

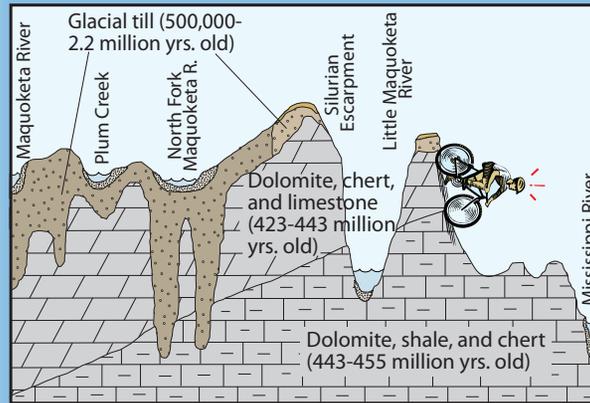
## RAGBRAI Final Geo-Quiz!!

- The Missouri River drains nearly \_\_\_ of the area of the United States.**  
a. one eighth   b. one sixth   c. one fourth   d. one half
- Dunes of silt, blown in from the ancestral Missouri and Big Sioux Rivers form the \_\_\_.**  
a. Southern Iowa Drift Plain   b. Des Moines Lobe  
c. Northwest Iowa Plains   d. Loess Hills
- Approximately 16,000 years ago, a lobe of the Laurentide Ice Sheet surged from Canada into north-central Iowa and deposited the \_\_\_.**  
a. Loess Hills   b. Des Moines Lobe   c. Fremont Channel
- A 74-million-year-old crater, 24 miles in diameter, hidden beneath glacial deposits in northwest Iowa is known as the \_\_\_.**  
a. Manson Impact Structure   b. Varina Crater   c. West Bend Anomalous Structure   d. Algona Mystery Spot
- \_\_\_ Lake is considered to be one of Iowa's "Great Lakes" of glacial origin.**  
a. Clear   b. Altamont   c. Rockford   d. Cedar Rock
- Iowa currently ranks \_\_\_ among states in US wind energy production.**  
a. fourth   b. sixth   c. second   d. third
- Stone lines, glacial erratics, pahas, and gently rolling topography are characteristic of the \_\_\_.**  
a. Iowan Surface   b. Southern Iowa Drift Plain   c. Northwest Iowa Plains   d. Missouri River Alluvial Plain
- \_\_\_ is one of the few places in Iowa where the public can collect fossils.**  
a. Bird Hill State Preserve   b. Cedar Rock State Park   c. Rockford Fossil and Prairie Park
- Energy from the ground used for heating and cooling buildings is known as \_\_\_ energy.**  
a. wind   b. solar   c. magnetic   d. geothermal
- Wetlands with little to no open water that get their water through groundwater are called \_\_\_.**  
a. kettles   b. hummocks   c. potholes   d. fens

ANSWERS: 1.B, 2.D, 3.B, 4.A, 5.A, 6.C, 7.A, 8.C, 9.D, 10.D

COVER PHOTO: Silurian Escarpment as seen at Echo Valley State Park, IA.

