

Minnesota Ground Water Association

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Newsletter

June 2014
Volume 33, Number 2

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President's Letter

MGWA Colleagues,

I hope this edition of the MGWA newsletter finds you well.

First of all, many, many thanks for those of you that turned out in such large numbers for our Spring Conference. I hope you all found it worth your while. I was especially happy to see so many students. I had the privilege of chatting with a number of them and was impressed with their brightness, energy, and maturity. With the prospect of substantial turnover as many in our aging workforce move into retirement, it was heartening to get the feeling that the resource will be in good hands as the generational shift marches on.

For those who missed the conference, abstracts and presentations can be found on the MGWA web site: www.mgwa.org/meetings/2014_spring/spring2014.php.

George Veni's presentation was a highlight of the conference for me, having worked in karst hydrology many moons ago. He took the opportunity to give some plugs for **14th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst**, which will be taking place in Rochester, MN, October 5-9 2015. This is an event well worth keeping on your radar screens. Find out more at www.sinkholeconference.com.

Speaking of radar screens, planning is under way for the MGWA Fall Conference, which

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Project Update: Characterizing Groundwater and Surface-Water Interactions in Northeastern Twin Cities Lakes, Minnesota

by Perry Jones, USGS

Between November 12 and 22, 2013 water-borne geophysical surveys were conducted on White Bear Lake, Turtle Lake, and Pleasant Lake in Ramsey County, and Big Marine, Lake Elmo, and South School Section Lake in Washington County, Minnesota, to characterize the subsurface geologic structure and geology below the lakes. These surveys were conducted in cooperation

with the USGS Branch of Geophysics, Minnesota Geological Survey, Minnesota Department of Health, and Metropolitan Council. The surveys were part of a 3 year, cooperative study to characterize groundwater and surface-water interactions in northeast Twin Cities lakes and the response of lake water levels to changes in precipitation and groundwater-flow conditions.

The geophysical surveys consisted of continuous-seismic-reflection (CSP) profiling surveys conducted across the lake surface. During these CSP surveys, an acoustic pulse emitter and a series of hydrophones were installed in a single unit called a towfish (see above photo). The towfish



Val Stanley, Minnesota Geological Survey, secured the towfish and Jeff Ziegeweid, USGS Minnesota Water Science Center, prepared to conduct water-borne geophysical surveys on White Bear Lake.

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Newsletter Deadlines

Issue	Due to Editor
September '14	08/01/2014
December '14	11/07/2014
March '15	02/06/2015
June '15	05/01/2015

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Jeff Stoner Retires from USGS

Little did Jeff Stoner realize that responding to a USGS job announcement (on a 3 by 5 card pinned to a University of Minnesota bulletin board) would lead to a career. After 39+ years he decided to retire. Jeff has degrees in geological engineering and civil engineering, is a certified professional hydrogeologist recognized by the American Institute of Hydrology, and is a licensed Professional Geologist in the state of Minnesota. In 1974, Jeff began his USGS career as a hydrologist in Montana. He has participated in numerous studies of groundwater, geophysics, and hydrology in the coal fields of Montana and Pennsylvania. Many of his activities focused on water-quality assessments in Montana, Pennsylvania, Minnesota, and North Dakota. As a supervisor, he guided scientists in a variety of hydrologic investigations and USGS water programs. He was the project manager for the Red River of the North National Water-Quality Assessment (NAWQA) study unit in Minnesota, North Dakota and South Dakota from 1990 to 1997. From 1997 to 2002, he was the leader of the nutrients national synthesis project for the NAWQA Program in Denver, Colorado. In 2002, he became the District Chief of the USGS Minnesota District. He helped the Regional Executive start up the newly formed North Central Area to help direct integrated USGS science and became the Science Program Officer in 2008 for that Area. He also acted as Center Director of the Northern Prairies Research Center and later as Regional Executive for the North Central Area. In 2010,

Jeff accepted the role as Science Coordinator for the Midwest Area (later becoming a region) and continued to assist science centers with opportunities for regional scientific research and assessments.

During his career Jeff has mentored, supervised, and worked with many talented scientists on a vast variety of interesting and complex programs in natural resources. Jeff served as U.S. Co-chair of the Rainy River Water Pollution Board of the International Joint Commission. He was president of the Minnesota Ground Water Association in 2007, a very rewarding experience with a great group of people. One highlight of his career was facilitating a recruitment team for hydrologic technicians with partner technical colleges in building a fresh and more diverse workforce to the USGS. In retirement, Jeff and Linda plan to enjoy their grandchildren and travel. Jeff also hopes to increase his volunteer activities, catch a few fish, and improve his golf game.



Terry Bovee Retires from MDH

Terry Bovee retired in April after a long career in both state and local government. A soil scientist by training, and a long time MGWA member, Terry worked on zoning, land use, and water planning at Le Sueur County before moving to MDH in 1998 to work on wellhead protection planning. He is well known among his friends and colleagues for his easy going manner, passion for public health protection, tolerance for rot-gut coffee, ownership of a 1950s era hot rod pickup (that he restored himself), and the mobile solid waste disposal facility he maintained in the back seat of his state vehicle. Terry intends to spend his time in retirement tooling about in his hot rod, attending art fairs with his wife, enjoying a beer now and then, and otherwise enjoying life.

Calvin Alexander's Retirement is Official

Calvin Alexander has retired from the University of Minnesota after a 40-year career.



Calvin was presented with new caving headgear. One of the brightest lights you'll ever see underground!

MGWA members had lamented Calvin's impending retirement and celebrated his career during MGWA's past fall conference and fall field trip. The Earth Science Department's official send-off was at the University's Campus Club. The evening included tributes to Calvin's unparalleled teaching skills, field camp stories, and an encore performance of "The Ballad of Calvin Alexander" by Eric Mohring (backed up by Stoney Lonesome, no less).

MGWA WHITE PAPER UPDATE

White Paper Initiative Update – First topic is underway!

MGWA's first White Paper topic has been selected. It is:

Manganese in Minnesota's Groundwaters: A New Understanding of the Health Risks of Manganese in Drinking Water.

This topic was announced to the membership at the Spring Conference, and MGWA members were encouraged to volunteer to serve on the Work Group which will research and prepare the White Paper at the conference and by subsequent emails. As we enter summer, the Work Group is being assembled and will be undertaking an information-gathering phase. During this phase, the MGWA membership will be invited to submit any information and experiences they might have on the topic to the Work Group. Emails inviting this input from the membership will be forthcoming this summer. We all want our final White Paper products to be as useful and informative as possible, and your participation can be potentially invaluable. More information is posted on the topic's website (http://www.mgwa.org/whitepapers_01_Manganese.php); please check it out. Thanks for helping!

--White Paper Committee (Kelton Barr, Mark Collins, Bruce Olsen, Jeff Stoner)

President's Letter, cont.

will be happening on November 12, 2014. The working title is "**Legacy and Future of Superfund**". It will be split roughly evenly into two parts: the first dealing with the evolution, history, and context of the Federal and State Superfund programs, and the second looking toward the future. Don't expect a dry, programmatic litany. Nor will it be a collection of presentations on plumes and extraction wells. It will involve tale-spinning, anecdotes, philosophizing, and good stories. One clever idea suggested to me is to track some of the big sites that a lot of people have worked on through investigation, remediation, cleanup, closure, and possible re-birth, from late 1970s to present, as well as the concomitant branching evolution/extinction of various consulting firms. If you can help with this, please get in touch!

Project Update: Characterizing Groundwater and Surface-Water Interactions in Northeastern Twin Cities Lakes, Minnesota, cont.

was towed in the water on the side of a boat while the acoustic pulse emitter sent a range of frequencies into the lake and the hydrophones recorded pulses reflected from the lake bottom. The acoustic source used a swept frequency, or chirp, system that produces a range of frequencies that are sent into the lake. The acoustic pulses were converted to electrical signals that are compared to one another to produce an acoustic image of the bottom and sub-bottom structure of the lake. In each lake, a series of 20-40 survey lines were run across the lake to assess the lake bottom. Results from the continuous-seismic-reflection profiling surveys will be used to (1) interpret the subsurface geologic structure and geology under different lake depths and sediment settings, and (2) determine potential locations where seepage to lower aquifers may be more prevalent and further characterization work needs to be done.

Contact: Perry Jones, pmjones@usgs.gov



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The primary objectives of the MGWA are:

- ◆ Promote and encourage scientific and public policy aspects of groundwater as an information provider.
- ◆ Protect public health and safety through continuing education for groundwater professionals;
- ◆ Establish a common forum for scientists, engineers, planners, educators, attorneys, and other persons concerned with groundwater;
- ◆ Educate the general public regarding groundwater resources; and
- ◆ Disseminate information on groundwater.

