

## SWC & NDDOT Coop With USGS To Gather Missouri River Channel Data

By Patrick Fridgen

Flooding along the Missouri River this year has brought unimaginable changes to lives and property along its banks. In fact, the full human, social, and economic impacts of this flood event may not be completely understood for years to come.

What has also transpired as a result of unprecedented releases from the Missouri River mainstem reservoirs, are changes to the river itself. In June, the US Army Corps of Engineers ramped up Garrison Dam releases, topping out at 150,000 cubic feet per second. This was almost ten times the average June releases from the year before.

Along with the high flows, came high velocities that resulted in extensive bank erosion, and



In populated areas like the greater Bismarck-Mandan area, where thousands relied heavily on stage predictions to move forward with temporary levee constructions, timely and accurate information was of utmost importance.

scouring of the channel bottom. And, aside from damage to riverbanks and property, the massive changes that occurred to the river bottom created difficult challenges for government agencies tasked with predicting river stages.

With changes happening to the river as a result of flows that had not been seen since Garrison Dam began operation in 1955, a unique opportunity presented itself to gain a broader understanding of erosion and deposition cycles on the Bismarck-Mandan reach of the Missouri River. To gather this data, the State Water Commission and Department of Transportation provided cost-share to have the US Geological Survey (USGS) conduct hydrographic surveys. More simply put, the USGS used a boat with onboard instruments capable of scanning or surveying contours of

the river bottom. This effort was conducted for about a 15-mile reach of the Missouri River through Bismarck-Mandan, including around piers at Grant Marsh, Memorial, and Expressway Bridges. (Walter Hjelle Bridge at Washburn was also surveyed.)

The Department of Transportation was already planning to have the USGS conduct surveys of the bridge piers, so the Water Commission contacted the USGS to see if they could expand their efforts to the 15-mile stretch of river through the greater Bismarck-Mandan area – and they agreed.

The results of the scans provided valuable information about Missouri River bottom topography, and the data can now be used

for investigations into impacts of erosion, sedimentation, and bank stability. The bottom mapping effort also showed that scouring around bridge piers had not been extensive enough to cause alarm.

