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# NEWS IN BRIEF

Compiled by Mark Gonzalez, Editor



## New Faces at the NDGS



Shawna Zelinsky joined the NDGS staff during the past summer. She has assumed the positions as our Publications Clerk and Office Assistant. Shawna is a native of South Heart, growing up on the family farm, which specialized in raising Quarter Horses. She moved to Bismarck two years ago and completed an Associates degree in Business Administration at Bismarck State College last spring before joining the NDGS. We are delighted to have her on board.

Karen Mitchell has left the NDGS, cashing in her view of the plains for one of the Skagit Valley and snow-capped peaks of the Cascade Range in Washington. Karen's move was predicated by her willingness to share professional growth opportunities with her husband, Todd. Todd accepted a position as the Environmental Specialist in the Swinomish Tribal Community Planning Department. This is a homecoming for Todd as he is a member of the Swinomish Tribe.

Karen worked on state mapping projects, including the Bismarck-Mandan 1:24,000-scale and the Cavalier 1:100,000-scale map projects. She oversaw the ESIC program for us during her two and one-half years with the Survey. Also, she worked with the ND Division of Emergency Management to get the NDGS into the Emergency Operations Plan, coordinated the 1998 (with Ann Fritz) and 1999 Earth Science Fairs, and worked on the 1999 and 2001 North Dakota Blue Books (coordinated by the Secretary of State's office). We wish Karen and Todd much success in their new surroundings.



## GIS / Cartographic Lab News by Ryan Waldkirch

The Geographic Information Systems Lab at the North Dakota Geological Survey (NDGS) has been very busy these past few months. With the close of the field season we will be busy capturing and digitizing the data from the geologists' field sheets. In particular, we are in the final stages of producing a map of the surficial geology of Dunn County. Also, we will be completing a map of the surficial geology of the Bismarck-Mandan area this winter. We have also planned to update our digital geologic layer of the Theodore Roosevelt National Park within the upcoming months.

One of the on-going projects at the NDGS has been our work with the Natural Resource Conservation Service (NRCS) to produce digital soils data for the state of North Dakota. These digital files contain all the information that is currently contained in the NRCS County Soil Handbooks. The digitized soils data can be easily used for many projects throughout the state. Some of the current and intended applications include assessment of taxes, determination of crop productivity, implementation of land-management practices, determination of pesticide susceptibility, analysis of landslide hazards, and implementation of precision agriculture, to name a few. Currently, work on 19 of the 53 counties has been completed with another 9 counties in some stage of completion. This digital data layer is eagerly awaited by many users. For more information, please check out our Soil Digitizing Program website at: <http://www.state.nd.us/ndgs/Soils/soils.htm>

In other exciting news, there have been many recent additions of data to the North Dakota Spatial Data Clearinghouse. For those of you who are not aware, the Spatial Data Clearinghouse is a web site that allows you to download spatial data of North Dakota. This site was designed to provide 'one-stop' shopping for spatial data of the state. Also, this service allows users to get data as needed, thereby eliminating the need to store large amounts of data locally. With the amounts of data that are being produced, the Clearinghouse serves to free up time and computer resources, especially limited storage

capacity. No longer do we have to make multiple copies of the data and mail them out to the different agencies or private individuals. Data on the web allow faster dissemination, 'any-time' access, and instant listings of available information. If you're not familiar with the state's Spatial Data Clearinghouse, or if you haven't seen it in a while, check it out at: <http://www.state.nd.us/ndgs/GISInfo/gis.html>

Some of the federally produced data that have been recently added to the Spatial Data Clearinghouse include all of the USGS Digital Elevation Models (DEMs), Digital Line Graphs (DLGs) of the Public Land Survey of North Dakota, and Digital Raster Graphs (DRG), which are scanned topographic maps. Many people have been requesting Digital Orthophoto Quadrangle (DOQs; also digital orthophoto quarter quads, DOQQs), which are scanned and rectified air photos. We will have DOQ coverage of most of the state on-line within three months. Download of DOQs is free!

The NDGS has also been busy putting some of our data on the Spatial Data Clearinghouse too. The NDGS has uploaded geology coverages at different scales from various locations around the state. We are attempting to add geophysical data of the state, such as magnetic anomalies and gravity data, as well as oil-analysis data and water-chemistry data to the web. Also, the Spatial Data Clearinghouse allows us to disseminate some of our unique map products, which we cannot print and distribute effectively in house. Over the next 6 to 12 months, the Spatial Data Clearinghouse will undergo some dramatic changes in both appearance and content. These changes are designed to make the clearinghouse more functional, accessible, and easy to use. We hope that this statewide clearinghouse will continue to serve as a hub for geo-spatial data in North Dakota.