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AGENCY NEWS

Same Network, New Name: The Southeast Minnesota Domestic Well Network

By Jim Lundy, MDH

The groundwater monitoring network in Southeastern Minnesota formerly called the "Volunteer Nitrate Monitoring Network" has a new name: the "Southeast Minnesota Domestic Well Network". Since 2008 the well-owner-driven network has generated seven rounds of nitrate data, information that has helped us understand water quality in southeastern Minnesota, with community involvement and at a very low cost. Partners include the nine counties of the Southeast Minnesota Water Resources Board (<http://semnwrwb.winonastatenews.com/>), Minnesota Pollution Control Agency, Minnesota Department of Health, and Minnesota Department of Agriculture.

The network's new name reflects an expanded project scope. Beginning with the samples collected in August 2013, the analyte list expanded to include not just nitrate, but also chloride, bromide, ammonia, and sulfate. The returned

geochemical data augments well construction and geologic information to support classifying wells as vulnerable, non-vulnerable, or transitional. These well vulnerability designations are helpful in planning future sampling rounds.

In the spring of 2014 (scheduled to be completed by the time this newsletter appears), professionally-trained samplers will collect water from over 150 network wells. Depending on hydrogeologic setting, the analytes for this sampling event will include: field measurements (dissolved oxygen, pH, oxidation-reduction potential, temperature, specific conductance); major ions (calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity, nitrate); gross alpha radiation; and tritium.

Assessing the spring 2014 data will be a step forward in developing useful tools for protecting domestic and public drinking water supplies from human-caused and natural contaminants. We are planning additional sampling rounds where we expect to learn even more. In the longer view, we hope the network can be sustained as valuable infrastructure that remains available for future drinking water protection studies that we cannot yet anticipate.

Evaluating Groundwater for Contaminants of Emerging Concern

By Byron Adams, Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency, in collaboration with the U.S. Geological Survey (USGS), is conducting a project to help determine whether the discharge of municipal and domestic wastewaters to land-based systems may be affecting vulnerable groundwater resources with contaminants of emerging concern (CEC). The project will test groundwater in monitoring wells adjacent to several large subsurface septic systems (LSTS), rapid infiltration systems (RIB), and a land application site with a history of receiving wastewater effluent from domestic septic systems.

An initial reconnaissance survey conducted in the Fall of 2013 tested groundwater for wastewater indicator parameters (chloride, boron, fluoride, nitrate and bromide) and CEC using an enzyme linked immuno assay analysis (ELISA). ELISA

test results showed positive detections for sulfamethoxazole in a number of monitoring wells, but inconclusive results for bisphenol A and estrogen compounds. Concentrations of wastewater indicator parameters were elevated in a number of monitoring wells coincident to sulfamethoxazole detections, indicating the presence of a wastewater plumes with the potential to contain additional CEC.

The detections of sulfamethoxazole and wastewater indicator parameters will be used to select a subset of wells at LSTS and RIB

— continued on next page



Figure 1. A rapid infiltration basin receiving a discharge of wastewater.

Abbreviations and Acronyms

- ◆ ASTM – American Society for Testing and Materials
- ◆ DNR – Minnesota Department of Natural Resources
- ◆ MDA – Minnesota Department of Agriculture
- ◆ MDH – Minnesota Department of Health
- ◆ MGS – Minnesota Geological Survey
- ◆ MPCA – Minnesota Pollution Control Agency
- ◆ USEPA or EPA – United States Environmental Protection Agency
- ◆ USGS – United States Geological Survey

Evaluating Groundwater for Contaminants of Emerging Concern, cont.

sites for more comprehensive testing of wastewater compounds in groundwater (Figs. 1 and 2), to begin in the summer of 2014 and end in the fall of 2016. Testing will include hormones, pharmaceuticals, and antibiotics to be tested by the USGS National Water Quality Laboratory. ELISA testing will also be conducted for sulfamethoxazole, caffeine, and carbamazepine at all sites to evaluate its utility as a less expensive screening tool for CEC. In conjunction with this work, soil and groundwater will be tested for CEC at a land application site with a long history of receiving domestic wastewater effluent from septic systems.

The results from this project will provide science-based data to inform MPCA programs whether their best management practices are protective of groundwater resources with regard to CEC. In addition, data from this project will be used to help explain the occurrence of CEC detected in areas of the state where no identified sources of CEC are known to be present. Furthermore, this project complements ongoing CEC monitoring being conducted cooperatively by the MPCA's ambient groundwater monitoring program and the USGS by evaluating point source contributors of CEC to groundwater. This project is funded by the Clean Water Legacy Fund.

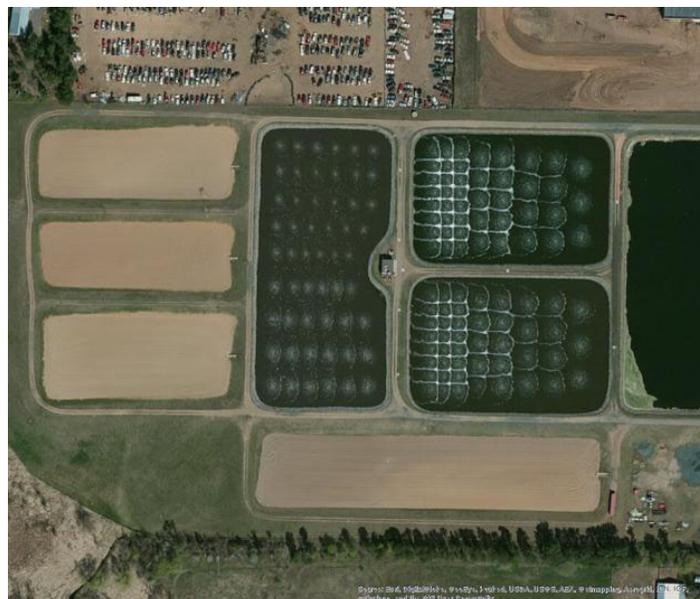


Figure 2. Four rapid infiltration basins, located on the west and south wide of wastewater treatment ponds.

Stratigraphic Codes for Paleozoic Bedrock to Change in CWI

by Bob Tipping, MGS

In 2008, revisions were made to the Paleozoic stratigraphic nomenclature for Minnesota in order to be consistent with current regional nomenclature (Mossler, 2008). Since that time, maps, reports and associated digital data from the Minnesota Geological Survey (MGS) have reflected those changes, including newly entered or re-interpreted data in the County Well Index (CWI) as part of ongoing mapping projects.

In order for the database to be internally consistent, older stratigraphic codes still in CWI will be converted to the new codes on August 1, 2014. For CWI users, this means that some of the codes you are familiar with will change. Major changes include:

- ◆ Ironton (CIRN), Galesville (CGSL), and Ironton-Galesville (CIGL) will be replaced with the Wonevoc Sandstone (CWOC).
- ◆ Franconia (CFRN) will be replaced by the Tunnel City Group (CTCG) when individual formations with the Tunnel City Group are not distinguished or when both are present, and by the Lone Rock Formation (CTLR) and/or the Mazomanie Formation (CTMZ) when individual formations within the Tunnel City Group are distinguished.
- ◆ The Galena Group (OGAL) as formerly used under the Austin (1969) stratigraphic framework for southeastern Minnesota referred only to the Stewartville through Cummingsville formations. Under the new nomenclature, the Galena Group is expanded to include the Dubuque and Decorah formations, so what was formerly (OGAL) is now (OGSC) for the Stewartville through Cummingsville formations only. To refer to the undifferentiated Galena Group, (OGGP) is used, this includes all or parts of the Dubuque through the Decorah where it is undifferentiated.

When distinguished, individual Galena Group formation codes remain the same. For example, there are no changes for the Decorah Shale (ODCR) nor for the Stewartville Formation (OGSV).

Note also that combined stratigraphic units or intervals will reflect these changes as well. For example, Franconia-Ironton-Galesville (CFIG) will be replaced with (CTCW) and the St. Lawrence-Franconia (CSLF) will be replaced with (CSLT).

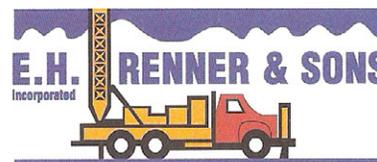
Although this will take some getting used to – CFIG is now the unpronounceable CTCW – it eliminates confusion for those working across state boundaries. For a thorough discussion of the new Paleozoic stratigraphic nomenclature see MGS RI-65 (<http://purl.umn.edu/58940>)

Austin, G.S., 1969, Paleozoic lithostratigraphic nomenclature for southeastern Minnesota: Minnesota Geological Survey Information Circular 6, 11 p.

Mossler, J.H., 2008, Paleozoic Stratigraphic Nomenclature for Minnesota. Minnesota Geological Survey Report of Investigations 65, 84 p. 65 (<http://purl.umn.edu/58940>)

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Advisory Council on Wells and Borings Upcoming Vacancies

By Michael Convery, MDH

The MDH is seeking qualified individuals to fill upcoming vacancies on the Advisory Council on Wells and Borings. The council advises MDH on technical matters related to the construction, maintenance, and sealing of wells and borings, and on the licensure/registration of well and boring contractors. The council meets quarterly (usually on the first Wednesday of March, June, September, and December). As established in Minnesota Statutes, section 103I.105, the council consists of 18 members, including six well contractors, four limited or specialized well/boring contractors (elevator, explorer, monitoring well, bored geothermal heat exchanger), two public members, and six representatives of various state agencies. Terms of appointment are for four years. More information on the council can be found at: www.health.state.mn.us/divs/eh/wells/lwcinfo/advisory.html

Effective January 1, 2015, the terms of six council members will expire, including three well contractors, one explorer, one bored geothermal heat exchanger contractor, and one public member.