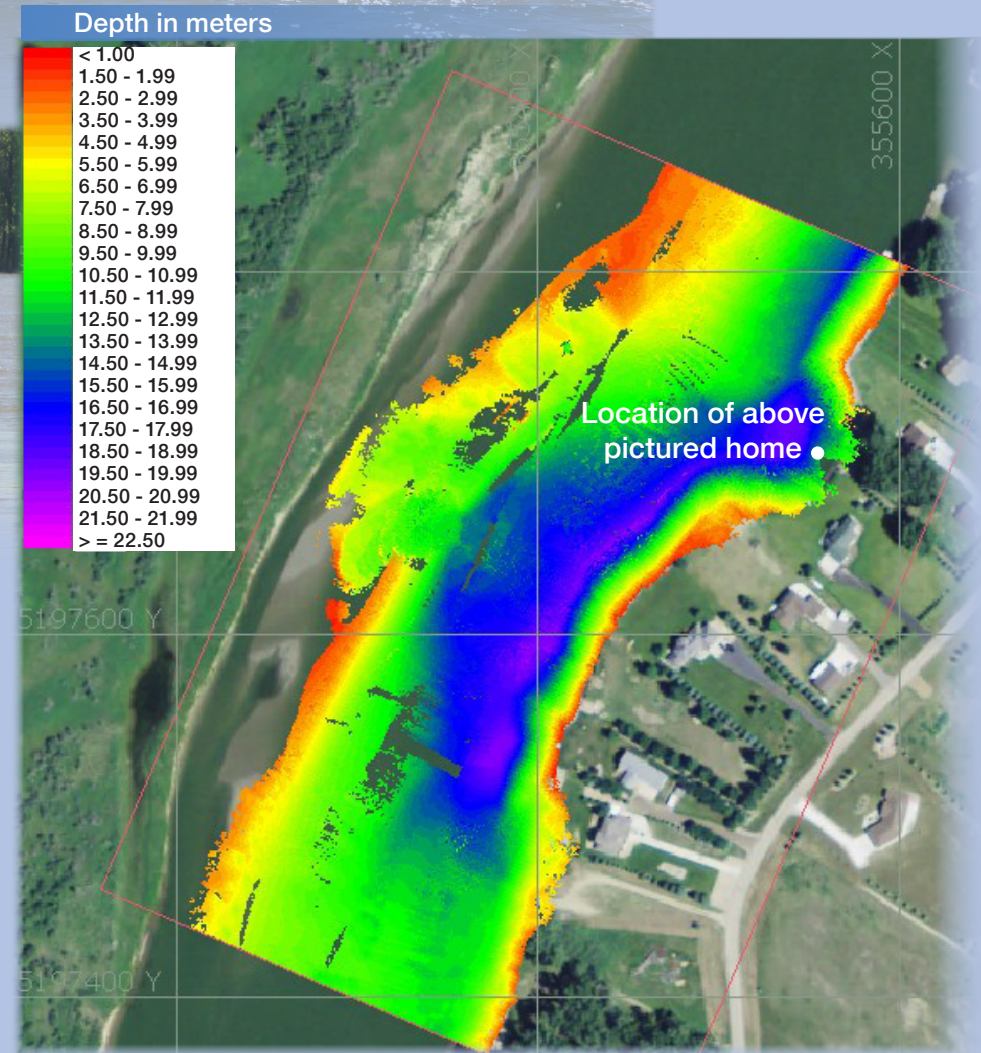


The below image was produced from USGS hydrographic survey efforts near Hogue Island north of Bismarck. At the time this article was written, a 22 meter (72.2-foot) scour hole had claimed one home (pictured left), with others in danger of being lost.

In mid-June, the maximum velocity of the Missouri River near the Bismarck gauge was 8.8 miles per hour. In comparison, the average velocity during typical June flows last summer was only about 1.6 miles per hour.



The USGS' boat used for hydrographic scanning.



The cost of this USGS survey project on the Missouri River was about \$130,000, with the Water Commission and Department of Transportation each providing \$55,000, and the USGS covering the balance.

In addition to the USGS' efforts, the Water Commission conducted sounding efforts of its own through the Bismarck-Mandan river corridor. Special attention was paid to problem areas where extensive erosion and scouring had been occurring – particularly near residential areas and where levees had been constructed. By collecting data on several different dates, the Water Commission was able to tell if certain areas were either filling in with sediment, or experiencing additional scouring.

Maps showing routes where the Water Commission collected Missouri River bottom profile information, along with bottom profile figures, are available for viewing and download via the Water Commission's website at [www.swc.nd.gov](http://www.swc.nd.gov).



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## Devils Lake the Site of 2011 WET Institute

The Project WET watershed education program moved its 2011 institute to the Devils Lake basin this past July, and gave 25 educators, from all grade levels and subject areas, insight into that region's water-related issues and concerns. The basin's ongoing flooding crisis, including the big lake reaching a new record elevation this year made it a timely location for educators to explore.

Participants conducted a complete environmental assessment on Starkweather Coulee. This assessment consisted of measuring stream flow and discharge, obtaining a cross section profile, collecting and analyzing macroinvertebrates (bioassessment), analyzing the chemical water quality (chemical assessment), and conducting a stream habitat assessment (habitat, ecosystem, and physical characteristics).

In addition, institute instructors conducted seven hands-on activities from three major Project WET educator curriculum guides that correlated to the field tours, environmental investigations, and presentations. Many of these activities were "make and take," where the materials were provided for the educators to construct the activity in class, and then take back to their own classroom for use with their own students. Participants were also provided with a comprehensive stream investigations field guide and dozens of other Devils Lake and North Dakota water resource and Project WET water education materials – including the new Project WET Sampler Guide.

As in past years, institute attendees were asked to provide evaluations on the program, and as usual, the feedback was extremely positive.

*"Wonderful leaders and presentations. This experience was a blast. I will use what I learned for years to come." Michael Preston, Grades 10-12 Biology Teacher, West Fargo*

*"This was my fourth institute and I believe this one was the best.... I want to integrate a unit on water into my Environmental Science class. The information gained from this course will help greatly." Todd Sivertson, Grades 10-12 Biology and Environmental Science Teacher, Minot*

*"I have such a greater understanding of Devils Lake basin flooding than previously. I also have a greater understanding from local people and the whole chain that these water problems impact." Chris Smith, Grades 9-12 Social Science Teacher, Rolette*

*"It has been an amazing experience! Such a fun way to learn." Laura Silky, Grades 1 and 5 Teacher, Fargo*

*"Loved everything!" Michelle Ohren, Grades 1-3 Teacher, Moorhead, MN*



**Mike Grafsgaard, Devils Lake City Engineer, talks to institute participants.**

*"The experience I received exceeded all of my expectations. So much valuable information to share with students and staff." David Vonesh, Grade 6 Teacher, Grand Forks*

The institute was funded in part by an EPA Section 319 Non-point Source Pollution grant, the North Dakota State Water Commission, and local county water resource districts and soil conservation districts.

The Devils Lake Watershed Institute was offered to educators for three graduate credits through Minot State University, North Dakota State University, or the University of North Dakota.

### 2011 Devils Lake Basin Field Tours

- Devils Lake
- Stump Lake
- Jerusalem Channel and Tolna Coulee
- City of Devils Lake Dam/Levee
- Devils Lake Water Treatment Plant
- Devils Lake Lemna Wastewater Treatment
- Sully's Hill National Game Preserve and Refuge
- Kenner Marsh
- Grahams Island State Park
- Devils Lake Outlet
- Minnewaukan
- Conservation Agriculture Program sites
- Starkweather Coulee investigation site