Ideal for Wind Farms

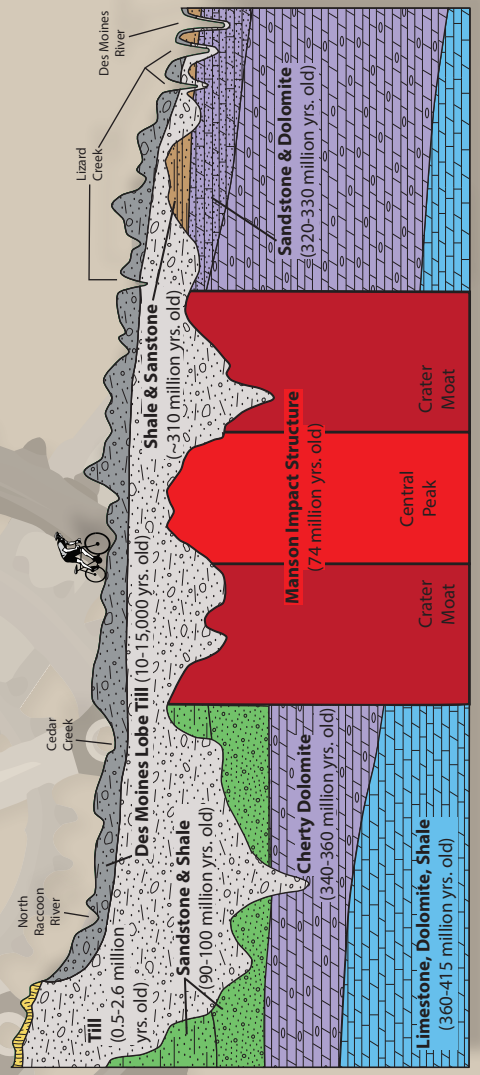
In 2014, Iowa generated more than 28% of its electricity from wind power - first in the nation. That's enough to power 1.5 million homes! Iowa possesses a very strong wind resource with the third most installed wind capacity of any state. Iowa is also a leader in wind manufacturing, home to a major turbine manufacturer and two major blade manufacturers.

Iowa passed one of the country's earliest renewable energy generation laws in 1983 requiring its major utilities to own or contract a specific amount of renewable energy. Today the goal has been significantly expanded.

With its open landscape, northern and western Iowa is an ideal region for harnessing the renewable power of wind. Wind maps show the winds in these areas to be stronger on average, making them better suited for the development of wind energy. Average wind speeds are inconsistent from month to month with the strongest winds on average from November through April, peaking in March. On a daily cycle, there is a slight rise in average wind speeds in the afternoon, from 1 to 6 pm.

To learn more, visit the **U.S. Geological Survey's Energy Resources Program** website for information on impact studies and an interactive Wind Turbine Map and Database.

http://energy.usgs.gov/OtherEnergy/WindEnergy.aspx



Daily Geology: The ride today should smooth out a bit as you cross onto the Des Moines Lobe landform region. This region was the most recently glaciated portion of Iowa. Probably the most unique geologic feature in Iowa is the Manson Impact Structure, which you will be riding over from just east of Fonda until Clare. The depth to bedrock along the ride ranges from over 400 feet in the west to within 20 feet of the surface in the east.

RAGBRAI

Day 2 2015

Monday, July 20

Learn About the Land

IOWA GEOLOGICAL SURVEY

IIHR Hydroscience & Engineering

USGS science for a changing world

IOWA LIMESTONE PRODUCERS ASSOCIATION
Your limestone resource since 1945!