Persons interested in serving on the council must submit an application to the Secretary of State, who handles applications for open appointment to state boards, councils, commissions, and other groups. The MDH Commissioner makes the actual appointments to the council. Members receive a \$55 per diem for each meeting attended. Expenses for lodging, meals, and travel are reimbursed. State agency representatives are assigned by their respective Commissioners and do not receive per diem.

Application forms and related information can be obtained by contacting the Secretary of State at:

Secretary of State – Open Appointments
State Office Building, Room 180
100 Rev. Dr. Martin Luther King Jr. Boulevard
St. Paul, Minnesota 55155-1299

Phone: 651-201-1324 (metro) or 877-600-8683 (outstate)
Fax: 651-215-0682

E-mail: open.appointments@state.mn.us

Web site: www.sos.state.mn.us

Individuals can also contact Mr. Michael Convery of MDH at 651-201-4586 or michael.convery@state.mn.us for information on the council or to request an application form.



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DNR Rolls Out New Online Water Permit Application

By MGWA Newsletter Team

The Minnesota DNR released a new online water permit application named MPARS (MN DNR Permitting and Reporting System). This new system supports water appropriation, public waters work, and dam safety permits. Users can create new applications, process permit change requests and enter water use data. MPARS will streamline and increase the transparency of the permit application process and will allow users to check on their permit application or view their current permit at any time. For more information about this new application see:

mndnr.gov/mpars



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Results of Hydrologic Monitoring at a Southwestern Minnesota Wetland Restoration Project with Seepage Fens

By Eric Mohring and Carol Strojny, Minnesota Board of Water and Soil Resources, St. Paul, MN

Background

The Hansen Wetland Bank is one of many wetland restoration projects established to mitigate for wetland impacts related to local road improvements. These projects, part of the Local Government Roads Wetland Replacement Program administered by the Minnesota Board of Water and Soil Resources (BWSR), generate wetland replacement credits to mitigate for construction-related impacts. This site is located in northeastern Murray County, approximately 12 miles from the City of Slayton (Figure 1). The project area includes 83.4 acres of rural farmland, with wetlands that were completely or partially drained through public and private drainage. Several hundred acres of existing permanent conservation easements (Reinvest in Minnesota or RIM) are located adjacent to the project site. Within the region are also USFWS Waterfowl Production Areas and Minnesota DNR Wildlife Management Areas.

The site consists of several basins nestled in rolling hills of stream-modified Des Moines Lobe till (Patterson, 1995). An interesting feature of the landscape is the presence of several (13 by last count) hillside seepage fens (Figure 2) that share some characteristics with calcareous fens, but lack the rare plant community to meet the strict definition criteria (MN DNR, 2008). Landowners had made several attempts to drain the fens for

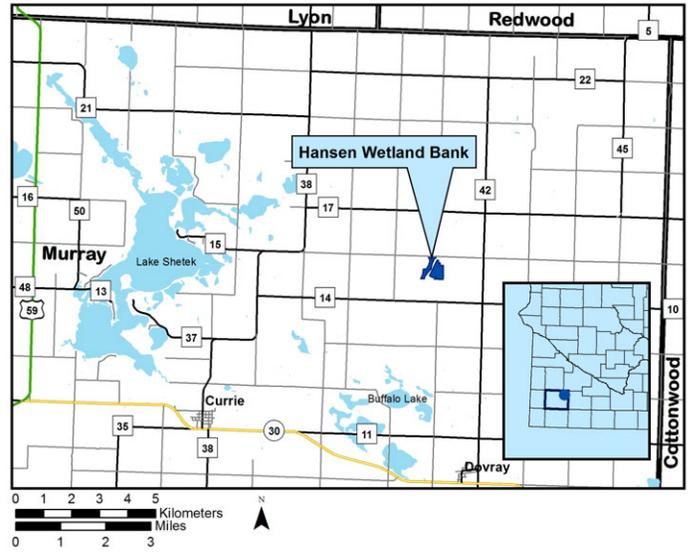


Figure 1. Location map for the Hansen Wetland Mitigation Bank. Inset map shows the location of Murray County in southwestern Minnesota.

agriculture using subsurface tile. These mostly failed, or at best were partially successful, so the fens and adjacent basin areas were never successfully farmed.

The goal of the project is, to the extent possible, to restore pre-settlement hydrological conditions and vegetative communities to the site, returning the functions of fresh wet meadow, marsh, and mesic prairie communities, and to preserve or enhance the

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Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

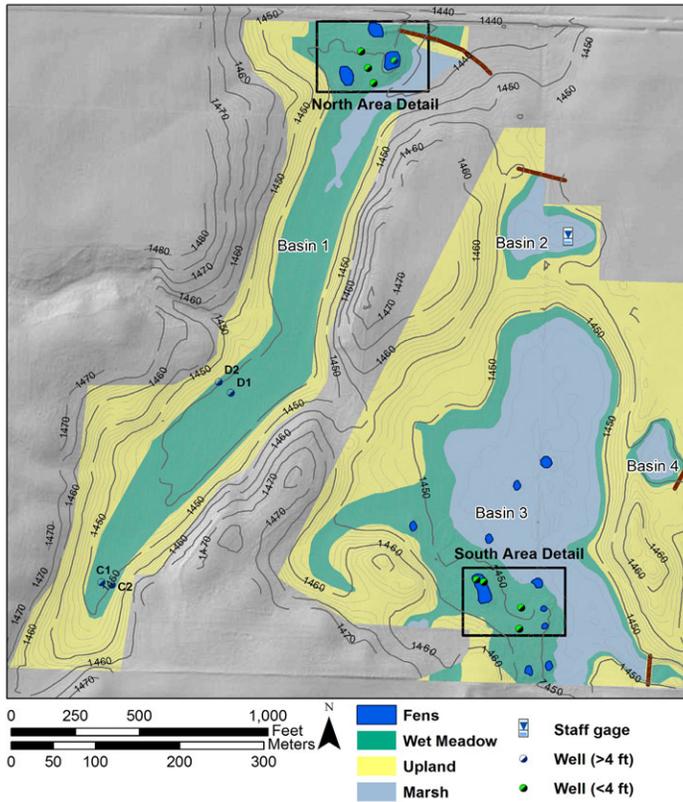


Figure 2: Map of the Hansen wetland mitigation bank showing locations of basins, planned vegetative communities, seepage fens, hydrologic monitoring, and area details. North area detail is shown in Figure 6A; south area detail is displayed in Figure 7A.

existing native fen communities (Figure 2). Construction work was completed in winter of 2012, including blocking drainage tile, installation of outlet structures, construction of earthen embankments, and removal of an existing earthen dam and outlet structure on an adjoining RIM easement at the southeast end of the site. There is some hope that dismantling the remnant drain tile near the fens tile will restore original fen hydrology and possibly result in the restoration of the fens to true calcareous fens.



Figure 3: Fen mound with monitoring wells. Wells extend approximately 2 feet above the surface.

Fen Characteristics

These fascinating fens take the form of peat mounds (or “domes”) that are circular or oblong in plan view and convex upward in cross-section. They range in diameter from 5 - 20 m and in height from 0.5 - 3 m (photo – Figure 3). They are typically saturated to the surface and maintain a constant, year-round discharge of alkaline, oxygen-poor, iron-rich ground water issuing from a central area and flowing outward across the fen. In contact with the atmosphere, the reduced iron oxidizes and drops out of solution as a rust-colored precipitate (photo – Figure 4). The rooting zone around the discharge point is commonly cemented by an iron-carbonate crust up to 15 cm thick (photo – Figure 5).



Figure 4: Fen discharge with iron-oxide precipitate.



Figure 5: Cemented iron-carbonate crust from fen.

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Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

Hydrology Monitoring

For the wetland bank to be successful, it is necessary to verify the restoration of wetland hydrology and vegetative communities, which is accomplished via monitoring of vegetation and hydrology after construction or other modifications, typically for a period of five years. Vegetation monitoring commonly involves transects through each community, done at least annually. This article focuses on the hydrologic monitoring results.

Hydrologic monitoring goals are: 1) to document the restoration of wetland hydrology in several representative locations; and 2) to document changes, if any, to the hydrology of the seepage fens resulting from the restoration. **Figure 2** shows all hydrologic monitoring locations established to date. **Figures 6 and 7** show details of two areas of focus. Hydrologic monitoring consisted of shallow monitoring wells and staff gauges, all instrumented with water level data loggers (Solinst Levellogger®).