**Statewide Watershed Delineation Efforts**  
by Ann Fritz  
Environmental Scientist, ND Dept. of Health - Division of Water Quality

As part of a nationwide effort to create a national, consistent, and seamless watershed database, several state and federal agencies have partnered to delineate and digitize watershed and subwatershed boundaries in North Dakota (Figure 1). A hydrologist delineates a watershed, i.e., defines the boundaries of the watershed, based on natural topographic flow. A technician will then digitize those boundaries into a computer database. The North Dakota Department of Health, in cooperation with the Natural Resource Conservation Service (NRCS), is the lead agency in the project. These two agencies along with the North Dakota Geological Survey, North Dakota State Water Commission, U.S. Geological Survey, and U.S. Forest Service (Dakota Prairie Grasslands) signed a memorandum of understanding this past summer and began this unprecedented cooperative effort.

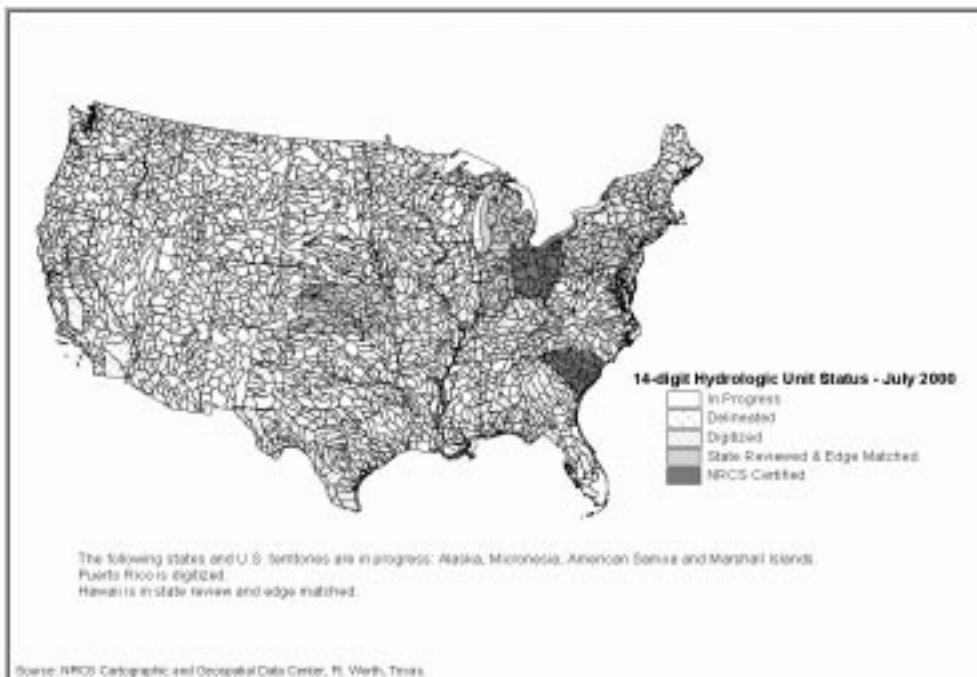


Figure 1. Current status of the watershed delineation efforts in the lower 48 states.

The project will support several water resource and management initiatives, such as non-point source pollution control, flood-control projects, area-wide planning projects, and Clean Lakes initiatives. Work has already begun in western North Dakota; the Little Missouri River, Cannonball River, Heart River, Cedar Creek, Boxelder Creek, the North Fork of the Grand River, Grand River, and Beaver Creek are already delineated and the data are in review. Delineations for North Dakota should be complete in 2003.

The project also will provide more detailed delineations in digital format for local and regional use that is consistent with other national seamless databases. Currently, there are no digital eight-digit hydrologic unit boundary maps that meet the Federal Geographic Data Committee standards, the standards by which all federally produced geographic data must comply.

A nationally uniform hydrologic unit (HU) system was first developed in 1974 by the U.S. Geological Survey. The system divides the country into 22 regions, 222 subregions, 352 accounting units and 2,149 cataloging units, all based using hydrogeologic features. A hierarchical hydrogeologic unit code (HUC) consisting of two digits for each level in the hydrologic unit system is used to identify any hydrologic area of interest. The NRCS refers to the accounting unit (six-digit) drainage as a "basin" and the cataloging unit (eight-digit) as a "sub-basin" (Table 1).