DNR

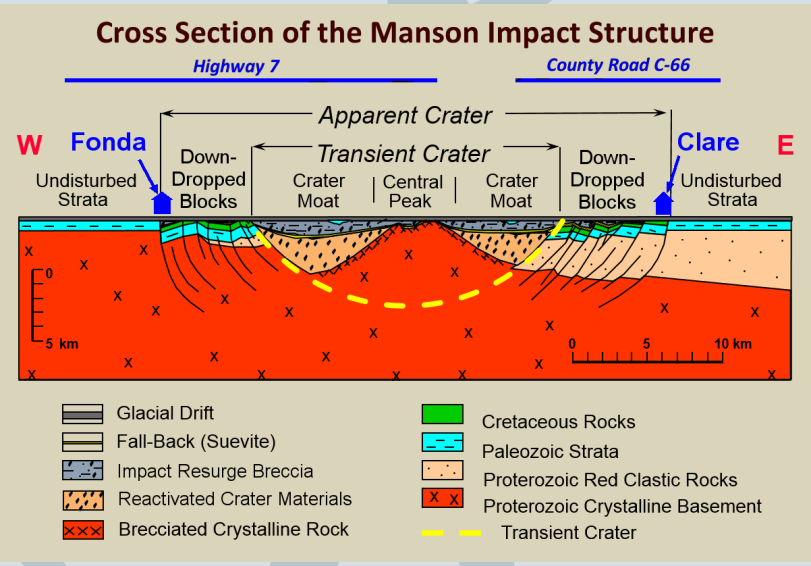
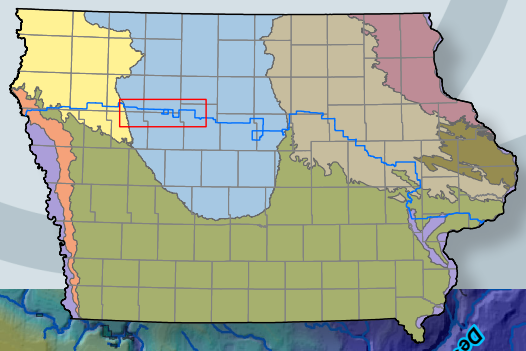
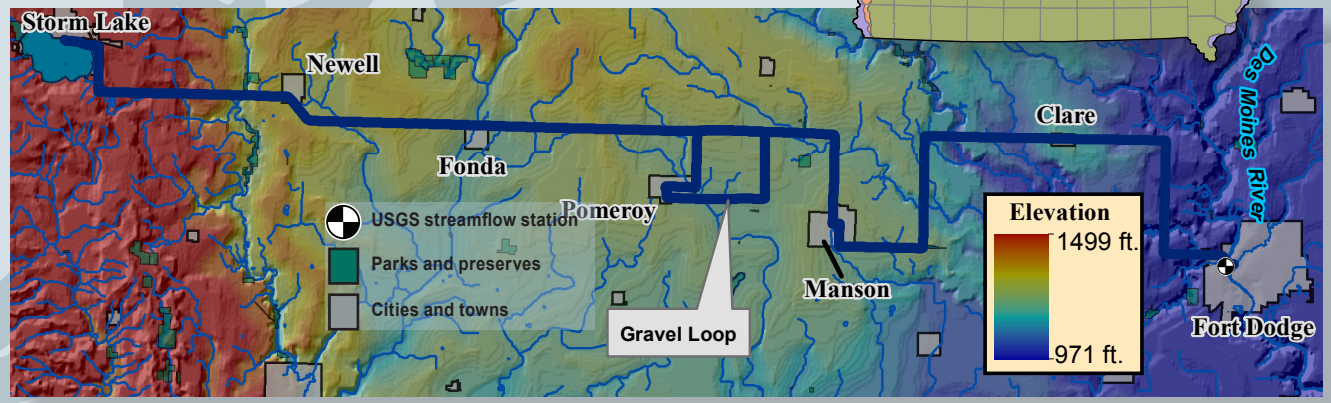
Gorgeous Glacial Geology

Day 2 finds you starting your day in lovely Storm Lake. This **kettle lake** lies adjacent to the Bemis Moraine, owing its existence to ice-calving at the former ice margin. Shortly after crossing Highway 71, you ascend the Bemis Moraine, a roughly north-south trending landscape feature. To the left, you may notice a gravel pit situated on the moraine crest. **Moraines** are remnant piles of debris (clays, sand, gravel, and boulders) that represent the former edge of an advancing glacial ice sheet. The Bemis Moraine is the terminal moraine of the Des Moines Lobe. Approximately 16,000 years ago a large glacial ice sheet advanced from Canada, splitting into several lobes that flowed into low-lying areas of the mid-continent. The easternmost lobe rapidly advanced through the north-central part of Iowa and terminated near the City of Des Moines. The Des Moines Lobe ice sheet advanced into Iowa during a relatively warm period of time and was lubricated by a film of water at the base of the ice. At mile mark 9 you cross the North Raccoon River, a former valley train river, and soon gently climb out of the valley as you ascend the Altamont Moraine, which is slightly younger than the Bemis. The topography is quite hummocky and rolling across this moraine and if you look south you should spot several conical mounds which are **kames**. These features formed as holes in the ice that later became plugged with coarse-grained sediment. After the ice melted these features were left as noticeable mounds on the landscape and in the past many were mined as gravel pits for local users.

* Cover photo: The welcome sign as you enter the town of Manson from the west.

The Manson Impact Structure

RAGBRAI 2015 riders that trek between Fond and Clare on Day 2 might not realize that they have biked across the 25th largest impact structure (meteorite crater) in the world. Named the Manson Impact Structure for the town nearest its center, the crater formed about 74 million years ago when an asteroid about 1.5 miles in diameter crashed into a shallow sea at about 45,000 miles per hour. The resulting explosion released the energy equivalent of ten times all of the nuclear weapons on Earth, producing a crater 5 miles deep and 24 miles across. The uplifted central peak raised crystalline basement rocks to within less that 100 feet below the land surface near the crater center in the Kalsow Prairie area northwest of Manson. The water supply at the town of Manson comes from these central peak crystalline rocks, and it is the only naturally soft groundwater in Iowa. There is no evidence of the crater at the land surface, since the area around the crater was erosionally leveled and buried by glaciers. This is now one of the flattest areas in Iowa.



New this year on RAGBRAI is the addition of the 'Gravel Loop'. It takes about 1,000 tons of gravel per mile of road with another 150 to 400 tons/mile in annual maintenance. That means the approximately 14.5 mile rural route took more than 14,500 tons of gravel to make, that's enough gravel to fill about 900 standard dump trucks!