

## RAGBRAI Geo-pedia

### What is loess?

Loess (rhymes with bus) is wind-blown silt that is very consistent in material and size. Loess is highly erodible when wet, but is surprisingly stable in vertical sections. Loess is thickest near its source (the Missouri River) and thins in the predominant wind direction, in this case west to east. You'll see some examples on the landscape in the first few miles of RAGBRAI (photo below).



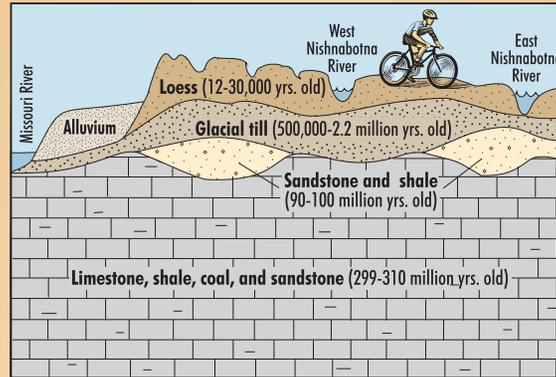
The origin of loess is usually attributed to glacial activity. Meltwater from glaciers carried abundant material that was deposited in river valleys. Three loess units are recognized in the Loess Hills of Iowa (oldest to youngest): the Loveland, Pisgah, and Peoria. The Loveland is associated with the older Illinoian glacial advance (300,000 to 130,000 years ago) and the Pisgah and Peoria were deposited during Wisconsinan time (30,000 to 10,500 years ago). The Peoria Formation loess is the most regionally extensive loess in Iowa and makes up the greatest thickness of the Loess Hills.

### What is a 'glacial erratic'?

Although glaciers are often romanticized as pure snow and ice, they are actually very dirty and carry tons of soil, stones, and boulders. When a glacier retreats, the stones and boulders are usually left behind, scattered across the landscape. Geologists call these rocks 'glacial erratics' due to their random placement on the land.

COVER PHOTO: A view looking east across the Missouri River Valley in Monona County. Photo by Mark Engler.

## Day 1 Milestones



**Start:** Council Bluffs

**Loess Hills/loess outcrops:** 10 miles

**Loess terraces:** 15.7 miles after Council Bluffs

**Sioux Quartzite erratic:** 3.4 miles after Mineola

**West Nishnabotna River:** 1.8 mi. after Henderson

**East Nishnabotna River:** 8.2 miles after Emerson

**Finish:** Red Oak – 51 miles

### Iowa Geo-books

*Iowa's Geological Past*

by Wayne Anderson, University of Iowa Press, 1998

"The only authoritative overview of Iowa's geologic record... [Wayne Anderson's] coverage is so current, comprehensive, and authoritative that professionals as well as rock and fossil enthusiasts will each need a copy."

Brian F. Glenister, A.K. Miller Professor of Geology  
Emeritus, University of Iowa

*Landforms of Iowa*

by Jean C. Prior, University of Iowa Press, 1991

"Jean Prior writes about the glacial geology of Iowa as if it's an old friend. She knows and cares about her subject and explains Iowa's geologic attractions with a sure hand."

