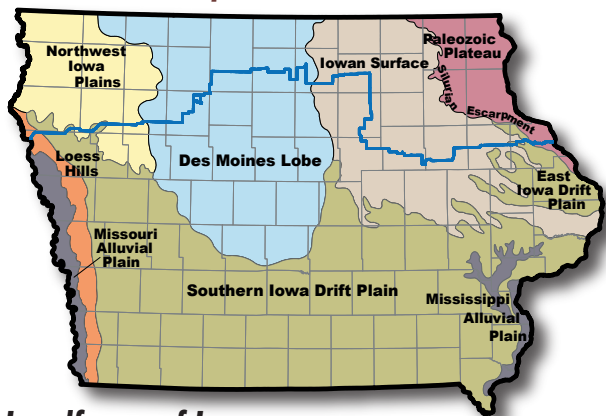


RAGBRAI Geo-pedia



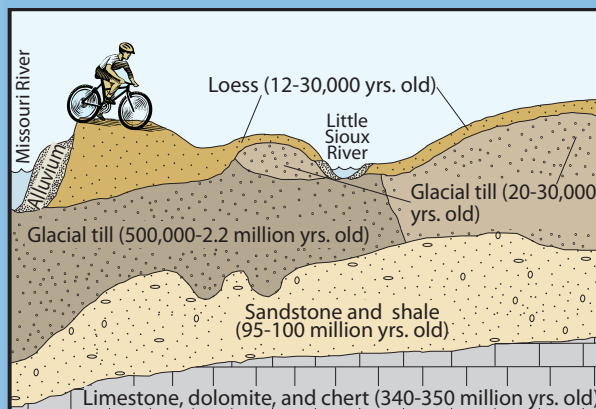
Landforms of Iowa

In Iowa, landform regions are composed of similar earth materials derived from glacial, wind, river, and marine environments of the geologic past. These landforms serve as a guide to appreciating the state's subtly diverse landscape and remarkable history. This year, you have the pleasure of biking over every major landform region in the state! Before you've gone half way on Day 1, you will have traversed four of Iowa's seven major landform regions:

- **Missouri River Alluvial Plain** – if you dipped your rear tire in the Missouri River, you did so at the northern end of a valley filled with thick deposits of boulders, gravel, sand, silt, and clay, all outwash from thousands of years of glacial melting. This landform only lasts a few blocks in Sioux City. Once you've turned east out of the Floyd River valley, it's uphill, as you cross into the...
- **Loess Hills** – dunes of silt, blown in from the ancestral Missouri and Big Sioux rivers. Thickness in this region can exceed 100 ft! After about 5.5 miles due east, the Loess Hills give way to the rolling terrain of the...
- **Southern Iowa Drift Plain** – an older glacial till terrain that has had time to weather into a deeply creased landscape all the way to the town of Kingsley. From there, you're on the...
- **Northwest Iowa Plains** – a gently rolling landscape that was last glaciated during ancient glacial advances between 500,000 and 2.2 million years ago.

COVER PHOTO: Sioux Quartzite on display at the Sioux City Public Museum (photo from Sioux City Museum).

Day 1 Milestones



Start: Sioux City

Missouri/Floyd River alluvium: mile 0

Loess Hills: mile 5.7

Southern Iowa Drift Plain: mile 10

Northwest Iowa Plains: mile 23

Little Sioux River: mile 39

Finish: Storm Lake – mile 68

Human and Natural History Partners

The University of Iowa Office of the State Archaeologist and Team Archaeology are back on RAGBRAI for our third year of Archaeology on the Road, and pleased to partner this year with the IDNR: Geological and Water Survey and the U.S. Geological Survey under the theme "**Human and Natural History Partners.**" Archaeology on the Road brings you the unique cultural history and prehistory of Iowa on the RAGBRAI route, pointing out interesting and significant archaeological sites and sharing Iowa's past along the way. Look for our booth at Expo and then again on Days 1, 5 and 6 on the route, and also keep an eye out for our Team Archaeology riders throughout the week and online at: www.iowaarchaeology.org.

The "**Human and Natural History Partners.**" booth, plus fossil-identifying geologists, will be at the Rockford Fossil Park and Prairie Preserve on Day 4 this week. Be sure to bring a fossil bag!

RAGBRAI 2010

Learn about the Land

Sunday, July 25

Day 1



Iowa DNR – Geological and Water Survey
109 Trowbridge Hall
Iowa City, IA 52242
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
5911 Meredith Dr.
Des Moines, IA 50322
www.limestone.org