• Radial View Color Video Inspection (4 in. min.) • Axial View Color Video Inspection (2 in. min.) • Natural Gamma Logging • Electric Logging (R & SP) • Caliper Logging • Temperature Logging • Impeller Flow Logging • Normal Resistivity Logging • Spectral Gamma Logging

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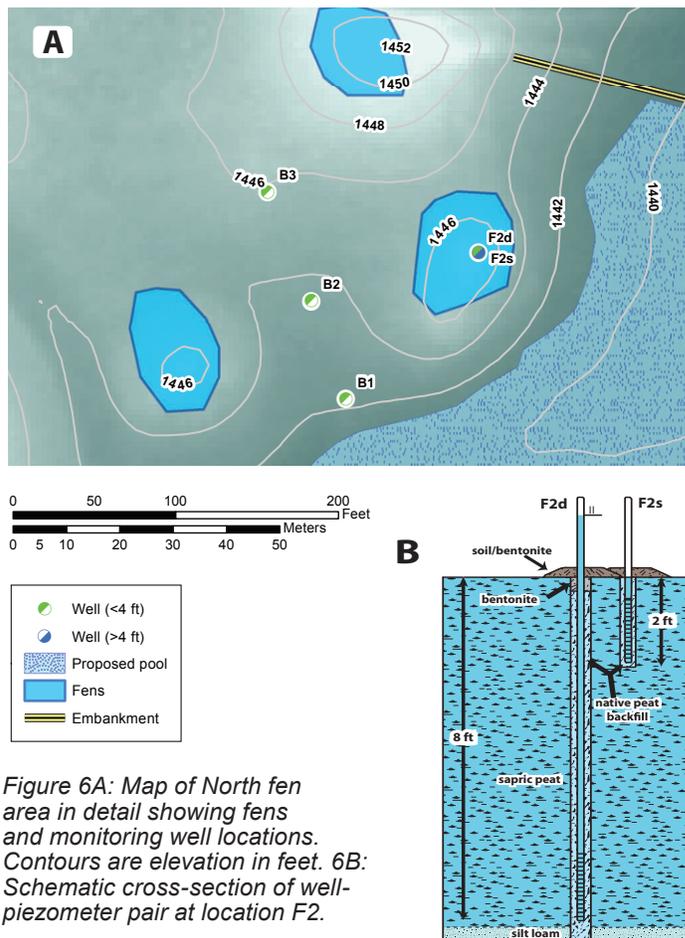


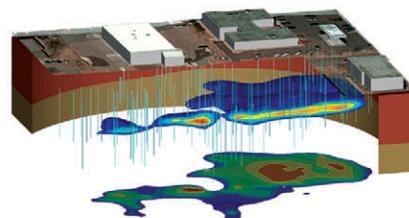
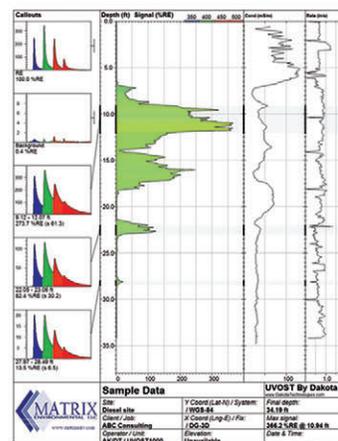
Figure 6A: Map of North fen area in detail showing fens and monitoring well locations. Contours are elevation in feet. 6B: Schematic cross-section of well-piezometer pair at location F2.

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Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

Basin edges

At three locations at the edge of the basins, transects of 2-3 shallow monitoring wells were installed – labeled A1-A2 (Figure 7), B1-B2-B3 (Figure 6), C1-C2 and D1-D2 (Figure 2). Wells were made using 1 ¼ -inch PVC casing and commercial PVC screen with .010-inch (“10-slot”) openings, and ranged from 3-6 feet deep depending on water table depth. They were constructed manually by hand-augering a 3-inch pilot hole, scarifying the sides of the hole to disrupt the effects of any smearing, installing the well, placing a sand pack around the screen, and placing a bentonite seal near the top. Figure 8 shows a typical soil boring/well construction log. Soil textures fell mostly in the loam to clay loam range, with occasional sand stringers, and surficial peat in the wells closest to the basin interior.

Fens

Well-piezometer pairs were installed at two of the fens to measure the vertical gradient through the peat mound. In the north fen area (Figure 6) a boring was advanced through the peat using a McCauley peat sampler and a piezometer was installed at the base of the peat - 8 ft deep (labeled F2d, Figure 6), using 1-inch PVC casing and commercial “10-slot” PVC screen with a vented well point. An adjacent shallower (~2 ft.) well of the same materials was installed by pushing it into the peat (labeled F2s, Figure 6). In the south fen area (Figure 7) a piezometer was installed to 10.8 ft below the peat surface (labeled F1Cd) by pushing, and a stilling well (labeled F1Cs) was installed in the central pool from which the main flow issued.

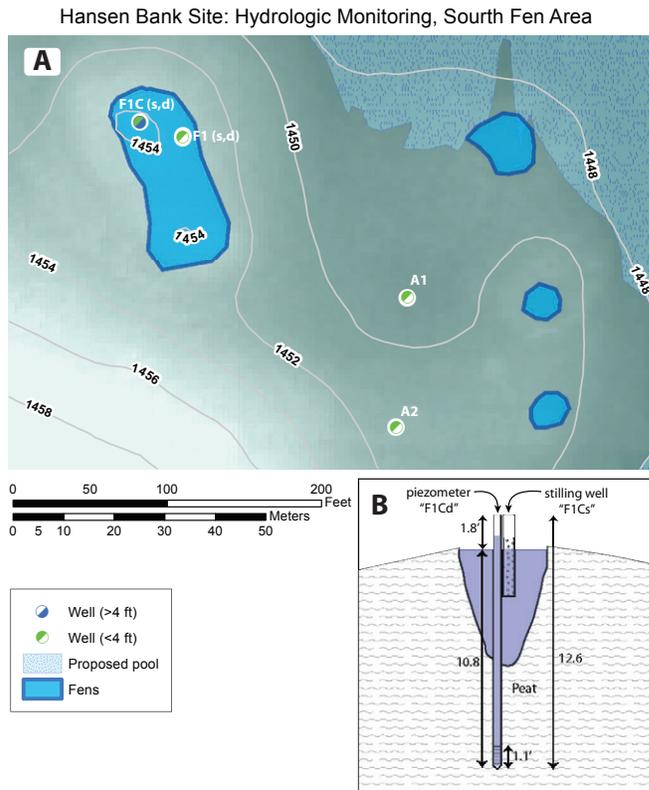


Figure 7A: Map of South fen area in detail showing fens and monitoring well locations. Contours are elevation in feet. 7B: Schematic cross-section showing fen well installation at location F1C.

— continued on page 11

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Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

Results

Basin Edges

Figure 9 shows water table elevation data from well transects B1–B2–B3 and A1–A2 (Figures 6,7) plotted on the same time scale as precipitation data. This type of analysis is useful for putting measured water levels in the context of precipitation conditions. There was, as expected, a noticeable “lift” after completion of construction in late 2012. This is especially noticeable in the lowest elevation wells in the transects (A1 and B1). There was some manipulation of basin water levels in 2013 for vegetation establishment around the fringes of the basins, but clearly the project will result in a successful wetland restoration to the target levels (Figure 9).

Fen Hydrology

The instrumented fens, not surprisingly, showed consistent upward groundwater flow, as indicated by the relatively constant difference between the higher head at depth and the lower head at the surface (Figure 10). The pressure gradient represented by this difference in measured water levels is the driving force causing ground water discharge at the fens.

The gradients in the fens did show some variation over the course of monitoring, but these seem to be associated with longer-term,

— continued on page 12

Date: 7/19/2010 County: Murray Site ID: Hansen- Well B2
Personnel: E Mohring, M Lennon, K Radel Equipment/ Method: dutch auger
Landscape Position: backslope Soil Series: 86 Canisteeo clay loam Parent Material: till
Water depth during installation: 2.2 ft Pack material: sand Backfill material: native clay

Diam (in)	Screen type	Slot (in)	screen length (ft)	screen interval (ft)	end plug	riser	riser length (ft)	total (ft)	Stick-up (ft.)	depth (ft)	pack interval	seals
1 1/4"	sch40 PVC wrapped	010	2.2	1.3 - 3.5	cap. vented	s40 PVC	3.4	5.6	2.1	3.5	.5 - 3.6	bentonite 0-5 bent/sand mound

Depth (ft)	Texture, etc.	Color		Wells	Remarks
		Matrix	Redox		
0-					Soil/bentonite Bentonite Sand Pack
0-	loam				Strong HCl reaction
1-	loam	10YR 2/1	7% 7.5YR 4/6		Strong HCl reaction
2-	loam	10YR 4/2	10% 7.5YR 4/6		Strong HCl reaction
2-	loamy sand	2.5YR 5/6			Strong HCl reaction
3-	silt loam mucky mod.	N 2/0	5% 7.5YR 4/6		Strong HCl reaction, shell fragments
3-	End of boring				

Figure 8: Typical soil boring and well installation data sheet. Location of the well is shown in Figure 6A.