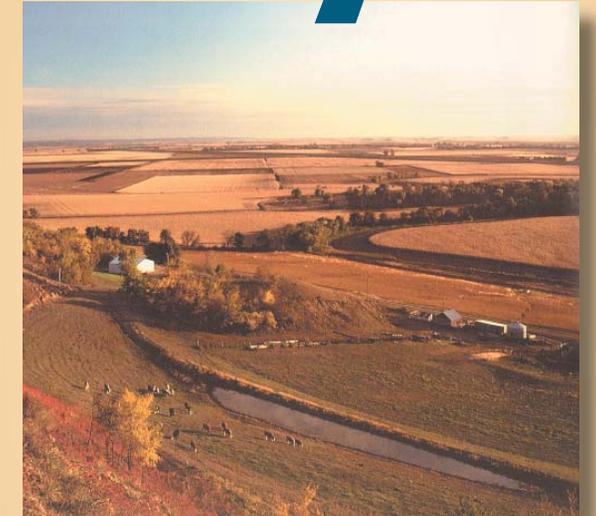
Rex Buchanan, Kansas Geological Survey

# RAGBRAI 2009

## Learn about the Land

# Day 1

Sunday, July 19



### Iowa DNR – Geological and Water Survey

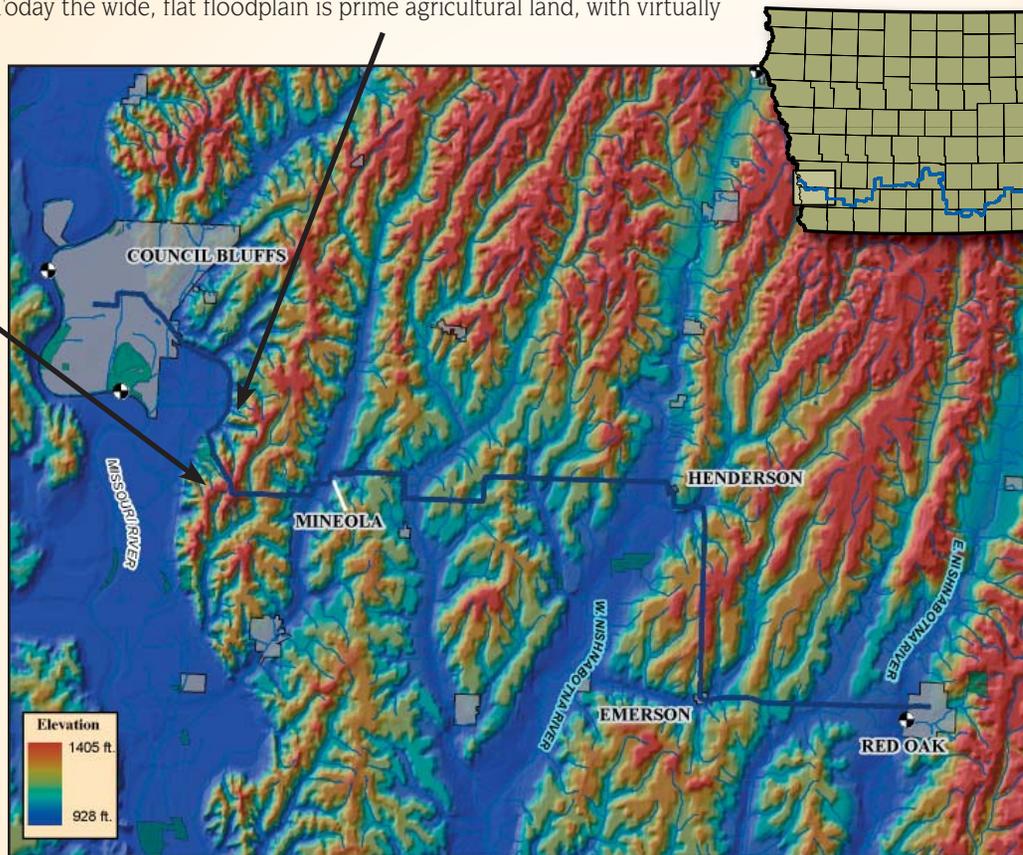
109 Trowbridge Hall  
Iowa City, IA 52242-1319  
(319)-335-1575  
[www.igsb.uiowa.edu](http://www.igsb.uiowa.edu)

### US Geological Survey

Iowa Water Science Center  
400 S. Clinton St.  
Iowa City, IA 52240  
(319) 337-4191  
<http://ia.water.usgs.gov>

Like most years, you'll begin RAGBRAI 2009 in the **Missouri River Valley**. Draining 1/6 of the United States, the Missouri River flows for 2,300 miles before joining the Mississippi River at St. Louis. This makes it the longest river in North America. Like most rivers in Iowa, the Missouri is relatively young by geologic standards, about 2 million years old. It was created by melt waters from the great continental glaciers, ice sheets that repeatedly advanced into Iowa over the last 2.5 million years. The width of the valley, up to 17 miles in Monona County, attests to the huge volumes of water that the ancient Missouri River carried. Today the wide, flat floodplain is prime agricultural land, with virtually unlimited supplies of irrigation water just a few feet below the land surface.

Although RAGBRAI usually crosses some portion of the **Loess Hills** landform region every year, 2009 is unique in that the route crosses near the thickest loess deposits, illustrating their impressive relief. Near Council Bluffs, loess thickness has been known to exceed 175 feet! Riders will have numerous opportunities to see loess exposures on the first day while leaving Council Bluffs, including a road cut only a few feet from the route.



The **Nishnabotna River** is a tributary of the Missouri River. It mostly flows through SW Iowa as two parallel streams, called the East and West branches. Both branches are about 100 miles



long and 20 miles apart. From their confluence, the Nish flows another 12 miles before joining the Missouri River. Sections of both branches have been straightened and channelized (photo above).

Riding up and down the hills of SW Iowa, you might be surprised to observe how much of the land is devoted to corn and soybeans, despite the steep hillslopes. In the first half of the 20th century, little attention was given to **conservation**, and intensive plowing turned over the soil with no consideration given to topography and runoff. Soil erosion occurred at a massive scale during this time. Agriculture has come a long way since then to reduce soil loss from cropped fields. As you are pedaling across the landscape, note the many types of conservation practices used to conserve the soil. Common practices include terracing contour planting (photo below), and conservation tillage practices, along with surrounding fields with buffer strips, field borders, and grass waterways. Together, these practices serve to reduce erosion and protect one of Iowa's most precious natural resources, its soil.



About three miles after Mineola, if you look to the left, you'll find a wonderful large glacial erratic of **Sioux Quartzite** (photo left). Sioux Quartzite was deposited as sand on the shore of an ocean that stretched from north-central Wisconsin to Arizona about 1.6 billion years ago. It is exposed in far northwest Iowa and adjoining regions of Minnesota and South Dakota. If you look closely, you'll see that it gives many roads in western Iowa a distinctive pink hue. It is common as rocks and boulders in the glacial tills of western Iowa and can be identified by its uniform pink color and, when closely examined, the presence of rounded quartz grains.