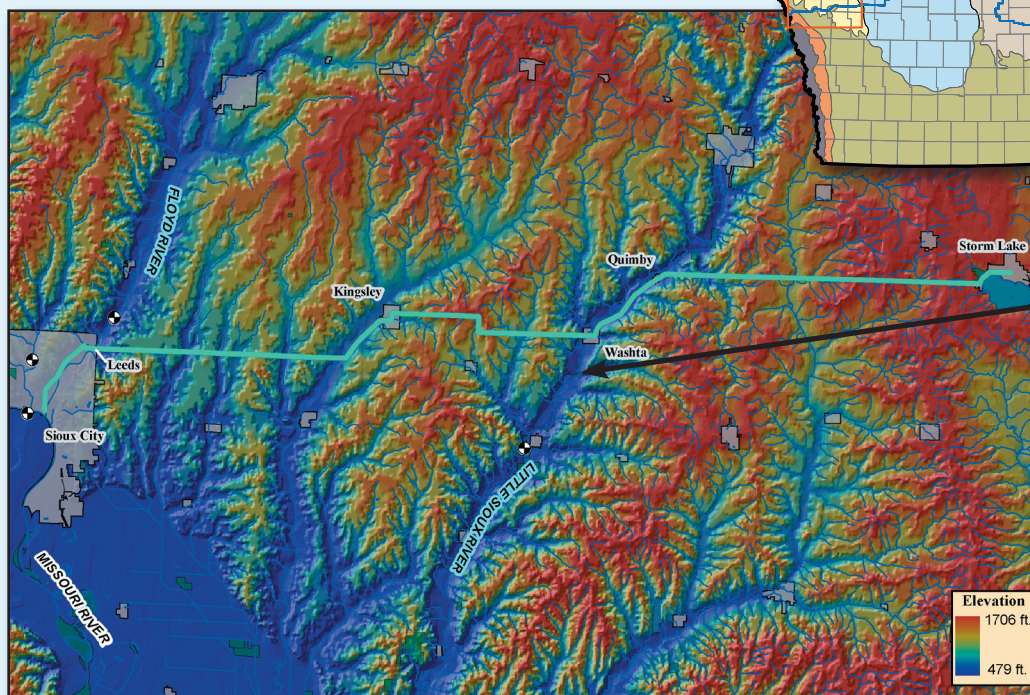
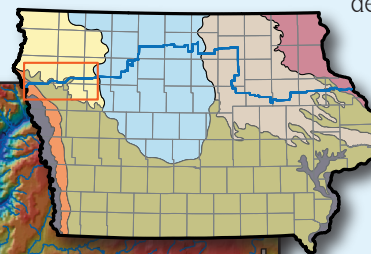
RAGBRAI starts today in the **Missouri River Valley**. The Missouri River drains nearly one sixth of the area of the United States, making it one of the truly Great Rivers of the world. Management of the Missouri River for socioeconomic services (e.g., hydropower, flood control, public water supply, and navigation) has resulted in substantial physical changes to the river and associated declines in native species. USGS scientists conduct research on the Missouri River to provide information needed to restore and manage the Missouri River ecosystem. They investigate physiology, behavior, habitat dynamics, and population dynamics to understand how management affects endangered and threatened species like the pallid sturgeon, interior least tern, and the piping plover. Also, the USGS conducts research on Missouri River invasive species, principally Asian carp.

As you bike along RAGBRAI these first few days, be sure to keep an eye out for the distinctive pink-hued gravel roads and pink boulders of **Sioux Quartzite** (photo of Sioux Quartzite on front cover). Sioux Quartzite is a thick sequence of pink quartz-cemented sandstone preserved across southwest Minnesota, northwest Iowa, northeast Nebraska and southeast South Dakota. The sand that became Sioux Quartzite was deposited by rivers and in near-shore ocean environments about 1.7 billion years ago. The quartz cement that binds the quartz sand grains together makes this one of the hardest and most erosion-resistant rocks in nature. This hard, durable nature makes Sioux Quartzite a popular aggregate for asphalt and cement and as ballast along railroad tracks.



One of the most valuable resources at the Iowa Geological and Water Survey is our extensive collection of **drill cores** (photo left). Cores are continuous cylinders of rock that are usually drilled for geological research by quarries, environmental engineering companies, and others. One of Iowa's deepest cores was drilled near the town of Washta in Cherokee County. The core was drilled in 1987 as a part of a National Science Foundation grant to study features of the Precambrian crystalline basement of Midwest states, rock more than 570 million year old. The Quimby core was drilled into granite that was first identified as a magnetic anomaly. The core reached a depth of 1997 feet, including 325 feet of granite age-dated at 1.433 billion years.

During the first three days of RAGBRAI, although you can't see it, you will be biking over bedrock 90-100 million years old that was deposited during the **Cretaceous Period**. During this ancient period Iowa was part of the vast coastline of an interior sea that covered most of North America. In Iowa, bedrock from the Cretaceous age is marked by sand, cobbles, and silts that were deposited in the mouth of coastal rivers. The main bedrock unit, the Dakota Formation, can be buried over 300 feet below the surface in this region and commonly serves as a source of water for many communities and businesses in the area.



USGS streamflow station
Parks and Preserves

As you enter the town of Washta, you will descend into the **Little Sioux River Valley** (photo below). The Little Sioux River has a rich archaeological history, and offers numerous fishing, canoeing, and camping opportunities along this scenic river valley. The northern portion of the Little Sioux River flows along the western edge of the Des Moines Lobe, a landform region which marks the boundary of the last advance of glacial ice into Iowa. Historically, the Little Sioux River flowed to the Mississippi River. In the recent geologic past (~14,000 years ago), however, glacial ice blocked the southeasterly flow of the Little Sioux River and its flow was redirected to its current southwesterly direction to the Missouri River.