**Table 1. Terminology, Coding, and Average Size for Hydrologic Units**

U.S. Geological Survey	NRCS	NRCS Digit	New Interagency Guidelines	New Interagency Digit	Level	Size (in acres)
Region	–	2	Region	2	1	
Subregion	–	4	Subregion	4	2	
Accounting Unit	Basin	6	Basin	6	3	
Cataloging Unit	Subbasin	8	Subbasin	8	4	448,000 (average)
–	Watershed	11	Watershed	10	5	40,000 to 250,000
–	Subwatershed	14	Subwatershed	12	6	10,000 to 40,000

In 1978, the NRCS mandated that all resource inventories and surveys be coded with and capable of being retrieved by HUCs. At the same time, NRCS initiated a national program to further subdivide HUCs into watersheds for use in water resource planning. An extension of three digits was added to the eight-digit HUC to designate a watershed.

In the 1980s, several NRCS state offices began subdividing the watersheds into sub-watershed categories for natural resource planning, water quality, flood control, and progress-reporting activities. This resulted in adding either two or three digits to the NRCS 11-digit code.

In 1992, the NRCS released the National Instruction for Hydrologic Unit Mapping and Digitizing for comment. This document provided the first comprehensive set of instructions about delineating boundaries and the digitizing process. Four years later, comments were received from the U.S. Geological Survey, the U.S. Forest Service, and the Bureau of Land Management (BLM). The comments were incorporated into the instructions, and the new Federal Standards for Delineation of Hydrologic Unit Boundaries were released as a draft in September of 2000. A final version of the Interagency Standards is expected to be released in December 2000. The new Interagency Guidelines outline the procedure for delineating scientifically justifiable hydrologic unit boundaries based upon natural topographic flow. In North Dakota, as in other states, special considerations will be made for legal drains, ditches, dams, and reservoirs, features that are not natural, but that have become an integral part of the landscape.

With the advent of geographic information systems (GIS), state and federal agencies, as well as other organizations, now have the capability to digitize or develop a geospatial database of HU for analysis, planning, and reporting. Guidelines first developed by the NRCS, then modified and adapted by an Interagency Work Group, will help the NRCS and all the cooperating agencies accurately and consistently map HU boundaries nationwide and assure the digital database is compatible with other natural resource digital data layers in a GIS.

If you have questions about the hydrologic unit delineation and digitizing process or would like more information, please contact Ann Fritz of the North Dakota Department of Health at 701.328.5226.

## We Are Changing Our E-mail Addresses

We are changing our e-mail server and domain so all our e-mail addresses will change effective 12/15/2000. Our server is nearing the end of its life and we have decided to move to the e-mail services provided by the state information technology department instead of replacing our server. Our new e-mail addresses are listed in the table below. Both our old and new e-mail addresses will be available until 02/01/2001. This will allow us time to contact everyone in our address books and notify them of our new e-mail addresses while maintaining our old addresses. This gives us an overlap period for new inquiries and time to respond to new contacts. On 02/01/2001 we will turn off our old e-mail server for good and switch completely to the new server.

Not everyone's address will change. Two staff members, John Hoganson and Jonathan Campbell, were already on the technology department's server so their addresses remain the same.

<u>Staff Member</u>	<u>New Address</u>
John P Bluemle	jbluemle@state.nd.us
Randy B Burke	rburke@state.nd.us
Johnathan M Campbell	jcampbel@state.nd.us
Paul E Diehl	pdiehl@state.nd.us
Mark A Gonzalez	mgonzale@state.nd.us
Karen M Gutenkunst	kgutenku@state.nd.us
Thomas J Heck	theck@state.nd.us
John W Hoganson	jhoganso@state.nd.us
Kent E Hollands	corelab@state.nd.us
Linda K Johnson	ndgspubs@state.nd.us
Elroy L Kadrmas	ekadrmass@state.nd.us
Julie A LeFever	jlefever@state.nd.us
Edward C Murphy	emurphy@state.nd.us
Ken Urlacher	kurlache@state.nd.us
Ryan P Waldkirch	rwaldkir@state.nd.us
Shawna J Zelinsky	ndgsmaps@state.nd.us
-Info-Geological Survey	ndgsinfo@state.nd.us



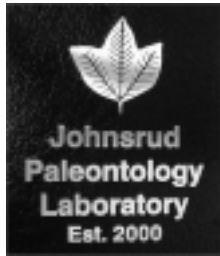
## Industrial Commission Helps to Fund Local Drive



During September, the Council of State Employees conducted a Shelter Supply Drive. Sarah Ross (Oil and Gas Division) and Shawna Zelinsky (NDGS) coordinated the COSE drive for employees of the Industrial Commission. The goal was to raise \$18,000. This goal was easily eclipsed with state employees donating over \$27,000 in money and supplies. The Industrial Commission (Oil and Gas Division and North Dakota Geological Survey) combined to donate nearly \$2500 or almost one-tenth of the total contribution from local state employees. Supplies and money collected in the drive have been distributed to 10 area organizations to help them meet the needs of others in our community. We feel fortunate that we had an opportunity to share our modest prosperity with others this year.