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Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

regional trends in moisture conditions. For example, the variations in gradients at the fens seem to correlate well with the Palmer Hydrologic Drought Index (Palmer, 1965), a measure of long-term, cumulative wetness conditions (Figure 11). They also seem to be unaffected by any local changes in hydrology associated with restoration activities.

Conclusions

Results from hydrologic monitoring confirm that goals are being met for restoring drained and partially drained areas, and that the restoration has not affected the hydrology of the fen areas. The two small surface-water fed depressional wetlands (Basins 2 and 4, Figure 2) may require a few more years to develop. Hydrologic monitoring will continue for several more years. These data can be used to document the restoration of wetland hydrology and any possible changes to the fen hydrology.

Vegetation will continue to be managed in the next few years, focusing on reducing non-native cattail cover in the existing wetlands, and establishment of native vegetative cover in restored

areas. We anticipate the vegetation in Basins 2 and 4 will be slower to develop, as these areas rely on surface water.

Future Work

An obvious gap in this work is the lack of water chemistry data on the fens. More work in this area would determine whether the fens are capable of being restored to true calcareous fens. Future work will also involve careful monitoring of the fen vegetation for the rare plant species associated with calcareous fens.

References

- MN Dept. of Natural Resources, 2008. Fact Sheet: What is a Calcareous Seepage Fen? Available at: http://files.dnr.state.mn.us/natural_resources/water/wetlands/calcareous_fen_fact_sheet_dec_2011.pdf
- Palmer, W.C., 1965. Meteorological drought. Research Paper No. 45. U.S. Weather Bureau. [NOAA Library and Information Services Division, Washington, D.C. 20852]
- Patterson, C.J., 1995. Surficial Geologic Map. Regional Hydrogeologic Assessment RHA-2, Part A, Plate 1. Minnesota Geological Survey. University of Minnesota, Minneapolis, MN.

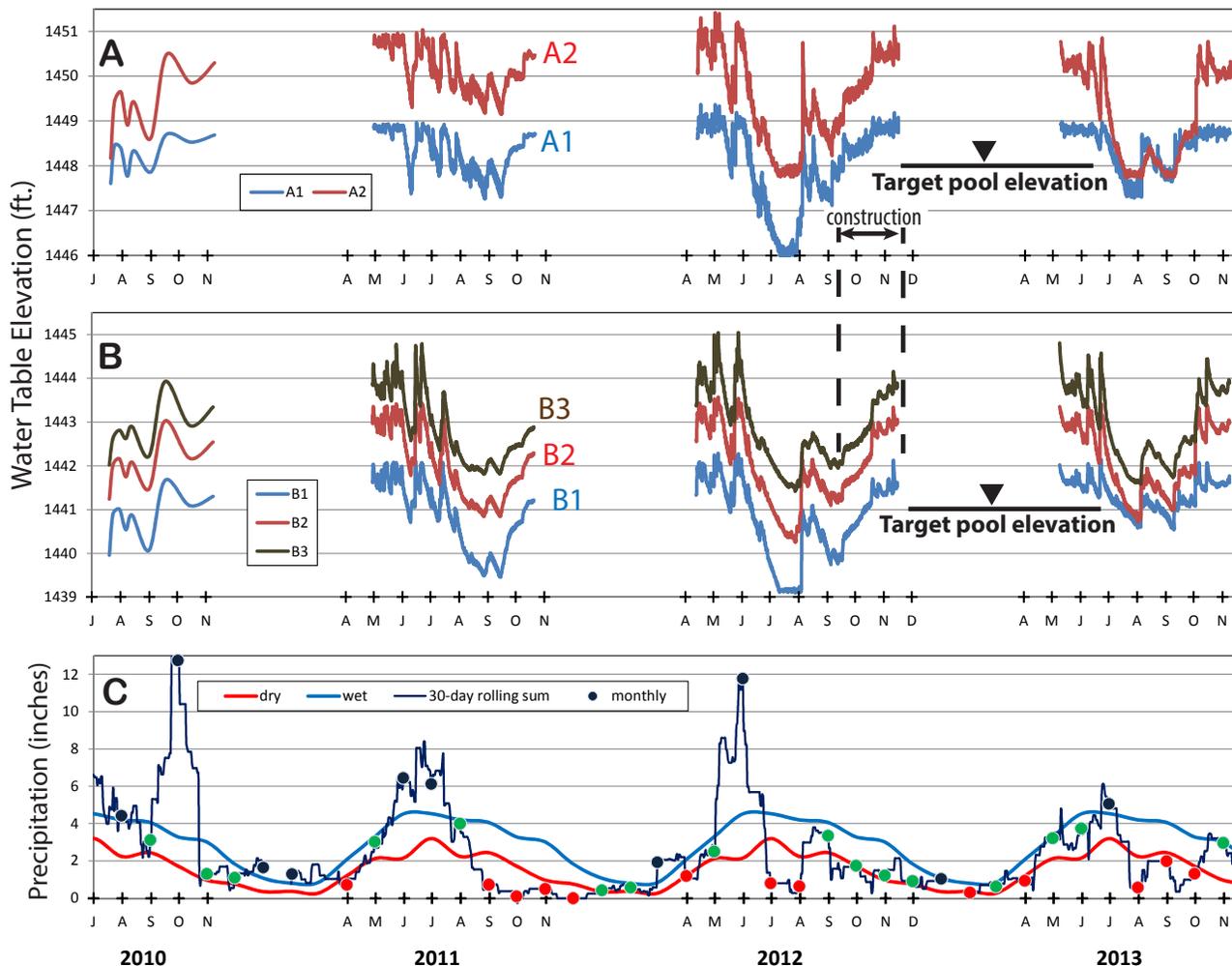


Figure 9: Multi-year plots of water level data from monitoring well transect A (South fen area—Figure 7) and transect B (North fen area—Figure 6) together with precipitation analysis. A: Water table elevations as measured in wells A1 and A2. B: Water table elevations as measured in wells B1-B3. Note the “Lift” in A1 and B1 at the end of 2012 to near the target levels. C: 2010 - 2013 precipitation analysis. Colored dots represent monthly precipitation; blue dots indicate wetter-than-normal months; green indicate months with normal precipitation; red indicate drier-than-normal months. The dark blue line is the 30-day rolling total of precipitation, i.e. each point on the dark blue line represents the total of the previous 30 days of precipitation. The range of normal monthly precipitation is the area between the red and light blue lines.

Monitoring Results at a SW MN Wetland Restoration Project with Seepage Fens, cont.

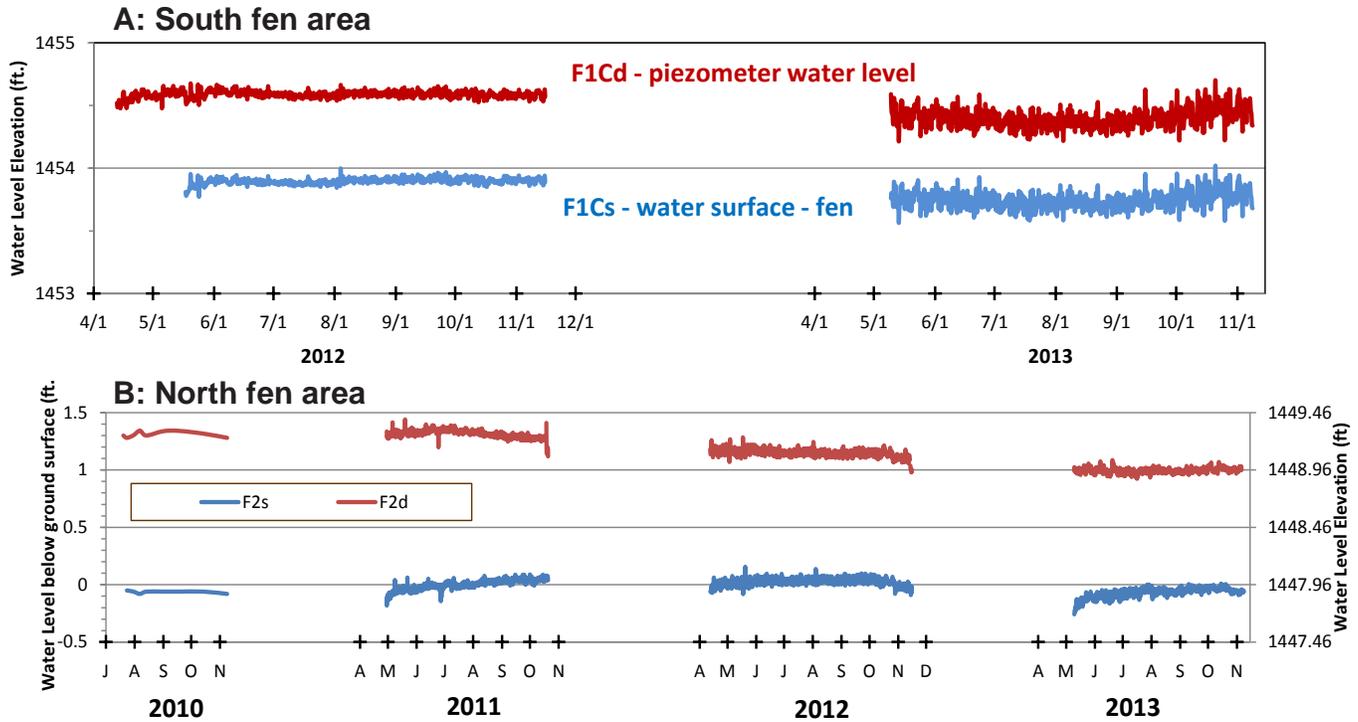


Figure 10: A: Water level data from stilling well/piezometer pair F1 (fen in southern area, Figure 7B). B: water level data well/piezometer pair F2 (fen in northern area, Figure 6B). The difference between the higher head at depth and the lower head at the surface is a measure of the upward flow gradient driving ground water discharge in the fens.

