

RAGBRAI Geo-pedia

Midwest Stream Quality Assessment

This year, the USGS and other agencies are sampling streams at 100 sites in 11 Midwestern states as part of the Midwest Stream Quality Assessment (MSQA) project. The streams will be sampled weekly throughout the summer to characterize their ecological conditions and the distribution of spring-summer seasonal concentrations of contaminants, nutrients, and sediment that impact and degrade water quality. The findings will provide information for communities and policymakers by identifying which human and environmental factors are the most critical in controlling stream quality. Seventeen of these sites are in Iowa. Beaver Creek near Bouton, approximately 6 miles east of Perry is one of the index sites. A final report will be published (and online) when the project is completed.

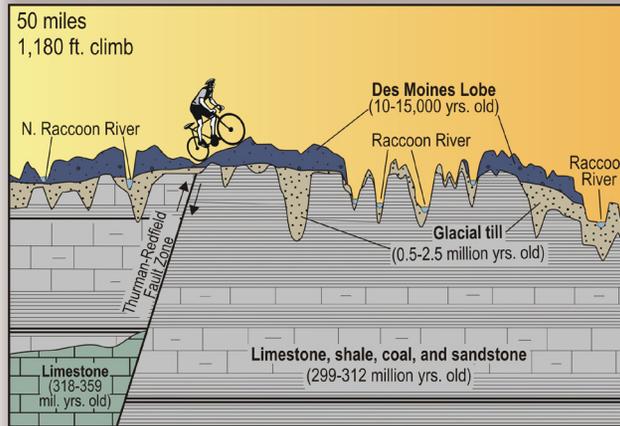
Limestone

Limestone is one of the most common rocks in Iowa. It is a sedimentary rock composed largely of the mineral calcite (calcium carbonate or CaCO_3). Limestones often contain variable amounts of chert or flint as tiny void fills, nodules, or layers. Sand, silt, and clay are also commonly found in limestone to varying degrees; geologists refer to a clayey or silty limestone as *argillaceous* limestone. The primary source of the calcite in limestone is typically microscopic remains of ancient marine organisms. Iowa's vast resources of limestone are obvious when you see buildings, retaining walls, sculptures, signs, walkways, gravel roads, and interstate highways all utilizing this vastly versatile material.



COVER PHOTO: *The Charles Sing Denman Memorial Garden at Water Works Park in Des Moines.*

Day 3 Milestones



Start: Perry

Thurman-Redfield Fault Zone: 16 miles

Des Moines Lobe Terminus/I-80: 28.5 miles

Finish: Des Moines – 50 miles



For More Information...

Surficial Geology Map of Dallas County

<http://www.igsb.uiowa.edu/gsbpubs/pdf/ofm-2002-2.pdf>

Surficial Geology Map of Polk County

<http://www.igsb.uiowa.edu/gsbpubs/pdf/ofm-2003-3.pdf>

Des Moines Lobe (recent geology)

<http://www.igsb.uiowa.edu/Browse/depress/DEPRESS.HTM>

<http://www.igsb.uiowa.edu/Browse/glacflds/glacflds.htm>

Nitrate Levels in the Raccoon River at Van Meter

http://waterdata.usgs.gov/ia/nwis/uv?cb_99133=on&format=gif_default&site_no=05484500