## Day 7 Milestones



**Start:** Manchester

**Plum Creek:** mile 11

**North Fork Maquoketa River:** mile 18

**Silurian Escarpment:** mile 23

**Paleozoic Plateau:** mile 24

**Little Maquoketa River:** mile 32

**Finish:** Dubuque: mile 47

## 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 2010

## Learn about the Land

# Day 7

Saturday, July 31



## 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>

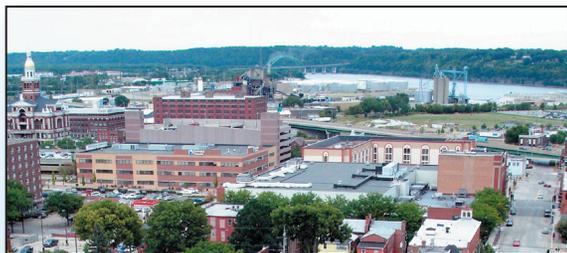
## Iowa Limestone Producers Association

5911 Meredith Dr.  
Des Moines, IA 50322  
[www.limestone.org](http://www.limestone.org)

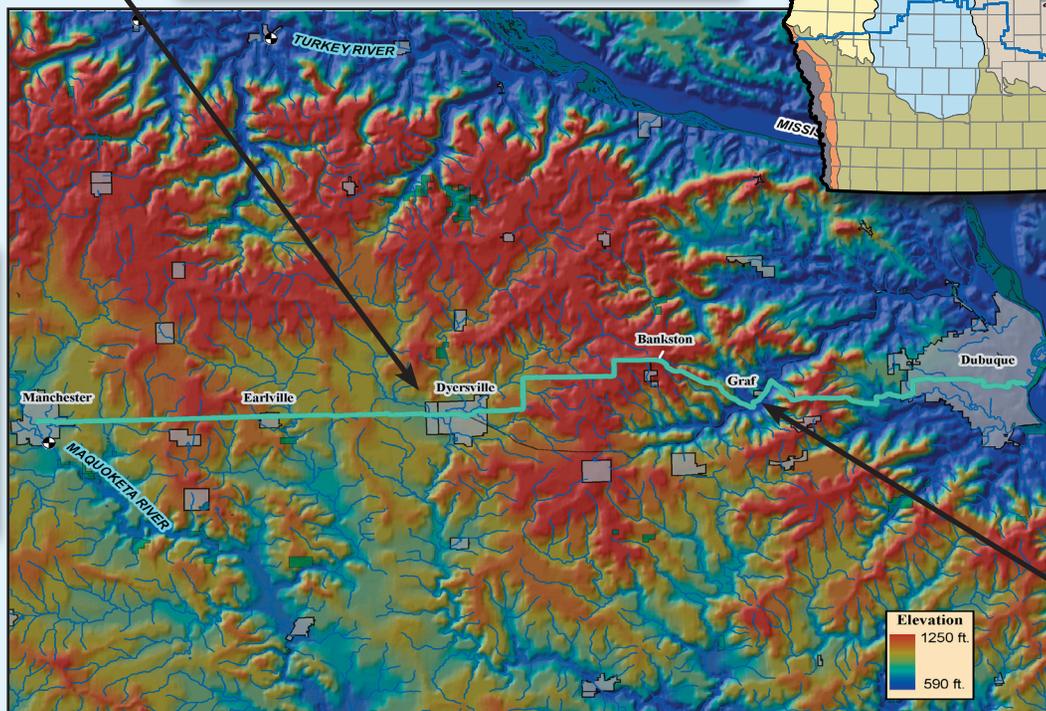
On your left, 5.5 miles east of Earlville, you will see a large **ethanol plant** near Dyersville (photo below), one of the largest of the 200 plants either completed or under construction in the US. A dry-mill plant with a 110 million gallon per year capacity, the facility consumes about 39 million bushels of corn annually, most of it from within 50 miles of Dyersville. It produces 350,000 tons of dried distillers grains annually, which can be used for high-protein feed for livestock. In production since September 2009, 50 people are currently employed at the facility.



The rocks (shale and dolomite) exposed in the valley at Graf comprise the reference section for the **Maquoketa Formation**, whose name derives from the Little Maquoketa River at Graf. The rock exposures at Graf have been studied by numerous geologists over the past 150 years. The Maquoketa Formation is dominated by soft shale that has weathered into row-cropped slopes below the steeper tree-covered Silurian Escarpment at the crest of the valley walls. The lower part of the Maquoketa Formation is well exposed at Graf, where it is seen as ledges of dolomite with intervening beds of softer brown shale. Remarkable accumulations of fossil nautiloid shells (relatives of modern squids) are seen in some of these ledges. These strata are unusually rich in phosphate, and millions of tiny phosphatized fossil shells (snails, etc.) are evident in the lower ledges. Carbon impressions of extinct graptolite fossils are abundant in some of the shale beds (photo right).



As you descend the Silurian Escarpment near Dubuque, you will be close to the end of your journey across Iowa to the **Mississippi River** (photo left). Beginning in 1987, USGS chemists and hydrologists undertook a research project to more closely examine a variety of intriguing research questions concerning the transport and storage of a variety of contaminants in the Mississippi and other large rivers. At the same time, the project has provided a highly comprehensive



set of data describing the movement of a wide range of contaminants from the major tributaries and down the main stem of this all-important river.

The Mississippi River is important for many different reasons. It serves as drinking-water supply for 70 cities and towns long the reach of the river. The birds, fish, and other organisms that live in or adjacent to the Mississippi River are affected by contaminants, and the Mississippi is a significant source of water, sediment, and nutrients that contribute to the Hypoxic Zone in the Gulf of Mexico. The Mississippi River drains 41 percent of the contiguous United States, in which reside 27 percent of the nation's population.

Today, just before entering the valley of the Maquoketa River, RAGBRAI will descend the **Silurian Escarpment** (cover photo) between the towns of Bankston and Graf. The Silurian Escarpment is a steep, north-east facing cliff that follows an irregular line

USGS streamflow station  
Parks and Preserves



from central Fayette County to southeastern Jackson County. This prominent line of cliffs separates the landform regions of the glacial till-dominated Iowan Surface (west) and rock-dominated Paleozoic Plateau (east). You will be riding across the top of the Escarpment for a few miles after Bankston, and should have an excellent view of the Paleozoic Plateau. As RAGBRAI begins the descent into the town of Graf, you should notice a significantly steeper grade for about an eighth of a mile. There the land surface drops about 100 feet through the escarpment onto the rounded slopes of the more easily erodible Maquoketa Shale. Similar Silurian rocks form the Blue Mounds and Door Peninsula in Wisconsin and the Niagara Escarpment in New York, where the resistant limestone ledge spectacularly forms Niagara Falls.