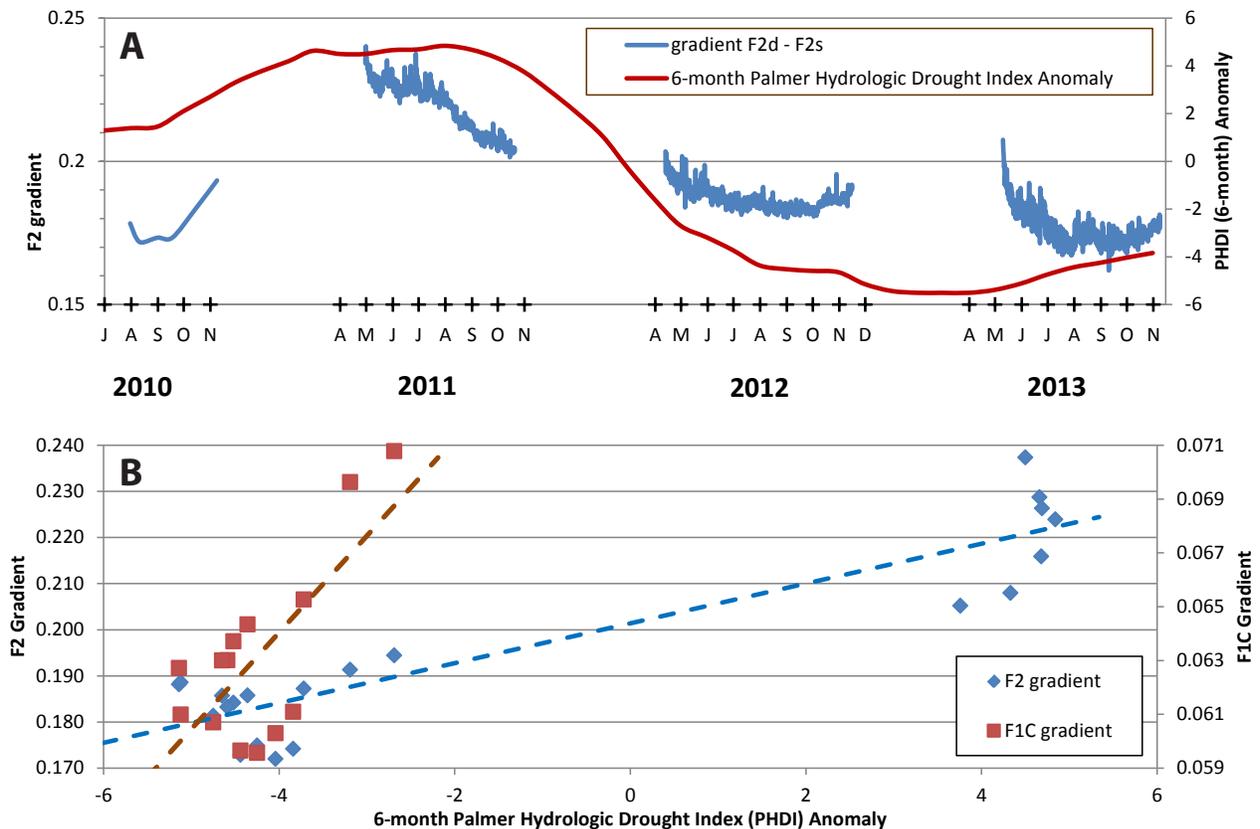


Figure 11: Gradients in fens correlated with Palmer Hydrologic Drought Index (PHDI). Gradients are dimensionless (ft./ft.) - the difference between water levels measured in the piezometer (deep) and surface (shallow) divided by the depth. A: Gradient at pair F2 plotted on same time scale as 6-month Palmer Hydrologic Drought Index Anomaly. B: Scatter plots of monthly average gradients at F1C and F2 vs. 6-month Palmer Hydrologic Drought Index Anomaly for that month, showing positive correlation.

LINKS OF INTEREST

CCE Caves Course

Summer caves course taught by MGWA member, Greg Brick, and offered through the University of Minnesota's College of Continuing Education:

www.cce.umn.edu/courses/CS-0528.html

and while we are on the subject:

Cave and Karst Science Back Issues available

Volumes of the journal "Cave & Karst Science" (Transactions of the British Cave Research Association) from 1974 to 2005 are now available as free downloads at

<http://bcra.org.uk/pub/candks/catalogue.html>.

To view more recent volumes go to <http://bcra.org.uk/pub/candks/index.html>. There is normally an annual fee to access this content but BCRA Council have agreed to provide free access for 1 month to encourage scientists to read past papers and, hopefully, to take out a subscription to support future publications. So, if you would like to read David Lowe's latest paper on Inception Horizons ("*Geological influences on cave origin and development in the Yorkshire Dales, UK*"; issue 41(1), 2014) or Trevor Faulkners detailed discussion of flow hydraulics in karst conduits ("*Speleogenesis and scallop formation and demise under hydraulic control and other recharge regimes*"; issue 40(3), 2013) go to the web site, click on the padlock and you will be taken to a site where you can either subscribe to the journal or obtain a free 1 month subscription that will allow you to download the papers.

MPR Ground Level

The Minnesota Public Radio series on groundwater continues with two new stories.

Treating groundwater contamination comes with a price:

www.mprnews.org/story/2014/04/28/ground-level-our-legacy-of-contamination

A plan to store treated water underground:

www.mprnews.org/story/2014/04/16/ground-level-beneath-the-surface-st-michael



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USGS PUBLICATIONS

Principal Aquifer Studies

This USGS publication describes the National Water Quality Assessment Program's studies in Principal Aquifers throughout the US. A subset of the wells were located within Minnesota. During 2013, eleven public supply wells in glacial aquifers were sampled in Minnesota. A similar number in the Cambrian Ordovician aquifers will be sampled within Minnesota in 2014.

USGS Fact Sheet 2014-3024: Groundwater Studies: Principal Aquifer Surveys

Suggested citation:

Burow, K.R., and Belitz, Kenneth, 2014, Groundwater studies-Principal aquifer surveys: U.S. Geological Survey Fact Sheet 2014-3024, 2p., <http://dx.doi.org/10.3133/fs20143024>.

This publication is available at <http://pubs.usgs.gov/fs/2014/3024/>. After the Digital Object Identifier (DOI) and product metadata have been registered by CrossRef, the official URL will be <http://dx.doi.org/10.3133/fs20143024>.

West Fork Beaver Creek, Minnesota Assessment

The USGS has released a new report: [Assessment of Conservation Easements, Total Phosphorus, and Total Suspended Solids in West Fork Beaver Creek, Minnesota, 1999-2012](#) by Victoria G. Christensen and Kristen A. Kieta.

The USGS cooperated with the Minnesota Board of Water and Soil Resources and worked collaboratively with the Hawk Creek Watershed Project to examine the West Fork Beaver Creek Basin in Renville County, which has the largest number of Reinvest In Minnesota (RIM) land retirement contracts in the State. Among all conservation easement programs, a total of 24,218 acres of agricultural land were retired throughout Renville County, and 2,718 acres were retired in the West Fork Beaver Creek Basin from 1987 through 2012. In 2000, land retirement increased sharply because of the Minnesota River Conservation Reserve Enhancement Program (CREP). The CREP ended in 2002.

Annual flow-weighted mean total-phosphorus concentrations ranged from 0.140 to 0.759 milligrams per liter, and annual flow-weighted mean total suspended solids concentrations ranged from 21.3 to 217 milligrams per liter. A downward trend in flow-weighted mean total-phosphorus concentrations was significant from 1999 through 2008. The downward trend in total-phosphorus concentrations was related significantly to annual land retirement for 1999-2008. However, flow-weighted total-phosphorus concentrations increased substantially in 2009, and the trend was no longer significant. High annual flow-weighted mean concentrations for total phosphorus and total suspended solids in 2009 were affected by outlier concentrations documented in March 2009. An increase in annual flow-weighted mean total-phosphorus concentrations during 2009-11 may be due to a number of factors, including industrial discharges, increases in drain tile installation, changes in land use including decreases in agricultural land retirement after 2008, increases in erosion, or increases in phosphorus applications to fields. Inclusion of land-retirement effects in agency planning along with other factors adds perspective to the broader picture of interdependent systems and allows agencies to make informed decisions on the benefits of perpetual easements compared to limited duration easements.