Sarah Ross (left) and Shawna Zelinsky (right), COSE Industrial Commission (Oil and Gas Division and ND Geological Survey) coordinators, with a truck load of donations.

## Dedication of the new Johnsrud Paleontology Laboratory by John W. Hoganson



The dedication of the new NDGS Johnsrud Paleontology Laboratory was held at the North Dakota Heritage Center on October 19, 2000. Clarence Johnsrud and his family donated to the State Fossil Collection a huge collection of beautifully preserved leaf fossils. Clarence had collected the specimens from the Paleocene-age Sentinel Butte Formation near Trenton (see my summer 2000 NDGS Newsletter article—v. 27, no. 1). An exhibit of those fossils can be viewed in the main gallery of the Heritage Center. In addition, the Johnsrud family donated \$200,000 to the NDGS paleontology program to develop a new exhibit in the *Corridor of Time* at the Heritage Center and to renovate the new NDGS paleontology laboratory. That exhibit, called the North Dakota Everglades, will display the environment and life forms in North Dakota 58 million years ago, when much of the state was a subtropical, swampy lowland similar to south Florida. The exhibit will feature Johnsrud plant fossils and will also contain the remains of other plants and animals, such as crocodiles and turtles, which inhabited North Dakota at that time.

The North Dakota State Fossil Collection has grown substantially since its creation in 1989 by legislative mandate. Additional space was needed in the Heritage Center to develop the collection further and to prepare fossils for research and exhibit. The State Historical Society of North Dakota provided additional space in the Heritage Center for expansion of the NDGS State Fossil Collection but funds were not available for renovation of this undeveloped area previously used for storage. Funds provided by the Johnsrud family have allowed us to renovate this space to create the new paleontology laboratory. I am pleased to announce that the new laboratory will be called the Johnsrud Paleontology Laboratory in recognition of and in thanks for the support from the Johnsrud family. The new laboratory triples our space and as a result enhances our capability to care for North Dakota's fossil resources and to restore fossil specimens for exhibit at the Heritage Center and other museums around the state.

Clarence, his wife, Clarice, and nine other members of the Johnsrud family traveled from Trenton and Williston, North Dakota, and Buford and Houston, Texas, to attend the dedication. Over 100 other people visited the laboratory during the ceremony. John Bluemle, State Geologist of North Dakota, Sam Wegner, Superintendent of the State Historical Society of North Dakota, and John Hoganson, NDGS paleontologist, gave short speeches thanking the Johnsrud family for their generous donations.



### Web-based Interactive Site for Groundwater Pesticide Assessment

Not all places are created equally; therefore, the potential for groundwater contamination varies in relation to various characteristics of the local geology, hydrology, and soils. Dr. Bruce Seelig, North Dakota State University Extension Soil Scientist, has developed a Groundwater Pesticide Assessment System (GPAS) that calculates the potential for groundwater contamination from pesticides across North Dakota. The GPAS can be used to determine which areas have shallow glacial or alluvial aquifers that are susceptible to contamination from the application of various pesticides. John Nowatzki, NDSU Extension Water Quality Specialist, has used ESRI's ArcView Internet Map Server (IMS) to develop an online, interactive map to perform the work of the GPAS. In Nowatzki's online map, users, such as farmers, extension officers, soil scientists, health officers, toxicologists, or groundwater specialists, can select an area as small as ¼ section. The IMS generates a color map of the selected area, in which red indicates areas where shallow aquifers are highly susceptible to contamination from a given pesticide, yellow indicates moderate susceptibility, and green indicates low susceptibility.

The Seelig and Nowatzki GPAS uses digitized information produced by the North Dakota Geological Survey and the National Resources Conservation Service to determine contamination potential. Four factors are assessed at each site: 1) depth to groundwater and direction of water flow, 2) permeability of soils and geological materials, 3) organic-matter content, and 4) chemistry of the pesticide(s). Seelig and Nowatzki obtained some of the data used to create the GPAS from the North Dakota Spatial Data Clearinghouse (see *GIS/Cartographic News* by Ryan Waldkirch on p. 4 for more information on the Clearinghouse). Their work illustrates only one of potentially thousands of uses for the data that are being catalogued in the Spatial Data Clearinghouse.

Interested readers can find more information and can use The Groundwater Pesticide Assessment System at <http://www.ageng.ndsu.nodak.edu/pest>.