USGS Fact Sheet about the MSQA project

<http://pubs.er.usgs.gov/publication/fs20123124>

RAGBRAI

Day 3

Tuesday, July 23

2013

Learn about the Land



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

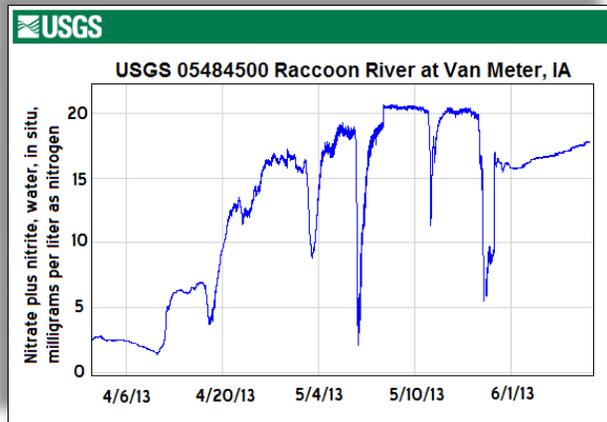
<http://ia.water.usgs.gov>

Iowa Limestone Producers Association

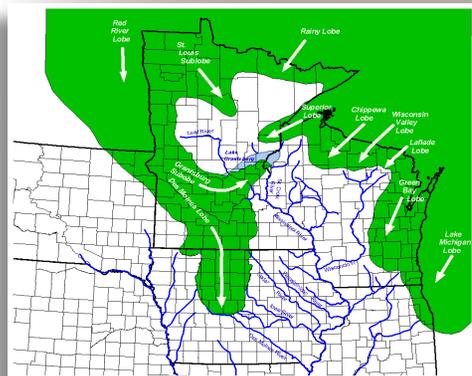
5907 Meredith Dr., Suite A

Des Moines, IA 50322

www.limestone.org

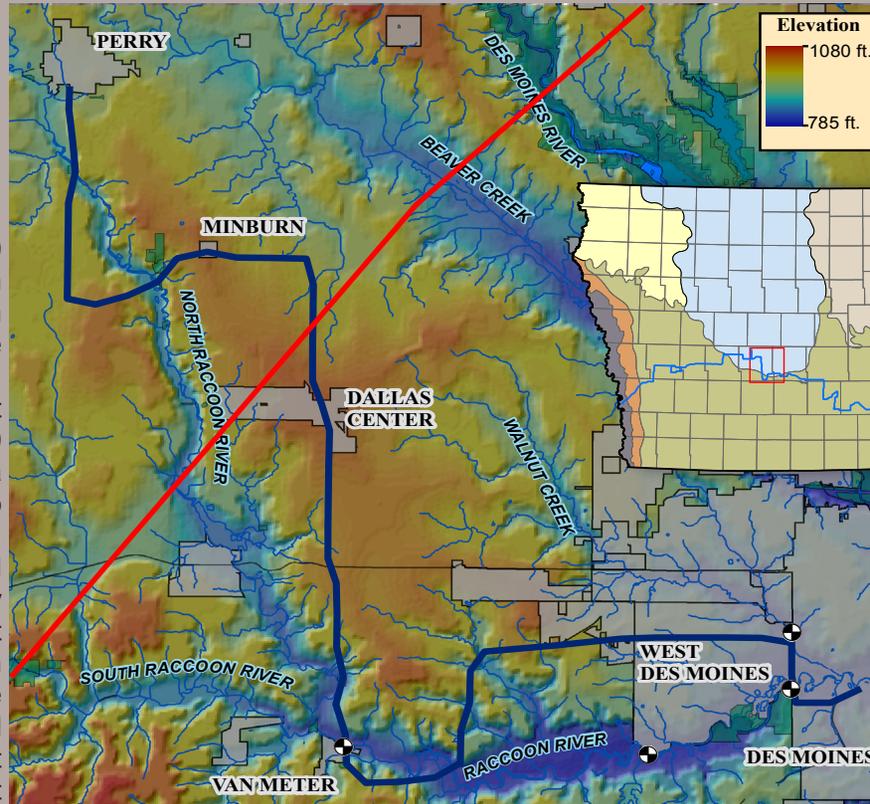


During the last “ice age” approximately 15,000 to 16,000 years ago, the Laurentide Ice Sheet (green area on figure below) split into several lobes that flowed down the low lying regions of the mid-continent. One of these lobes, the **Des Moines Lobe** surged through Canada, Minnesota, and northern Iowa until stopping at what is now the City of Des Moines, approximately 14,500 years ago. The Des Moines Lobe advanced into Iowa during a relatively warm period of time, compared to the height of the last ice age, but not as warm as today. Lubricated by a thin film of water underneath the bed of the glacier, the Des Moines Lobe was a relatively fast moving glacier. Today’s ride crosses an area that once supported stands of spruce, larch, and birch forests until the time it was overrun and buried by the advancing glacial ice. The ride will start out on a till plain and later traverse an area of lineated ridges that



are the result of a former crevasse field on the glacier. Just south of Hwy 6 you will ascend the Bemis Moraine, the terminal end moraine of the Des Moines Lobe, and shortly after crossing I-80 you will ride onto the much older Southern Iowa Drift Plain. Nearing Valley Junction (Jordan Creek) you will again ride onto the Des Moines Lobe surface and then off again while crossing the Raccoon River a third time prior to arriving at Des Moines Water Works Park.

Water quality changes rapidly in response to rainfall events. Typically, scientists interested in water quality have to collect samples from a stream then transport those samples to a laboratory, where analysis of the samples may take days to weeks. By then, the water quality in the stream has likely changed. However, new technology is allowing scientists to measure water quality in the stream every 15 minutes and report those measurements via a satellite to the internet. In Iowa, **nitrate sensors** are giving researchers an amazing glimpse at how nitrate is delivered to streams and how fast those readings change. One of the first sensors installed in Iowa was placed at the Raccoon River near Van Meter.



- USGS streamflow station
- Parks and Preserves
- Thurman-Redfield Fault Zone

The Northern Natural Gas Company operates a major **underground gas storage** facility near Redfield in Dallas County. The facility stores natural gas that is transported via pipelines from fields in Oklahoma. The gas is stored in sandstone and limestone aquifers beneath naturally-occurring structural domes that formed along the Thurman-Redfield fault zone. Originally certificated in 1954, the facility encompasses approximately 12,600 acres of surface area, with natural gas stored in four stacked underground aquifer-type reservoir formations; the Elgin, Galena, St. Peter, and Mt. Simon formations. The facility can store and withdraw as much as 133.75 billion cubic feet of natural gas, and has provided Iowa with a steady supply gas for energy generation, heating, and fertilizer production, even in times when the out-of-state supply was limited. Within the Redfield storage facility there are approximately 60 miles of pipeline, a compressor station with seven compressor units totaling 16,760 horsepower, and multiple injection/withdrawal and observation wells into each reservoir.