Book Review

HISTORY OF THE DEVELOPMENT OF HYDROGEOLOGY IN THE UNITED STATES, 2nd Edition (2012) by Joseph S. Rosenshein and John E. Moore. NGWA Press, Westerville, OH. Softcover, 200 pages, 8.5 by 11 inches, ISBN 1-56034-021-5. Member price \$40, nonmember price \$50. Reviewed by Greg Brick Ph.D.

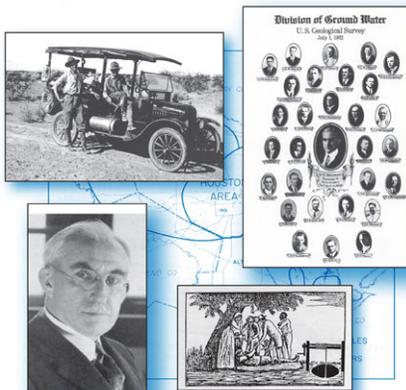
Most histories of hydrogeology agree that the USGS has played a major role in the development of hydrogeology in the United States. Following the establishment of the USGS in 1879, its first major publication on groundwater was Chamberlin's artesian monograph in 1885, but the spate of publications that continues to the present day did not really begin until the late 1890s, with such prestigious names as Gilbert, King, Slichter, Darton, Fuller, Lindgren, Lee, Mendenhall, and others. Upon the establishment of the USGS Ground Water Branch in 1908, and the long and productive reign of Oscar Meinzer from 1912 to 1946 as chief of this division, during which the Cooperative program was established, its influence became pervasive in American hydrogeology. But as Deming (2002) observed, "the glory days when the USGS dominated the groundwater profession are a bygone era," and the editors of the book under review place this shift "about 1970."

The present book, despite its encompassing title, largely focuses on these USGS contributions. It's the second edition of a book of a different title, *Two Hundred Years of Hydrogeology in the United States*, published in 1986, which covered the years from 1776 to 1976. Overall, the coverage is uneven, and this is attributable to the circumstance that the book originated as the proceedings of a 1976 GSA symposium. Indeed, some of the original chapters are redacted from voice recordings made at that symposium and we can thank John Moore for having had the foresight to tape the proceedings. These original chapters are retained in the new edition but with additional chapters bulking out previous sections, helping to patch gaps and extending the story to 2010. While the first edition had 110 pages, the second has 200 pages, so these are substantial additions. The problem is that this new material has not been integrated with the old, so to find the continuing story you must go hunting among the new chapters—and there's no index to help you out.

As for some particulars, Chapter 3, "Birth of American Hydrogeology," includes the interesting story of John Robert Shaw, the famous early well-digger, who was "blown up four times" in the course of digging bedrock wells. But strangely there's no mention of Saratoga Springs in upstate New York, which played such a crucial role in the development of hydrogeochemistry in the United States, including the earliest (1807) quantitative chemical analysis of groundwater (see, for example, Davis and Davis, 1997). The exceedingly brief Chapter 12, "Geochemistry," two pages by the late Bill Back, was disappointing. His other publications on the history of this topic (e.g., Back and Freeze, 1983) are impressive, so I got the feeling that he laid his pen down too soon. Some other chapters were like this, barely more than abstracts. I found Chapter 15, "Hydrogeology, Policy, and Politics,"

History of the Development of Hydrogeology in the United States 2nd Edition

Joseph S. Rosenshein · John E. Moore



by Harold E. Thomas, a valuable summary of U.S. groundwater law, but important legislation has been enacted since this chapter was written in 1976. There's no mention of Superfund.

Given the importance attributed to the USGS in hydrogeology, and its changing focus over the decades, it was surprising that the editors left out Garald Parker's (1986) immensely helpful graphic, "U.S. Geological Survey Family Tree," which appears as Figure 8 in his article of the same title as Parker's Chapter 4 in this new, expanded edition. Another conspicuous absence was John Bredehoeft, who has published impressive historical summaries of USGS hydrogeology (see, for example, Bredehoeft et al., 1982). American hydrogeologists have made unique and valuable contributions to karst hydrogeology, but these are omitted. Coverage of this topic is provided by Watson and White (1985), and White (2006), among others, for those who are interested.

This book is what historiographers would call an "internalist" account of hydrogeology: a celebratory narrative written largely for other participants. Some chapters are not what purists would call history but rather compilations of unconnected anecdotes and interesting historical tidbits.

— continued on page 16

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Book Review, cont.

I think the most instructive comparison is to the somewhat slimmer volume (140 pages) by Stanley N. Davis and Augusta G. Davis (2005), *Hydrogeology in the United States 1780-1950*. This book was written by academics, rather than USGS personnel. Davis and Davis divide the history of U.S. hydrogeology into five (rather than three) periods, unrelated to the USGS, providing coherent, concise, systematic coverage, with good context.

Another parallel is *200 Years of British Hydrogeology*, edited by John D. Mather (2004), which is also multi-authored, but larger (400 pages) and with a well-developed scholarly apparatus. In the U.K., as in the U.S., a government agency, the British Geological Survey, played the major role. Writing from the British perspective, Mather asserts that in the first half of the 20th century “the significant advances in hydrogeology [were] taking place in mainland Europe and North America,” a statement with which I think Rosenshein and Moore would heartily concur.

I recommend this book for anyone interested in the history of hydrogeology in the United States, though it retains more the flavor of a volume of proceedings and should be supplemented with additional texts to round out the picture.

Literature Cited

- Back, W. and R.A. Freeze (1983). *Chemical Hydrogeology*. Stroudsburg, PA: Hutchinson Ross.
- Bredehoeft, J.D., W. Back, and B.B. Hanshaw (1982). Regional groundwater flow concepts in the United States: Historical perspective. *GSA Special Paper 189*, pp. 297-316.
- Davis, S.N. and A.G. Davis (1997). Saratoga Springs and early hydrogeochemistry in the United States. *Ground Water* 35(2): 347-356.
- Davis, S.N. and A.G. Davis (2005). *Hydrogeology in the United States 1780-1950*. Tucson: University of Arizona.
- Deming, D. (2002). *Introduction to Hydrogeology*. New York: McGraw-Hill.
- Mather, J.D. (2004). 200 Years of British Hydrogeology—An Introduction and Overview. IN J.D. Mather (ed.), *200 Years of British Hydrogeology*. Geological Society, London, Special Publication 225, pp. 1-13.
- Parker, G.G., Sr. (1986). Early stage of hydrogeology in the United States, 1776 to 1912. *Water Resources Bulletin* 22(5): 701-716.
- Watson, R.A. and W.B. White (1985). The history of American theories of cave origin. *GSA Centennial Special Volume 1*, pp. 109-123.
- White, W.B. (2006). Fifty years of karst hydrology and hydrogeology: 1953-2003. *GSA Special Paper 404*, pp. 139-151.

Featured Photo



On the left is a picture of a drill rig in the process of constructing an observation well at Bear Head Lake State Park, as part of a study of groundwater/surface water interaction at Sentinel Lakes. This beautiful park has it all: clear water, hiking, boating, camping, and a thick, near surface lens of cobbles.

If the first picture is the “Before”, the one on the right is the “After”. Here we see the driller inspect the damage to his equipment that resulted from pulling his flights back through the cobbles. Not pictured is the driller loudly (and colorfully) promising to never drill another well for the project, the researcher, or his Agency.

Picture credits: Andrew Streit

MGWA BOARD MINUTES

Minnesota Ground Water Association Board Meeting Minutes

Meeting Date: March 05, 2014

Location: Fresh Grounds Café 1362 West 7th Street, St. Paul, MN
Attendance: Eric Mohring, President; Bob Tipping, Past President; Layna Ross, President-Elect; Audrey Van Cleve, Treasurer; Avery Cota-Guertin, Secretary; Sean Hunt, WRI; Jeanette Leete, WRI; Kelton Barr.

Past Minutes: Approved as amended.
Treasury: Van Cleve provided the Board with copies of the report. Net income is \$10,426; total assets: \$89,297.
Newsletter: WRI is waiting to receive the MGWA newsletter materials from the newsletter team.
Web Page: Updated webpage with 2014 materials.
WRI Report: WRI provided copies of the membership update and Business Manager's Report. Hunt sent email and paper membership renewal reminders to MGWA members. Hunt sent a 2014 spring conference announcement and Darcy Lecture announcement to members. Leete described the issues with untangling the endowment and unrestricted funds in the Affinity Plus checking account. Leete suggested to the Foundation opening a checking account with Hiway Federal Credit Union for the unrestricted funds.

Old Business: 2014 spring conference. Hunt added an exhibitor page to the website and updated the exhibitor contract forms. Tipping reports posters are still coming in. Hunt wants to know if announcements should be sent out for exhibitors, posters submissions, and conference registration. Kelton reports in the past personal emails were sent to exhibitors and emails were followed up with phone calls if necessary. Tipping has been sending emails to follow up with poster submissions. Announcements can be sent out for exhibitors and posters. Mohring reported the speaker list for the conference.
Coordination with the Foundation. Tipping spoke with Scott Alexander about soliciting exhibitors for the 2014 conference.
Fall 2014 conference. The Board discussed potential speakers, planning for the fall 2014 conference, and the possibility of holding a field trip.
2015 fall conference. Kelton reported that the planning stage has moved into determining session titles and session chairs. The session chairs will begin work to invite speakers. The venue has been tentatively set. Kelton also reported going through their mailing list to updating contact information. WRI suggested an editable PDF for registration. The Board will be responsible for the registration process for the event. Kelton suggested Ross contact Wisconsin and Iowa groundwater association/organizations to raise awareness for this conference.
White paper topics-committee report. Kelton provided the Board with copies of the white paper nomination form and three proposed topics. The committee worked up follow-up questions for the proposed topics to better define the topic. The committee will make a topic recommendation to the Board by the April MGWA Board Meeting. The Board discussed the proposed topics and thoughts moving forward with the White Paper Initiative. The committee will communicate with topic proposers when topics are not chosen for the current round. Kelton suggested topics not chosen could write an article to the newsletter proposing the topic.

New Business: Birdsall-Dreiss. The request was approved and the lecture will be held this fall.

Meeting Date: April 02, 2014

Location: Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN
Attendance: Eric Mohring, President; Layna Ross, President-Elect; Audrey Van Cleve, Treasurer; Avery Cota-Guertin, Secretary; Kelton Barr.

Past Minutes: Approved.
Treasury: Van Cleve provided the Board with copies of the financial report. Net income for the period of January 1, 2014 – March 29, 2014 is \$27,622; total assets as of March 29, 2014 \$101,837.
Newsletter: Mohring provided the Board with a newsletter update from an email Ronning sent, stating that the contribution deadline for the June newsletter is May 2, 2014. March issue was produced and distributed.
Web Page: No report
WRI Report: No report
Old Business: 2014 spring conference. The Board discussed the final details in assembling conference materials for attendees. The Board discussed the speakers for the conference and scheduled times for presentations.
2014 field trip. Barr made a few suggestions for possible field trips. The board discussed a possible reprise of the "Minnesota River Tributaries" field trip that Carrie Jennings led. It was suggested that the field trip be offered as a one day event. Van Cleve presented the Board with a summary of the field trips MGWA offered in the past. Mohring will contact Tipping and discuss the logistics of organizing the field trip.

MGWA 2014 Membership Dues

Professional Rate:	\$35
Full-time Student Rate:	\$15
Newsletter (printed and mailed)	\$20
Directory	\$7

Membership dues rates were revised at the October 1, 2010 meeting of the MGWA Board. They remain unchanged.

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MGWA BOARD MINUTES

April 2, 2014 Minutes, cont.

The MGWA Board meets on the first Wednesday of the month from 11:30 am to 1:00 pm at Fresh Grounds., Café, 1362 West 7th Street, St. Paul, Minnesota. Members are welcome to attend. As appropriate, please forward agenda items to the President a week before the meeting.

2015 fall conference. – Barr spoke with Ross about the current ‘to do’ items in preparation for the conference. Barr suggested that George Veni may be interested in checking out the Rochester, MN conference location while in town for the 2014 spring conference.

White paper topics – committee report. Barr presented the Board with the scoping document to propose ‘Manganese in Minnesota’ as a white paper topic. The Board discussed the scoping document and proposed white paper topic. Mohring motions to proceed with the proposed ‘Manganese in Minnesota’ white paper topic. Motion approved. Barr will send a copy of the white paper topic to Hunt to put on the website by the 2014 spring conference. Barr will present the white paper topic at the 2014 spring conference and call for volunteers for the work group.

New Business: None

Meeting Date: May 7, 2014

Location: Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN
Attendance: Eric Mohring, President; Lanya Ross, President-Elect; Bob Tipping, Past-President; Audrey Van Cleve, Treasurer; Kelton Barr; Ted Ronning; Jeanette Leete; Sean Hunt
Past Minutes Approved
Treasury: Van Cleve provided the Board with copies of the financial report and Spring Conference details. Net income for the period of January 1, 2014 – May 6, 2014 is \$31217; total assets as of May 6, 2014 \$103,435.24. Net income for the Spring Conference as of May 6, 2014 is \$19,234.57.
Newsletter: Ronning provided the Board with a newsletter update, stating that he is ready to turn over the June newsletter to Jenny on the 23rd of May. Ronning asked if the June newsletter should include information about the White Paper Initiative; Barr agreed and suggested a call for volunteers. Tipping suggested including an announcement about the change in County Well Index codes.
Web Page: Hunt reported that the web page has been updated with information about the Spring Conference, the White Paper initiative was posted on the web page before the conference, and miscellaneous employment opportunities are updated as needed.
WRI Report: Leete provided the Business Manager report. All student registrations and non-member sign-ups have been added into the member database with a free year membership to promote member retention. This year’s issue with credit card processing for conference payments has been much higher than in past years. Leete discussed the value of pushing the late payment deadline up two weeks. Tipping discussed the value of beefing up exhibitors to support increased Foundation scholarships. Hunt reported that membership levels are right on track with this time last year.
Old Business: 2014 spring conference. The Board discussed the final details in assembling conference materials for attendees. The Board discussed the speakers for the conference and scheduled times for presentations.
2014 field trip. Barr made a few suggestions for possible field trips. The board discussed a possible reprise of the “Minnesota River Tributaries” field trip that Carrie Jennings led. It was suggested that the field trip be offered as a one day event. Van Cleve presented the Board with a summary of the field trips MGWA offered in the past. Mohring will contact Tipping and discuss the logistics of organizing the field trip.
2015 fall conference. Barr reported that Veni approved the proposed venues. Leete, Hunt, Barr, and Ross agreed to meet May 21 to discuss expectations, volunteer needs, paid staff time, and coordination with NKRI. One critical issue was identified: Veni’s schedule to have August/September registration open with options to sign up for field trips, meeting days, short courses, etc; this would be unlike anything done by MGWA before. Hunt recommends a September 1, 2014 registration opening.



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MGWA BOARD MINUTES

May 7, 2014 Minutes, cont.

White paper topics – committee report. Barr presented the Board with the final draft of the White Paper instructions, which reflects the Board's responses to questions sent out earlier by Bruce. The Board was asked to read it carefully along with the 'Chronology for Preparing a White Paper'. The Board provisionally approved the document, with the expectation that it will be reviewed again after the first White Paper is completed.

Tipping moved to put the Instructions and Chronology on the web page with potential for Board and White Paper Committee review and changes following completion of the first White Paper. The motion was approved.

Hunt verified the documents to be posted to the web page: call for papers application, Chronology, and Instructions.

Hunt moved to post a call for White Paper workgroup members on the web page.

The motion was approved.

New Business:

2014 fall conference. Mohring reported that all the speakers slots for the Fall Conference were already lined up. The Fall Conference title will be 'The Legacy and Future of Superfund'.

Next Meeting:

Wednesday, June 5, 2014

11:30-1:00pm at Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN



Students and Teachers Gearing Up For Earth Science Week 2014

Alexandria, VA – In celebration of Earth Science Week 2014, the American Geosciences Institute (AGI) is sponsoring three national contests honoring this year's theme "Earth's Connected Systems" This year's competitions will feature a photography contest, a visual arts contest, and an essay contest.

Students, geoscientists, and the general public are invited to participate in this year's photography contest, "Connections in My Community." Entries must be composed of original, unpublished material, and show where you observe the dynamic interactions of earth systems in your community.

This year's visual arts contest, "Earth's Connected Systems and Me" is open to students in grades K-5. Scientists study, for example, how water shapes the land, how living things use air, and how air and water act on each other. How do such connected systems affect you? Use artwork to show how land, water, air, and living things are connected in the world around you.

Finally, students in grades 6 through 9 may participate in the essay contest. This year's essays must address the idea of "Earth System Science in Today's World."

Submissions will be judged by a panel of geoscientists on creativity, relevance, and incorporation of the topic at hand. Selected winners will be awarded for their submissions. For details, please visit <http://www.earthsciweek.org/contests/index.html>.

Earth Science Week 2014 will be celebrated October 12-18. To learn more, please visit www.earthsciweek.org. To order your Toolkits, please visit www.earthsciweek.org/materials/index.html. You may also call AGI Publications to place your order at 703-379-2480.

The American Geosciences Institute is a nonprofit federation of 49 geoscientific and professional associations that represents more than 250,000 geologists, geophysicists and other earth scientists.

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